Public Goods and the Fourth Industrial Revolution

Inclusive Models of Finance, Distribution and Production

Edited by Maria Płonka

First published 2023

ISBN: 978-1-032-22899-0 (hbk)
ISBN: 978-1-003-27468-1 (ebk)

4

Health security as a public good in the era of the Fourth Industrial Revolution in Poland

M. Płonka, J. Niżnik, and T. Jedynak

DOI: 10.4324/9781003274681-5

Routledge
Taylor & Francis Group
LONDON AND NEW YORK

4 Health security as a public good in the era of the Fourth Industrial Revolution in Poland

M. Płonka, J. Niżnik, and T. Jedynak

4.1 Chapter overview

The level of socio-economic development, historical and cultural conditions, and the social contract, shape the concept and scope of public goods (Breton 1998; Deneulin and Townsend 2007; Kleer 2015). In a classification discussed in Chapter 2, the subject literature allows for the separation of public goods due to their various features and characteristics. These include: the provision of goods by the public sector (Picciotto 1999; Hausner 2013), collective consumption (Samuelson and Nordhaus 1997; Buchanan 1999), the inability to exclude from their consumption (Gruber 2011), as well as non-market allocation supplemented by the possibility of supplementary market allocation (Owsiak 2017). Most often, however, the division is based on two of their characteristics: ease of exclusion and competition in consumption, allowing the distinction between public goods and private goods (Holcombe 1997; Rosen and Gayer 2010).

Among public goods, a special place is occupied by social goods or socially-desirable goods – *merit goods*. In the case of merit goods, the public nature of their provision results from the needs and preferences of a given community agreeing to their financing from common funds (Musgrave 1959; Sturn 2007; Ott and Cebula 2008). Social goods are perceived as goods due to society as a result of the social policy adopted by the state (Owsiak 2017). These are goods that benefit society as a whole and its individuals. Social goods are produced by the existence of instruments that are in the public domain or have been financed by public funds, and can be both private and public goods (see Chapter 2).

In the context of the content presented in the previous chapters (see Chapters 1 and 3), it must be noted that the megatrends observed today (e.g. digitization, globalization, ageing population and silver economy, neo-urbanization) and the broadly understood Fourth Industrial Revolution (REV4.0) phenomenon are influencing transformations in the sphere of public goods. On the one hand, the changes taking place affect the ways in which goods traditionally considered public are produced, financed and distributed. On the other hand, these changes affect the emergence of new needs, for which new goods with public characteristics are created.

DOI: 10.4324/9781003274681-5

One of the basic needs is health and health security. Ensuring health security is the basis of national health programmes, but the Covid-19 pandemic has shown the global dimension of health security as Humanity's need and the new possibilities for its implementation resulting from REV4.0.

4.2 The need for security as a basic human need

Among the many human needs, regardless of the changing reality, the need for security is crucial. Security is a situation characterized by the lack of risk of losing something that a person particularly values/considers important, e.g. health, work, respect, feelings and material goods. It is a value necessary for human life and development (Barnaszewski 2005), triggering his activity and enabling self-realization.

Security is not only a basic need of every human being, but also of social groups. In this context, it was defined by Maslow (1954) and included – after satisfying physiological needs – to the group of primary human needs, conditioning the achievement of higher-order needs. Among the needs of security, Maslow included: protection from physical and mental harm, no fear of losing a job, no fear for oneself and loved ones, stability, care, freedom from fear and chaos, the need for order and law. From Maslow's critique of the theory of needs, the ERG (Existence, Relatedness, Growth) theory was born. Its creator, Alderfer (1969), hierarchized the needs by distinguishing, among others, the needs of existence, to which, in addition to physiological needs, he included the need for security. Unlike Maslow, according to Alderfer, human actions can be induced at the same time by several categories of needs, and man can satisfy the needs of a higher order without satisfying the needs of a lower order. Maslow's theory is referred to by the theory of F. Herzberg (Herzberg et al. 2017), which distinguishes only two categories of needs: hygiene and motivation. The former includes the need for security. The theory of needs was transferred to the theory of culture that linked human nature with his products in the form of culture by Malinowski (1944). According to him, humans have a number of innate predispositions (basic needs, among them the need for security), on which culture is built. It contains the conditions necessary for the survival of human communities.

Unlike other human needs, the need for security is not fully achievable. The process of providing it is continuous and, with the change of environment, living conditions, social development, the concept of security expands and new categories of security appear, such as cybersecurity, ecological security, educational security, etc.

Security has a personal dimension. Perceived through the prism of a single individual or social group, it is a need. Often realized security threats (or risks) cause the appearance of damage. And these can be satisfied by certain public or private goods. An illustrative catalogue of the most important contemporary social risks, together with the corresponding public goods and private goods, will be complicated by Table 4.1.

Table 4.1 Social risks and public and private goods

Social risks	*Public good*	*Private good*
Permanent or temporary inability to work and self-support (e.g. illness, disability)	Sickness insurance, disability insurance	Private life insurance, private health insurance
Inability to work after reaching retirement age	Pension insurance, care insurance, social assistance benefits	Private pension insurance, pension funds, individual retirement accounts, reverse mortgage, alternative methods
Inability to meet basic needs on their own (independence in old age)	Care services (palliative care, nursing care), social assistance benefits,	Care insurance
Death of the breadwinner	Disability insurance, social assistance allowance	Private life insurance
Accident at work or occupational disease	Sickness insurance, disability insurance	Private life insurance
No job/job loss	Unemployment insurance, social assistance allowance	Financial security buffer
Motherhood and parenthood	Maternity allowance, child benefit	Insurance with option for the birth of a child, dowry insurance
Family income deprivation (poverty)	Social assistance allowance	
The need to cover the costs of treatment and healthcare	Health insurance	Private health insurance, subscriptions
Negative consequences of stress and mental tension	Health insurance, psychiatric care, social assistance benefit, disability insurance	Private health insurance
Inability to reconcile professional work with family obligations	Care allowances, teleworking	Private nursery, kindergarten, nanny
Failure to adapt professional qualifications to the changing labor market	Education, studies, professional development courses	Private education
Lack of ability to use new technologies	Education	Private education
Cyber risk	Cybersecurity, education, legal system, patent system (security), procedures	Private education, private financing of security services (anti-burglary, anti-virus programmes)
Pollution	Legal system (global, national), education, fire brigade services, water and air quality standards, pollutant emission regulations	Replacement of technical equipment, waste segregation

(*Continued*)

Table 4.1 (Continued)

Social risks	*Public good*	*Private good*
Lack of support from family and loved ones and loneliness	Social inclusion programmes, psychiatric care (therapies), social assistance benefits	Private therapy, activation activities organized by NGOs
Wrong consumer decisions	Education, legislation, institutions of ombudsman, consumer ombudsman	Education

Source: own study.

The information presented in Table 4.1 indicates that the needs arising from the implementation of social risks are primarily met by public goods. This is because modern states with a certain level of development create legal and financial conditions to ensure the stabilization and development of societies. Of course, the level of satisfaction of needs or the standard of public services may be insufficient, hence the need to supplement and sometimes replace public goods with private goods.

Basic needs are autonomous, independent of consciousness (e.g. physiological needs). Most needs, especially of a higher order, appear as a result of awareness of their feeling and the possibility of satisfying them, i.e. knowledge, skills, attitudes and behaviours related to its satisfaction (Cycoń et al. 2020).

If the need for security is met, awareness means:

- Knowledge of rights and obligations, allowing the perception of threats, knowledge of the institutions that can provide this knowledge,
- Ability to assess the potential danger and its consequences,
- Attitudes towards danger (passive, active),
- Behaviours that minimize the potential threat.

Awareness of the need for security occurs when it is threatened in the subjective sense of citizens by various types of events. Security awareness can be shaped at the individual, social, national, or global level. New threats resulting from megatrends and REV4.0 do not immediately cause an increase in awareness, violating the sense of security in the common dimension (cybersecurity, ecosecurity). Therefore, various stakeholders (entities) of local, national and global scope are involved in shaping public awareness. The relationship between these needs, risks and goods is shown in Figure 4.1.

On the basis of security theory, in terms of this subject, we can define social security and universal security. The concept of social security was introduced into subject literature by Rubinow (1934), who identified this term with the actions of the state resulting from threats in the form of accidents, diseases, old age and unemployment. Sen (1999) outlined a very broad definition of social

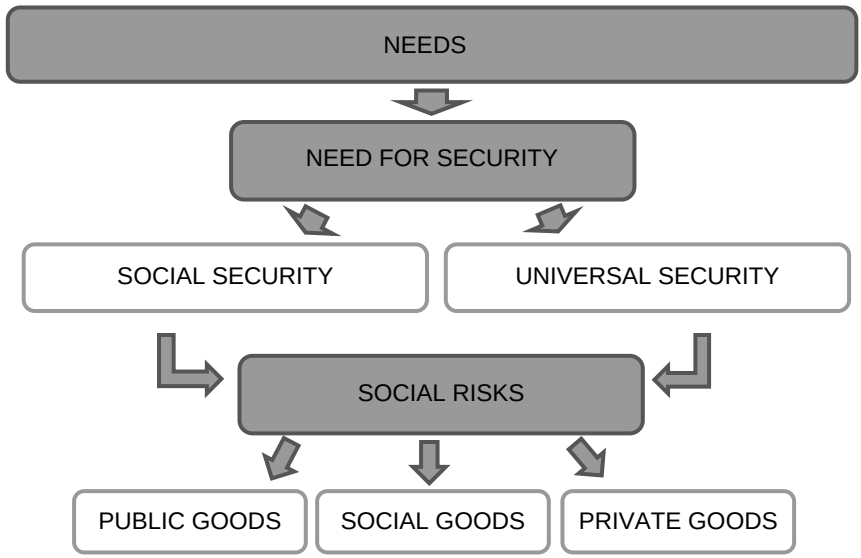

Figure 4.1 Needs and security and social risks and public, social and private goods.
Source: own study.

security, which is related to state policies promoting and protecting the standard of living. Drèze and Sen (1991) distinguished between two aspects of social security, which they define as the use of social measures to prevent deprivation (promoting the standard of living) and vulnerability to deprivation (protection against a decline in the standard of living). Social security is most often understood as the survival, prosperity and sustainable development of society, thus the classic categories of social risks can be included in this category.

There is no single definition of universal security. It is most often assumed that it is a security field dealing with the organization of the protection of human life and health, as well as material and cultural goods and the natural environment to the extent necessary for the survival of Humanity/citizens (Gromek 2010). Universal security includes ecology, education, economy and cybersecurity.

As previously mentioned, the security risk associated with the implementation of specific risks gives the opportunity to deal with the damage caused by means of specific public goods or private goods.

4.3 The role of the state in ensuring the need for security

4.3.1 Research methodology

Due to the particular importance of security as a need, this issue was the subject of empirical research carried out by the authors as part of the project

Socio-economic consequences of the Fourth Industrial Revolution. The aim of this study was to determine the socio-economic consequences of REV4.0 in the area of production and distribution of traditional and modern social goods. The respondents were surveyed on significant problems related to the protection of key social goods: traditional goods (social security) with particular emphasis on the right to health protection and to the protection of old age and new goods (universal security), which are a consequence of REV4.0 (work-life balance, mental well-being, cybersecurity, environmental protection and transparency of information understood as minimization of the influence of anti-social goods).

The research objectives set in the survey were as follows:

1 Perception of the state's responsibility to protect citizens from traditional and new risks.
2 The hierarchy of importance of support for selected public goods by the state and other institutions.
3 Evaluation of the state's activities in the area of healthcare and the social welfare system.
4 The impact of the Covid-19 pandemic on the perception of changes in ensuring health security in the future.

The study put forward the following research hypotheses:

H1 Respondents see the key role of the state in providing social goods compared to other entities.
H2 Respondents rate as important the state's actions in providing social goods.
H3 Respondents positively assess the state's actions in the field of providing social goods.

The survey was conducted among residents of Poland in the period from 01.10.2020 to 31.10.2020, and utilized the CAWI (Computer Assisted Web Interview) technique. The Polish Medical Association was responsible for carrying out the survey, which is a non-public organization dealing with stimulating the flow of knowledge, technology transfer as well as building and implementing mechanisms of coordinated medical care, telecare and telemedicine. The survey included descriptive (metric) characteristics of respondents, such as: age, gender, education, number of children, socio-professional status, place of residence, income on hand per person and self-assessment of health status. In total, 808 complete answers were obtained in the study, which formed the basis for the implementation of research goals and hypothesis verification.

4.3.2 The role of the state in providing social goods

Ensuring the security of citizens by the state is a fundamental function of the state and a fundamental public good, regulated autonomously in each country.

This function is connected with building such a reality and awareness of citizens, in which not only the state, but the citizen himself and other institutions co-create a sense of security, treated as a common good. The co-responsibility of other institutions for ensuring security may be complementary or supplementary; it may take place in the form of market and non-market allocation, taking the form of public, private and mixed goods, depending on the axio-normative system, economic and cultural conditions. The state and other institutions, in the exercise of their function, are subject to change, and the role of the state in providing this and other basic goods evolves not only as a result of the pressure of citizens, but also as a result of the influence of global megatrends. Megatrends are also changing the perception of the state's function in ensuring an adequate volume of public goods, as well as the ways in which they are delivered. The results of the objective 1 and H1 verification tests are presented in Table 4.2.

The answers given by the respondents to the question about the responsibility for protecting citizens against the indicated types of risks made it possible to positively verify the hypothesis that respondents perceive the key role of the state in providing social goods (H1).

According to the respondents, the protection of social (public) goods allowing for minimization or compensation of damage resulting from the implementation of the indicated social risks should be the domain of the state. In this manner, on average, about 67% of respondents answered all the questions asked in the field of social security (questions1–12). The average response indicating the state as the responsible entity was around 74.7%. In the case of universal security (questions 13–17), on average, 63.8% of respondents gave such answers. Respondent perception of individual social risks in the context of state responsibility varies. According to them, the state should undoubtedly be responsible for environmental security and cyber security (93.07% and 84.53% of responses, respectively), while the state should at least secure the negative effects of the implementation of risks related to the death of the breadwinner, accident at work or its loss (about 50%).

At the same time, the research shows that respondents feel little responsibility for the negative effects of the implementation of the indicated social risks (in approximately 12.9%). The distinction between social security and universal security does not bring significant differences in respondent perception of citizen responsibility, and amounts to 12.3% and 13.1%, respectively. Interestingly, in most cases (questions 2–5, 7–8, 10–11, 16 and 17), respondents do not think that citizens should in any way protect themselves against the indicated types of risks. Only the possibility of losing a job and permanent inability to work as well as the negative consequences of stress and mental tension remain within the protection of individual individuals (that is considered by 51.36%, 42.45% and 46.91%, respectively).

The responsibility of other entities to protect citizens against the indicated risks is perceived in different ways. According to the respondents, the protection against the effects of the surveyed risks should be the least appropriate

Table 4.2 Responsibility of individual entities for protecting citizens against the indicated risks (%)

Nr	*Social risks*	*Citizen independently*	*Family, loved ones*	*Charities, associations, churches*	*Private institutions, business*	*State*
Social security						
1.	Permanent or temporary inability to work and self-support (e.g. illness, disability)	42,45	0,00	33,42	45,17	78,22
2.	Inability to work after reaching retirement age	0,00	27,23	45,05	42,95	63,37
3.	Inability to meet basic needs on their own (independence in old age)	0,00	32,18	52,72	16,96	81,68
4.	Death of the breadwinner	0,00	43,81	61,26	16,96	50,12
5.	Accident at work or occupational disease	0,00	16,09	44,80	58,66	50,12
6.	No job/job loss	51,36	53,22	16,83	37,38	50,50
7.	Motherhood and parenthood	0,00	16,09	44,55	40,97	67,08
8.	Family income deprivation (poverty)	0,00	0,00	66,71	47,40	55,82
9.	Negative consequences of stress and mental tension	46,91	26,98	33,42	33,79	67,08
10.	Inability to reconcile professional work with family obligations	0,00	34,78	49,01	58,79	64,85
11.	Failure to adapt professional qualifications to the changing labor market	0,00	26,98	33,42	37,87	70,30
12.	Lack of support from family and loved ones and loneliness	16,58	15,59	52,10	65,72	64,23
Universal safety						
13.	The need to cover the costs of treatment and healthcare	16,34	36,14	33,42	58,54	62,87
14.	Lack of ability to use new technologies	20,79	16,09	16,83	52,10	68,19

(*Continued*)

Table 4.2 (Continued)

Nr	*Social risks*	*Citizen independently*	*Family, loved ones*	*Charities, associations, churches*	*Private institutions, business*	*State*
15.	Cyber risk	24,50	16,09	16,83	49,13	84,53
16.	Pollution	0,00	0,00	51,11	32,80	93,07
17.	Wrong consumer decisions	0,00	23,89	63,61	64,60	66,83

Source: own study.

from families and loved ones (on average in 19.6%), to a greater extent charities, associations and churches (42.1% respectively) as well as private institutions and business (44.7% respectively). Protection against the effects of certain social risks in relation to family and relatives included in the context of social security and general security does not differ significantly, because only by 2.4%. Significant discrepancies in this respect occur in the case of other entities. On average in 44.4% respondents believe that in the field of social security, charities, associations and churches should be responsible for the negative effects of the implementation of social risks, while 41.9% believe that private institutions and business. In the case of universal security, these institutions should protect citizens against the effects of the indicated risks in 36.3% and 51.4%, respectively.

The presented results and research related to Objective 1 indicate that respondent expectations regarding responsibility for securing basic security needs are high towards the state and relatively low towards citizens.

4.3.3 Hierarchy of importance of support for selected social goods by the state and other institutions

Subsequent research objectives and research hypotheses were verified on the basis of answers to the question regarding the validity of support by public institutions to protect citizens against the indicated effects of risks (Objective 2, H2) and the question of assessing the state's activities in this area (Objective 3, H3). Respondents gave answers to both questions on a five-point Likert scale, which was assigned the appropriate numerical values. The assessment of the validity of support included a scale: 1 – unimportant, 2 – not important, 3 – medium important, 4 – important and 5 – very important, and the question about the assessment of state actions was considered on the scale: 1 – very bad, 2 – bad, 3 – average, 4 – good and 5 – very good. To aggregate the results, the arithmetic mean response values were calculated. Then, the figures obtained in this way were applied to the coordinate system, on which the values on the horizontal axis represent the aggregate value of the answer to the question concerning the provision of a given good, and on the horizontal axis, the

assessment of the state's activities in its area. The combination of both criteria creates perception maps for social security (Figure 4.2) and for universal safety (Figure 4.3), which synthetically summarize the research carried out.

In pursuing Goal 2, for the vast majority of respondents, the role of the state in providing citizens with key social goods, both traditional and new, is very important or rather important, because for all the risks surveyed, this value amounted to an average of 3.8. Taking into account the view of these risks from the point of view of social security and public safety, the results are similar and slightly deviate from the average by 0.06p.p. and 0.14p.p., respectively. In a similar spirit, the vast majority of respondents assessed the role of the state in providing citizens with key social goods as important or rather important. However, in this case, the rating was lower and averaged 3.09. The division of risks from the point of view of social security and public safety did not show significant differences, deviations from the average amounted to 0.01p.p. and 0.02p.p., respectively.

The average deviation between the validity of support by public institutions to protect citizens against the effects of the implementation of the indicated risks and the assessment of state actions in this area is 0.71. Looking at the presented results in the context of individual risks differs slightly from the average results. According to the respondents, the biggest differences concern the inability to meet basic needs on their own (1.37) and job loss (1.16). To the least extent, the expectations resulting from the importance of state support in the implementation of these risks differ from the assessment of the activities of public institutions in the case of a shortage of income in the family (0.16)

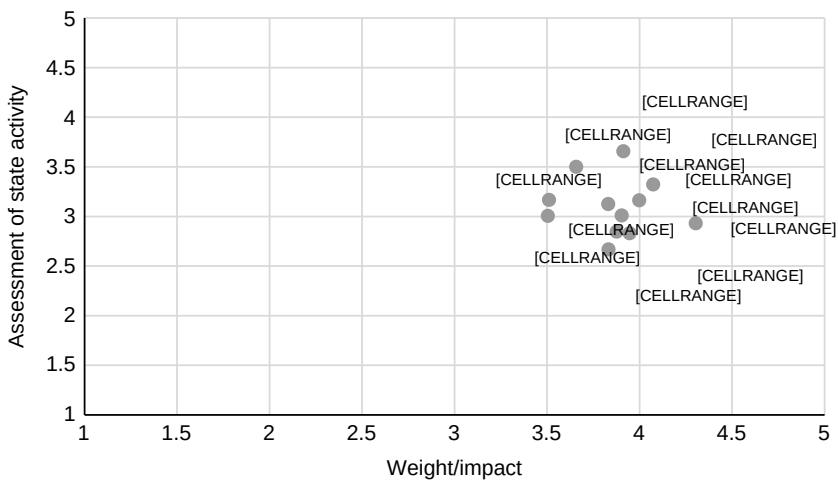

Figure 4.2 Validity and evaluation of state social security activities.

Source: own study.

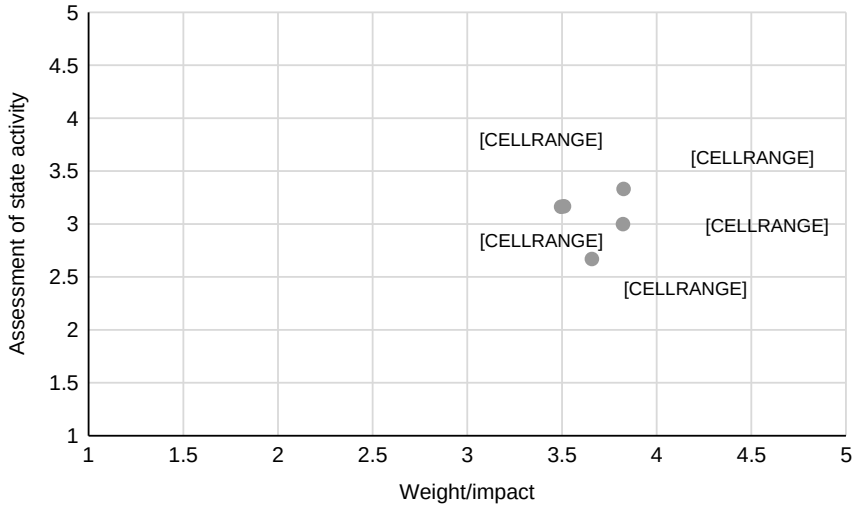

Figure 4.3 Validity and evaluation of state activities in the field of public security.
Source: own study.

and the inability to reconcile professional work with obligations towards the family (0.25).

Respondents considered that to the greatest extent the state should support activities aimed at helping people who are not able to meet their own basic needs (dependent in old age), unable to work after reaching the age of retirement and those with qualifications not adapted to the changing labor market (weighting of approx. 4.1).

As part of the implementation of objective 3, the best assessed were state actions giving the opportunity to reconcile professional work with family obligations (3.66) as well as support in the event of a lack of income in the family (poverty – 3.5).

According to the respondents, the least need for support from public institutions have citizens who suffer damage related to the implementation of risks related to motherhood and parenthood, the need to cover healthcare costs and cybersecurity (3,5). They assess the state's actions in the situation of job loss and providing support in making consumer decisions the worst (2.67).

Summarizing the results of the analysis carried out in this part of the study, it was found that the obtained results provide the prerequisites for establishing the validity of the hypotheses: H2 and H3. That is, it is true to say that respondents assess the state's actions in the provision of social goods as important. Moreover, in the light of the research carried out, it can also be concluded that the respondents have a positive opinion of the state's activities in the provision of social goods.

4.4 Universal healthcare and the need for health security

In the light of the theory of public goods, health security can be classified as social goods (merit goods). The main value provided to society is health. Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity (Constitution of WHO 1948, 2006, Preamble). The enjoyment of the highest attainable standard of health is one of the fundamental rights of every human being without distinction of race, religion, political belief, economic, or social condition. By definition, it follows that health is one of the personal and social values and ensuring health security is a key function and goal of the state and even global organizations, which is exemplified by the Covid-19 pandemic of 2020 and 2021.

Although health is in principle a private good, health security is already an element of public social policy at the level of the state, region or global community. The need for health security is coordinated and realized by the state through UHC, a social good understood as a guarantee of meeting the specific health needs of citizens within the framework of the adopted health policy (national health policy or strategy) (Figure 4.4).

National health policy or strategy is embedded in specific conditions, shaped by the global megatrends described in Chapter 1, available resources, and political consensus (Table 4.3).

An important element of health security policy is to ensure the resilience of UHC to anticipated changes in the distribution of risk (e.g. aging of the population, disease trends) and unforeseen shocks (e.g. pandemics). Such resilience is understood as the ability of the system to predict, absorb and adapt to future structural changes, determined by civilization megatrends and incidental events (e.g. Covid-19) in order to minimize the impact of these factors on the level of UHC. Experts from the EU Expert Group on HSPA (2020) expressed themselves in a similar spirit.

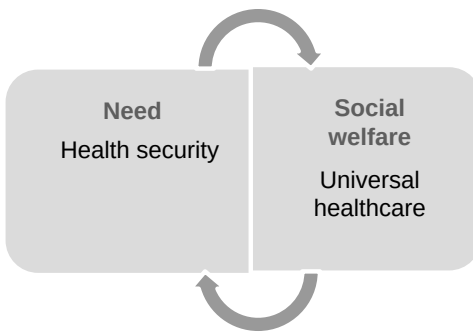

Figure 4.4 Health security and universal healthcare.

Source: own study.

Table 4.3 Determinants of universal healthcare

Conditions	*Details and examples*
Socio-economic	Demographic factors (e.g. population size indicators, age pyramid of society, further life expectancy)
	Factors related to the general health of the society, the living conditions of society
	Economic factors (e.g. GDP per capita, level of economic inequality, public spending on UHC)
Cultural	Traditions and habits
	Health needs
	Society's expectations of the state
	The level of public trust in the state and health policy
Political	Consensus on the UHC financing system
	Adopted co-payment model
	Adopted scope of UHC, in the form of a basket of guaranteed health services
	The adopted model of public-private partnership in providing UHC
	Regulations regarding the recording, reporting and control of expenditure on UHC
	Regulations on the protection of patients' rights
Technological	Factors related to the use of new technologies (e.g. teleadvice, remote monitoring of patient health, artificial intelligence, medical robots)
Organizational	Available material and technical infrastructure
	Available human resources
	Incentive system
	Education and the education system
	Organization of the UHC network
	Monitoring of activities and progress
	Control of the implementation of activities and effectiveness
	Anticipation of health risks
	Development of shock resistance methods

Source: own study.

Ensuring the need for health security is provided by the Healthcare System (HCS), which is an ordered set of elements forming a coherent and organized whole, aimed at ensuring health security. HCS operates in an operational environment: market, non-market (horizontal links) and in a regulatory environment (vertical links). The horizontal entry of HCS is: health needs and the financing of these needs, the exit is: UHC level and health security. The vertical input of HCS is: regulations related to health policy, the exit is efficiency. The internal structure of HCS is formed by the organization and management of healthcare and the distribution of health services. The HCS frame diagram is shown in Figure 4.5.

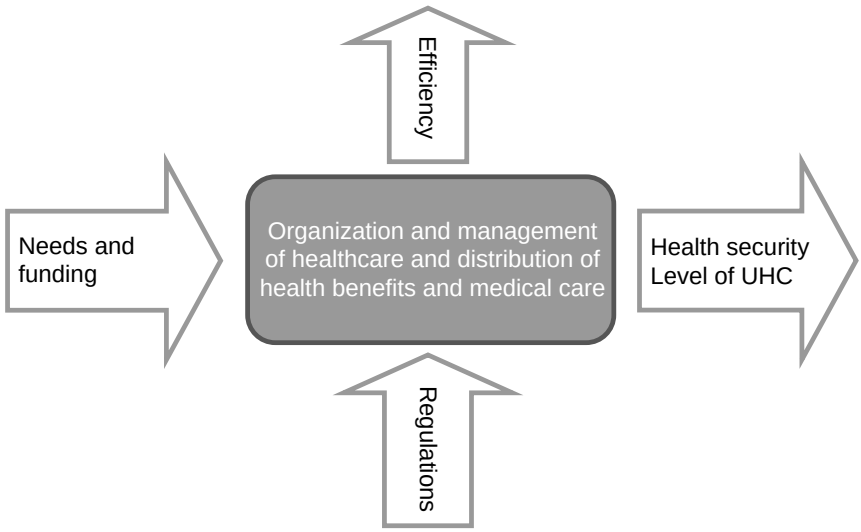

Figure 4.5 Healthcare system (HCS) – structure and connections with the environment. Source: own study.

4.4.1 Health security and level of UHC

The aim of the state's health policy is to ensure a level of healthcare and health security (output) adequate to the expectations of society and financial capabilities (input). State policy in this area is also shaped by the global megatrends of modern civilization, in particular globalization, demographic changes, digitization and additionally the Covid-19 pandemic, which has become a catalyst for change. In this context, health security policy is implemented at the global, national and individual levels.

At a global level, the objective of the WHO "shall be the attainment by all peoples of the highest possible level of health" (Constitution of WHO 1948, Article 1). Among the 22 defined functions of the WHO an important one is "to assist Governments, upon request, in strengthening health services" (Article 2c).

At the national level, the basic task of the state is to ensure equal access to health services by creating conditions for the functioning of HCS, analyzing and assessing health needs and factors causing their changes, health promotion, prevention and creating conditions conducive to health, financing services on the principles set out in national legal regulations.

At the individual level, the perception of one's own health security is less formalized and varied depending on the location of health in the individual hierarchy of values, psychobiological characteristics, propensity for risk, individual foresight and thriftiness.

Health security is a qualitative category, perceived individually, difficult to quantify. One of the most important factors related to security is trust, understood as the perception of the actual state in relation to social expectations towards the state and its institutions.

The UHC level is also a qualitative category, but attempts are being made to quantify it effectively. One of the UHC level measures may be the Euro Health Consumer Index (EHCI), annually monitored by the Health Consumer Powerhouse synthetic index, the maximum value of which is 1000 points. It takes into account the following factors: patient rights and information, accessibility, waiting times for treatment, outcomes, range and reach of services provided, prevention and pharmaceuticals (EHCI 2019). This indicator is calculated for European countries and can be the subject of comparative tests in these countries.

4.4.2 Health needs and how the state meets them

Health as a human need is revealed in the absence of actual illness or the feeling of this lack. Therefore, health needs are objective and subjective. This need can be met on its own or through the use of public or private healthcare services. From the point of view of the state, satisfying health needs realized as a public good is the result of a consensus between social expectations and opportunities.

Within the framework of the public healthcare system, under conditions of certain budgetary possibilities, the distribution of health services is the result of political decisions. The basic tool for the distribution of services is a basket of guaranteed health services. The basket of guaranteed health services is defined as a set of guaranteed benefits (in Poland, these are defined in the Law of 2004, Article 5(35)), which is a healthcare service financed in full or co-financed from public funds on the terms and to the extent specified by law. The scope of benefits from the public system depends not only on the financial capabilities of the state, but also on the way the basket is defined. Two possible solutions in this regard are presented in Table 4.4.

Table 4.4 Two models of building a basket of guaranteed health benefits

Model	*Scope of services*	*Selection transparency procedures*
Positive	List of defined benefits financed under public HCS	Required recommendation of the Health Technology Assessment in reimbursement decisions, based on optimization analyses of costs and effects of the service or procedure and health policy priorities.
Negative	List of defined benefits excluded from public HCS funding	

Source: own study.

The negative basket covers a wider range of benefits than the positive basket. It is not possible to meet all health needs within the UHC, so in each country the public healthcare system is supplemented by a non-public model of the market (open health insurance, employee health insurance, out of pocket financing – OOP).

4.4.3 Funding and efficiency

The way healthcare is funded is culturally rooted and stems from political decisions. The internal structure of the system and its inter-relations with the environment are complicated and multi-faceted, but all public healthcare systems face a similar problem: what organizational and technical framework should be used for the purpose of specific measures in order to create an effective healthcare system? (see: Płonka 2019). In any case, the benefits of providing socially desirable goods should be evaluated against the costs of that supply, in the framework of an input-effect relationship. The state, having a specific fund, must decide how to allocate it optimally in order to achieve the best possible level of healthcare.

The main models of financing healthcare in the world assume basic financing from public sources and complementary financing from private sources. Most of the existing models are mixed models. Table 4.5 shows their characteristics arranged in ascending order according to the criterion of State responsibility for the financing of HCS.

The next stage in the operationalization of the distribution of public health services is the way they are financed or reimbursed to health service providers. Methods of financing services from the public UHC system may be prospective, on the basis of planned benefits (money flowing *ahead of the patient*) or retrospective, based on the number of services actually performed (money flowing *after the patient*). The main types of relationships between system entities are presented in Table 4.6.

Table 4.5 Main HCS public funding models and examples of countries where they are used

Model	*The main way to finance HCS*	*Countries*
Market (residual)	Voluntary health insurance funded directly by citizens	United States
Bismarck	Compulsory, universal social security	Poland, Austria, Germany, France, Switzerland, Benelux
Beveridge	State budget and local government budgets	United Kingdom, Denmark, Ireland, Iceland, Norway, Sweden, Finland

Source: own study based on: Niżnik, 2004, pp. 64–66.

Table 4.6 Types of benefit financing relationships

Relationship type	*Method of implementation*
Per capita	Fixed remuneration paid to healthcare providers at a fixed rate for each patient enrolled in a general practitioner, in hospitals based on estimated projections of the number of services provided
Per case mix	The method based on the so-called DRG system, i.e. Diagnosis Related Groups (uniform patient groups), consists in classifying patients and assigning them to specific groups related to diseases and procedures related to the treatment of these diseases. It is currently considered the most effective and is used by more and more European Union countries.
Fee for service	Healthcare provider's fee for the service rendered (e.g. number of man-days for hospitalization)
Out of pocket (OOP)	Direct expenditure of the patient on treatment in the form of: • Expenses payable by the patient in 100% • Shared payment: co-payment (a certain amount) or co-insurance (a certain % of the cost of the benefit) • Expenditure reimbursed by the insurance scheme (e.g. the French model)

Source: own study based on: Rudawska 2007.

The services and procedures offered by the public system are not sufficient, so in developed countries there is a model of additional, public-private healthcare systems, which can be complementary (complementary to the public system) or supplementary (additional, applied independently of the public system). In general, the narrow scope of the basket implies the development of complementary benefits (e.g. the system of compulsory health insurance in France). The relatively wide range of the basket implies the development of supplementary benefits: private health insurance: individual or group, employee or open on the market, or direct patient expenses (e.g. Poland). There is no conclusive evidence of the effectiveness of a particular system, rather it is determined by cultural conditions and social acceptance.

4.4.4 Regulations

HCS regulations can be global, national and local (Table 4.7).

The HCS regulatory system aims to implement the principles of:

- Budgetary balance of financing (contributions) and health services,
- Proportionality of contributions and benefits,
- Social solidarity.

Table 4.7 HCS regulations at the global, national and local levels

Level	*Examples of regulations*
Global	Global standards (e.g. EBM, HTA), legal regulations, medical procedures (e.g. fight against the Covid-19 pandemic)
Domestic	National health programmes, national legal regulations, standards, procedures and decisions regarding the financing and distribution of goods, medical procedures and the participation of entities participating in their distribution.
Local	Local government health programmes, employee health programmes, open consumer groups

Source: own study.

The principle of budgetary balance (balance between budget revenues from contributions and expenditure on healthcare) is fundamental to the sustainability of the public finance system. However, this principle is rarely implemented. For example, in Poland, revenues from health insurance premiums do not fully cover all expenses for healthcare, hence the system is additionally financed from the budget in the amount set annually by the Polish Parliament.

The principle of proportionality of contributions and benefits in the public HCS system is generally not implemented but it is replaced by the principle of social solidarity enshrined in legal acts (e.g. Polish Constitution from 1997). However, it occurs in the additional, private health insurance system and in the case of OOP financing.

The principle of social solidarity is a key principle applied in the healthcare systems of developed countries. It consists in the fact that the general contribution to health insurance (Bismarck model) or tax (Beveridge model) is paid by all citizens obliged to do so, depending on the amount of wages, while healthcare guaranteed by the state according to the same basket of benefits covers all citizens of the country, regardless of whether and in what amount they pay public tribute.

These regulations mean that in the public HCS system, the basic form of benefit allocation is a redistributive (non-market) allocation, in which the citizen has the right to benefits as needed within a given basket of benefits for which s/he does not pay or pays public tribute, while market allocation takes place in the case of supplementary private benefits, provided independently of public benefits.

4.4.5 Organization and management

The internal structure of HCS consists of public and private entities (stakeholders) and the organization of all human, material, intangible, technological resources that serve to ensure the health security of society. This requires the state to create a policy framework for efficient governance and supervision, ensuring the effectiveness of the system.

The healthcare system is defined by three main categories of stakeholders who interact and interact with each other:

- State (organizations and government agencies at central and sub-level),
- Health service providers (public, private, non-profit, care networks or services),
- Citizens (individuals, civil society organizations).

Special types of stakeholders are civil society communities, which can be divided into:

- Formal communities: global (e.g. WHO) international, national and local,
- Informal communities: support groups, a circle of relatives,
- Biological communities: family, relatives.

Managing HCS requires the state to develop the ability to modify the social, environmental and economic determinants of healthcare and resilience to shocks.

4.5 The fourth industrial revolution and health security

Opportunities to improve health security are provided by new technologies resulting from REV4.0. Already in 1998, a WHO Executive Board report (WHO 1998, p. 1) stated that: "on the threshold of the new millennium the world health community faces exceptional challenges and opportunities in a rapidly changing world, with the *double burden* of old and new diseases falling most heavily on the developing countries. Since recent advances in information and communications technology may offer considerable and practical opportunities for global health improvement." In this context, the term *health telematics* appeared, defined as a composite term for health-related activities, services and systems carried out over a distance by means of information and communication technologies, for the purposes of global health promotion, disease control and healthcare, as well as education, management and research for health.

The WHO report presents key legal, political, ethical, information access rights, technical, administrative, human and cultural factors related to the problem. It outlines the strategic elements of the proposed policy as a *window of opportunity* (see: Table 4.7), with particular attention paid to the needs and capacities of developing countries; the elements include awareness and promotion, capacity-building, standards, regulation, quality of service, cost-benefit analysis, partnerships, financing and evaluation. WHO uses the term eHealth as follows: "eHealth is the cost-effective and secure use of ICT (Information Communication Technologies) in support of health and health-related fields, including healthcare services, health surveillance, health literature, and health education, knowledge and research" (WHO 2016, p. 5). The Global Health Observatory (GHO 2016) used a similar term *teleHealth* – the delivery of healthcare services, where patients and providers are separated by

distance. Telehealth uses ICT for the exchange of information for the diagnosis and treatment of diseases and injuries, research and evaluation, and for the continuing education of health professionals. Telehealth can contribute to achieving universal health coverage by improving access for patients to quality, cost-effective, health services wherever they may be. It is particularly valuable for those in remote areas, vulnerable groups and ageing populations. The World Health Assembly in 2018 acknowledged the potential of digital technologies to play a major role in improving public health, where delegates agreed on a resolution on digital health. The resolution urges Member States to prioritize the development and greater use of digital technologies in health as a means of promoting Universal Health Coverage and advancing the Sustainable Development Goals (WHA 2018).

In 2006, most EU countries developed national strategies for eHealth with the use of information and communication technologies (ICT). In 2012, the European Parliament's Commission in its document: eHealth Action Plan 2012–2020 (CEP 2012) in the development of e-Health saw significant development potential, stating that the use of information and communication technologies in the field of health and in healthcare systems can increase their efficiency, improve the quality of life and provide an impulse for innovation in health-related markets. In 2015, the WHO (2015) created an Atlas of eHealth, which presents data collected on 125 WHO Member States. In the report (GHO 2016), remote patient monitoring was at the highest level in European countries and amounted to 70%, while in the rest of the world this percentage was no higher than 40%.

The research by Liu et al. (2015) identified key technology attributes that can be used to assess the importance of cloud technology and determine whether migration from traditional technology to cloud environment is justified. A system fitness check template was provided (AlDossary et al. 2017). The main barriers to the implementation of telehealth were said to be a lack of funding to develop and support telehealth programmes, a lack of infrastructure (equipment and/or connectivity), competing health system priorities and a lack of legislation or regulations covering telehealth programmes. A two-channel (online and offline) healthcare system has been shown to be more flexible than a traditional outpatient system, but studies have shown that medical facilities should not provide telemedicine services in some situations (Wang et al. 2019).

In terms of methods of providing services, telemedicine can be divided into three streams (Wang et al. 2019):

1 *Store and forward* (acquisition and storage of medical data, e.g. medical images, biosignals and their remote transmission to a doctor).
2 Remotely monitor patients using wearable devices, digital video.
3 Real-time interactive services (patients and doctors can communicate via video conferencing, with the help of tele-specialists).

In this context, selected windows of opportunity of eHealth development according to the WHO methodology are presented in Table 4.8.

Table 4.8 Selected windows of opportunity for e-health development according to the WHO methodology

Area	*Windows of opportunity*
Store and forward –eHealth foundations	National universal health coverage policy or strategy
	National eHealth policy or strategy
	National health information system (HIS) policy or strategy
	Government-supported Internet sites in multiple languages
	Health research
Store and forward – legal frameworks for eHealth	Liability or reimbursement of eHealth services
	Patient safety and protects the privacy of personally identifiable data
	Protects the privacy of individuals' health-related data held in electronic
	format in an Electronic health records (HER)
	Governs the sharing of digital data, personal and health data
	Governs civil registration and vital statistics
	Governs national identification management systems
Store and forward –information systems integrationElectronic health records (EHR)	National EHR system
	Legislation governing the use of the national EHR system
	Health facilities with EHR
	Other electronic systems and information systems
	PACS (Picture archiving and communication system)
	ICT(Information and communications technology) assisted functions
	Electronic medical billing systems
	Supply chain management information systems
	Human resources for health information systems
	Collecting health information (open source vs sensitive data protection)
Store and forward –safety, big data	Governing the use of big data in the health sector
	Governing the use of big data by private companies
Remote patient monitoring	Teleconsultation, Videoconsultation
	Remote patient monitoring
	Remote operations

(*Continued*)

Table 4.8 (Continued)

Area	*Windows of opportunity*
	Contact tracing, mobile applications, mobile apps as a complement to manual contact tracing
	Management of health services
Real-time interactive services –health education	The scope of application of e-learning in the education of health professionals
	Health education (tele-education) of the society
	Training of medical staff
Real-time interactive services – applications managing the individual patient path	Toll-free emergency
	Health call centres
	Appointment reminders
	Management of disasters and emergencies
	Treatment adherence
	Accessing/providing health information
	Community mobilization
	Access to information, databases and tools
	Patient records
	Decision support systems
	Health surveys
	Disease surveillance
Real-time interactive services – communication	Use of social media in the health strategy, promotion campaigns
	Management of patient appointments
	Feedback on the health services, emergency announcements, learning about health issues, helping decide what health services to use

Source: own study and WHO 2015.

The integrated digitization of HCS will increase information transparency, optimize the use of human and financial resources in healthcare and improve long-term access to services and develop a patient-centred system. Access to information in on-line time, accelerate the implementation of services and reduce the scope and number of unnecessary medical services and processes, which will increase the effectiveness of HCS. However, it becomes an implementation challenge and a problem in the case of the older, non-digital part of patients (the *before computers* generation), who most often use medical services. In 2019, around 27% of individuals aged 16–74 years old did not use mobile devices to access the internet in the EU, going up to 51% among individuals aged 55–74 and only six European countries (Austria, Denmark, Estonia, Finland, Slovak Republic and the United Kingdom), have high technical and operational readiness to generate information from EHRs (Colombo et al. 2020).

The Covid-19 pandemic has accelerated the development of e-health. Research in Poland has shown an increase in the use of tele-consultations and e-prescriptions during the pandemic. The forced change in the form of providing medical services from personal to remote, enabled their greater availability, which quantitatively accelerated the increase in the number of tele-consultations, but their quality was assessed differently. Respondents in another study (N = 500) showed only an understanding that in pandemic conditions a better solution is a tele-consultation than the risk of contracting the virus or lack of advice in conditions of excessive burden of patient service facilities (Płonka and Stanienda 2020; Płonka et al. 2021).

In Poland, the Home Quarantine app uses facial recognition and location data to monitor and enforce quarantine, including by levying fines, and can be used by the police. In France, cities are using artificial intelligence and CCTV to monitor the use of masks in public spaces. Lichtenstein is the first European country to use electronic bracelets to collect biometric data in real time, and the United Kingdom is using an app to collect self-reported symptoms from users. Over 50 million Europeans downloaded digital contact tracing apps in the first nine months of 2020 (OECD 2020).

Only six countries (Austria, Denmark, Estonia, Finland, Slovak Republic and the United Kingdom) made a range of healthcare data readily and securely available to the research community through real-time remote access services or a research data centre. Finland and Iceland both have national EHR systems with patient portals and, as a result, were able to quickly develop the capability to track Covid-19 patient longitudinal progress, offer integrated tools for people to report their symptoms, and triage people to appropriate services as their symptoms progressed. In England, where an analytics platform for research with primary care EHRs was already established, data from records covering over 17 million primary care patients were linked to deaths in- hospital from February through to the end of April to identify risk factors for death from Covid-19, with results published online in early May (OECD 2020).

Research has shown that the implementation of eHealth is a challenge, in which the key steps are: system integration, cybersecurity, educating the public and ensuring the universal availability of its tools.

4.6 The role of the state in ensuring health security – the case of Poland

The healthcare system in Poland is based on universal health insurance (the Bismarck model). The obligatory health contribution in the amount of 9% of the salaries achieved is paid to the central government agency: the National Health Fund (NFZ), which finances health services provided to insured persons and reimburses purchase of medicines. In the case of some social groups, e.g. students, clergy and health insurance contributions are financed by the taxpayer. There is no principle of co-payment in the public HCS system. The complementary level of the system consists of: OOP, supplementary

private health insurance and medical subscriptions, having the character of club goods. Healthcare providers are medical entities that can operate as entrepreneurs, independent public healthcare institutions, budgetary units, research institutes, foundations and associations, churches, entities conducting medical and care practices, pharmacies and other entities that provide services on the basis of an agreement with the NFZ. The structure of HCS funding sources in Poland is presented in Table 4.9.

An additional source of financing for some benefits, not included in the reports, are collections for treatment for certain individuals (crowdfunding).

The Polish healthcare system is not very effective. This is evidenced by the HCS comparative data for Poland against the average for selected European countries (Table 4.10).

The main reason for the low position of Poland in the HCS ranking (one of the last places in the survey) is the underinvestment of the public system, compensated by the use of private health services. The shortage of financial resources and medical staff cements in place the continuous presence of queues and places an excessive burden on medical staff. Another possible reason is the excessive (unnecessary) use of free benefits, in the absence of mechanisms to limit them (e.g. through co-payment).

In order to obtain additional information, research generated the opinions described in Chapter 4.3.1., among persons covered by the Polish health insurance system. The results of the survey confirm the high degree of use of private health services by respondents. Only 16% of respondents declared that they would be able to use only the public healthcare system (free of charge). The vast majority of respondents (78.59%) declared readiness for the purchase of services in the form of OOP. The average declared annual value of OOP expenses was about PLN 1,000 (about EUR 230), increasing in older cohorts.

The declared proposals for solutions improving the level of healthcare in public healthcare (one answer) indicated a high level of acceptance of the co-payment principle from insured patients (58.79%), which is an important change in the mentality of Poles brought up in the spirit of the HCS that functioned until 1999 and an important potential direction for its improvement. In the public system of the UHC in Poland, there is no possibility of subsidies, and politicians, fearing the loss of support from the electorate, do not

Table 4.9 Structure of HSC financing sources in Poland compared to the average for the 27 countries of the European Union in 2018

Specification	*EU 27 (%)*	*EN (%)*
Government schemes	32	10
Compulsory contributory health insurance	41	62
Voluntary health insurance	5	6
OOP	22	20

Source: OECD/European Union, 2020, p. 163.

Table 4.10 Selected indicators of the healthcare system in Poland against the average for 34 European countries included in the study with the highest and the lowest values of the index

Problem	*Europe*	*Poland*	*Poland's place in the ranking*	*The highest and the lowest values of the index*
Health expenditure per capita, (EUR)	2572	1511	21	5241 Switzerland 1292 Romania
Health expenditure as a share of GDP (%)	8,3%	6,2%	30	11.7% Germany 5.4% Luxembourg
People-reported quality of health services	7,3/10	6,5/10	26	8.4 Austria and Luxembourg 6.0 Greece
Out-of-pocket spending on health as share of final household consumption	3,3%	2,3%	26	7,5 % Malta 1,3 % Croatia
Practicing doctors per 1,000 population	3.8	2,4	32	6.1 Greece; 2.4 Poland
Number of doctor consultations per person	6,7	7,6	7	10.9 Slovak Republic 2.7 Sweden
Average length of stay in hospital, (days)	7,5	7,1	23	9.6 Hungary 5.1 Netherlands
Waiting times for cataract surgery, (days)	No data	250	11	25 Italy 250 United Kingdom
Share of the population aged 65 and over, 1 January (%)	20,3	17,7	23	22.8 Italy 14.1 Ireland
EHCI Index, * (max 1000 points)	No data	585	32	893 Switzerland 549 Romania

Source: OECD/European Union, 2020.
*EHCI (2019).

voice such expectations. In second place was declared: a decrease in the number of free medical services or the scope of services offered (28.22%), while in third and last place: an increase in the health insurance premium (12.99%). The differences of opinion between women and men on this subject are presented in Figure 4.6.

The most frequently declared share of subsidies is 10–20% of the full value of the benefit, depending on its type. Only 2.35–2.47% of respondents do not accept any subsidies for the services of a family doctor or specialist. In the case of other benefits or treatments, the share of respondents who did not accept subsidies was higher.

An important factor related to health security is trust in the state and institutions responsible for UHC. The ranking of Poles' trust in various sources of information related to health security is presented in the chart (Figure 4.7). The ranking was calculated as the average value of the answers given by

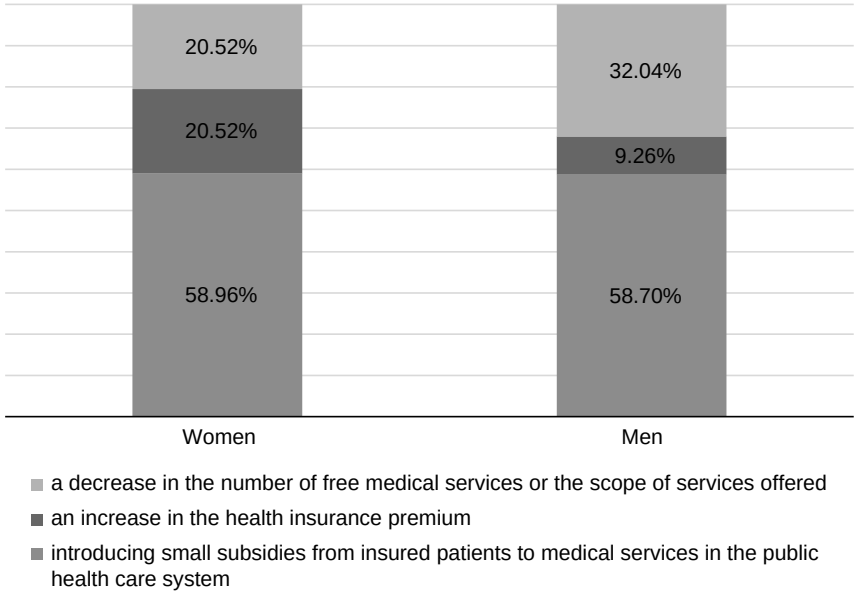

Figure 4.6 Preferences of women and men in Poland on ways to improve UHC (N = 808). Source: own study.

respondents on a five-point scale (1 – I definitely do not trust, 5 – I have full confidence) (Figure 4.7).

One of the questions of the multifaceted study as part of the implementation of goal 4 of the survey was to examine the opinions of respondents on how the experience of the Covid-19 pandemic will affect the future of healthcare in Poland. The results of the study are presented in Table 4.10. The values in the last column were calculated as the average of the answers given on a scale of 1–5 (1 – definitely not, 5 – definitely yes) Table 4.11.

One way to improve UHC quality is to introduce new technologies. In Poland, e-health solutions are at the implementation stage. New technologies are definitely ahead of regulation and implementation of HCS solutions. Even before the pandemic, the implementation of digital solutions began – e-sick leave; from 2018, e-prescription; from 2020, e-referral; from 2021, Internet Patient Account (IKP), electronic medical documentation. The Internet Patient Account is an integrated tool to facilitate the convenient use of digital services for patients and to organize the previously scattered medical information about the patient's health in one location (information about the patient's past, current or planned treatment). Electronic medical documentation is an electronic document enabling the recipient to obtain healthcare of a specific type. It contains the most important data and information about the patient's health, provided, granted and planned healthcare services, including

Figure 4.7 Ranking of respondent trust in sources of information related to health safety in Poland (N = 808).

Source: own study.

Table 4.11 Ranking of respondent opinions on the impact of the Covid-19 pandemic on the future of healthcare in Poland (N = 808)

Ranking	*Opinions*	*Average rating*
1.	Develop the market for private medical services	4,32
2.	Increase citizen interest in private health services	4,17
3.	Increase citizen care for their health	3,81
4.	Increase state spending on healthcare	3,73
5.	Improve the quality of health services in the public health service	3,47

Source: own study.

an electronic document enabling the recipient to obtain healthcare of a specific type. At the same time, work is underway to prepare key e-health standards: informational, patient identification, teleadvice, how to establish contact with healthcare provider, ensuring the possibility of using healthcare in direct contact with the patient, keeping e-documentation (Płonka et al. 2021).

4.7 The concept of inclusivity in healthcare

If e-health goods were delivered within a market allocation, inequalities and areas of economic exclusion would increase (for the less affluent, dysfunctional and disadvantaged), spatial (for the population of sparsely populated areas), digital (for the *before computer* generation and people with less digital skills), structural (the most cost-effective health services would be provided, at the expense of the most expensive services). The exclusion of individuals from access to merit goods, especially those from categories socially recognized as legitimate, is unacceptable and can lead to inequality and negative consequences (protests). In European countries, since the end of the 19th century, the state has been creating a basic health policy based on social solidarity, covering all citizens. At the same time, non-economic arguments are becoming stronger, referring to intra-generational and intergenerational justice, mitigating the exclusionary power of the market and limiting excessive exploitation of resources done at the expense of consumption of future generations (e.g. environmental degradation weakening the health level of society). A potential threat is the petrification of bad consumption habits and civilizational diseases and their transmission onto future generations.

Modern healthcare systems are facing great challenges related to, among others, the ageing of the population, new potential health dysfunctions (mental illnesses), which result in an increase in social expectations towards health services and the need to change the scope of HCS.

The distribution of health services is increasingly dependent on knowledge and skills in the use of new technologies, which raises a new risk of digital exclusion, leaving active life associated with the lack of soft skills (keeping up with technology, flexibility, competence *agility*). New public goods will be widely available, but access to them will require hard and soft skills of the *new generation* and new social capital and new relationships resulting from the development of artificial intelligence and augmented reality.

The inclusive development of HCS is of a postulative nature and means that the public health system should benefit society as a whole in order to improve the quality of life of citizens, taking into account the idea of sustainable development and combating exclusion. In particular, the health programmes and decisions on how to finance and distribute HCS-related goods should take into account:

- Eliminating inequalities in health,
- Eliminating financial barriers to access to universal healthcare,

- Improving the efficiency of HCS as a result of the use of new technologies.

The implementation of the idea of inclusivity includes various decision-making processes and, consequently, real processes creating:

1 Value chain.
2 A chain of functional solutions.

The proposed value chain is shown in Figure 4.8.

The idea of inclusivity should be anchored at the stage of creating a health programme and be consistently implemented in individual stages of the functional value chain. The condition for the inclusivity of HCS are activities (functions) implementing the idea of sustainable socio-economic development, the welfare state, where the state should assume the imperious role of coordinator of relations between stakeholders through specific decisions. In those decisions, the allocation of goods is not determined by the wealth or social status of citizens, but by ensuring optimal efficiency of the system by balancing inequalities in access to the adopted basket of basic benefits, whose value chain is shown in Figure 4.9.

REV4.0 enables cross-sectoral health cooperation and can empower the patient, which can significantly contribute to more efficient and effective healthcare. The state's inclusive goal is not only to reduce inequalities in health, but also in access to benefits related to digital exclusion. This requires the development of data selection skills, the use of applications, the use of modern technologies and the need for continuous learning, as the life cycle of technology and knowledge is shortened. In the conditions of REV4.0 and inclusive development, universal digitization, free access to the Internet, cybersecurity, consumer protection against cyberattacks, asymmetry of information, but above all the protection of critical infrastructure and the development of resistance to predictable and unpredictable threats enables us.

The state, involved in global megatrends, loses its decision-making autonomy in providing health security (autonomy is transferred to the global dimension). The decision only concerns the scope of its involvement (and of its citizens) in global and technological megatrends, in the creation of National Health Programmes.

Health security is an element of national security and UHC is a long-term investment in the future of citizens, conditioning the efficient use of human capital, necessary for economic development and the quality of life of society.

4.8 Chapter summary

The unprecedented pace of socio-economic, technological and information changes affect the perception by individuals and by entire social groups of the role of the state in satisfying the need for security. The scope of security

Figure 4.8 Inclusive development of UHC – value chain.

Source: own study.

Figure 4.9 Functional chain of UHC.

Source: own study.

categories considered to be the domain of the state is constantly changing due to the emergence of new threats (risks), which implies the expansion of social expectations and widening of the public goods catalogue. In addition to the classic social risks, ecological risks, cybersecurity are becoming increasingly important, but health risk and ensuring health security remain one of the most important tasks of the state, resulting from social expectations.

Undoubtedly, the level of health security is currently determined by megatrends that are technological, social, environmental and legal. And the innovative technologies that REV4.0 brings with it create new tools that change the functioning of the state, economic entities and other organizations and society. In addition, the Covid-19 pandemic has forced a reformulation of the perception of health security and its importance. The most important type of capital has become new technologies and the widespread ability to use them in the health policy of the state.

Technological changes are definitely ahead of regulations, standards and medical procedures. Dynamic technological changes also mean that the life cycle of standards, procedures, benefits and skills is shortened. Under these conditions, there is a problem of time delays in the use of technologies related to REV4.0, both on the part of healthcare providers and beneficiaries of public systems. In general, market operators have lower time delays than public entities operating under non-market allocation. A significant group of beneficiaries of health services (older generations) are digitally excluded. Education is therefore a prerequisite for social inclusion.

Health security at the national, but also global level is a prerequisite for sustainable socio-economic development. The national level is insufficient, as global links and the diffusion of processes on a global scale are becoming stronger, as exemplified by the Covid-19 pandemic.

Bibliography

Alderfer C. (1969). "An empirical test of a new theory of human needs". *Organizational Behavior and Human Performance*, 4 (2): 142–175.

AlDossary S., Martin-Khan M.G., Bradford N.K., Smith A.C. (2017). "A systematic review of the methodologies used to evaluate telemedicine service initiatives in hospital facilities". *International Journal of Medical Informatics*, 97: 171–194, 10.1016/j.ijmedinf.2016.10.012.

Barnaszewski A. (2005). Istota pojęcia i znaczenie bezpieczeństwa w funkcjonowaniu jednostek i społeczności, Zeszyty Naukowe WSOWL.

Breton A. (1998). *Competitive Governments: An Economic Theory of Politics and Public Finance*. Cambridge: Cambridge University Press.

Buchanan J.M. (1999). *Public Finance in Democratic Process, Fiscal Institutions and Individual Choice*. T. 4. The Collected Works of James M. Buchanan. Indianapolis: Liberty fund. https://1lib.eu/book/782248/163861.

Burgess R.S.L., Stern N. (1991). Social security in developing countries: What, why, who and how? in Ahmad E., Dreze J., Hills J. and Sen A.K. (eds). *Social Security in Developing Countries*. Oxford: Clarendon Press.

CEP (2012). Communication from the Commission to the European Parliament, the Council, the Eeuropean Economic and Social Committee and the Committee of the Regions: eHealth Action Plan 2012-2020 - Innovative Healthcare for the 21st Century. Brussels. 736 final. https://ec.europa.eu/health/sites/health/files/ehealth/docs/com_2012_736_en.pdf.

Colombo F., J. Oderkirk, L. Slawomirski (2020). Health Information Systems, Electronic Medical Records, and Big Data in Global Healthcare: Progress and Challenges in OECD Countries, in Handbook of Global Health, Springer International Publishing. 10.1007/978-3-030-05325-3_71-1

Constitution of WHO (1948). Forty-fifth edition, Suplement 2006. https://www.who.int/governance/eb/who_constitution_en.pdf

Cycoń M., Jedynak T., Płonka M. (2020). *Postawy studentów wobec zabezpieczenia ryzyka starości - studium empiryczne*. Kraków: Wydawnictwo Uniwersytetu Ekonomicznego w Krakowie.

Deneulin S., Townsend N. (2007). "Public goods, global public goods and the common good", P.B. Anand i Des Gasper (red)". *International Journal of Social Economics*, 34 (1/2): 19–36. 10.1108/03068290710723345

Drèze J., Sen A., 1991. Public action for social security: Foundation and strategy. In Ahmed E. et al. (eds.), *Social Security in Developing Countries*. Oxford: Oxford University Press.

EHCI (2019). Björnberg A., Phang A.Y., *Euro Health Consumer Index 2018 Report*, Health Consumer Powerhouse Ltd. https://healthpowerhouse.com/media/EHCI-2018/EHCI-2018-report.pdf

EU Expert Group on HSPA (2020). Assessing the resilience of health systems in Europe: An overview of the theory, current practice and strategies for improvement, https://ec.europa.eu/health/sites/health/files/systems_performance_assessment/docs/2020_resilience_en.pdf (accessed 22.03.2021).

GHO (2016). Analysis of third global survey on eHealth based on the reported data by countries, Global Health Observatory. https://www.who.int/gho/goe/telehealth/en/.

Gromek P. (2010). Istota bezpieczeństwa powszechnego w Polsce, Zeszyty Naukowe SGSP 2018, Nr 68; W. Kitler., Bezpieczeństwo powszechne [w:] Bezpieczeństwo ludności cywilnej. Pojęcie, organizacja i zadania w czasie pokoju, kryzysu i wojny, Wyd. Towarzystwa Wiedzy Obronnej, Warszawa.

Gruber J. (2011). *Public Finance and Public Policy*, 3d ed., New York: Worth Publishers.

Hausner J. (2013). *Kultura i polityka rozwoju*, w- *Kultura a rozwój*, J. Hausner, A. Karwińska, J. Purchla (red.). Warszawa: Narodowe Centrum Kultury.

Herzberg F., Mausner B., Bloch Snyderman B. (2017). *The Motivation to Work*. Routledge.

Holcombe R.A. (1997). "Theory of the Theory of Public Goods". *Review of Austrian Economics*, t. 10, nr 1.

Kleer J. (2015). Dobra publiczne: wczoraj-dziś-jutro. PTE.

Konstytucja (1997). Konstytucja Rzeczypospolitej Polskiej z dnia 2 kwietnia 1997 r. (Dz.U. 1997.78.483).

Liu W.L., Zhang K., Locatis C., Ackerman M. (2015). *Cloud and traditional videoconferencing technology for telemedicine and distance learning*. Telemed J E Health. 2015 May;21(5):422–426. doi: 10.1089/tmj.2014.0121. Epub 2015 Mar 18. PMID: 25785761; PMCID: PMC4432776.

Malinowski B. (1944). *The Scientific Theory of Culture and Other Essays*. Chapel Hill: University of North Carolina Press, reprinted Routledge, 1992.

Maslow A.H. (1954). *Motivation and Personality*. New York: Harper and Row Publishers.

Musgrave R.A. (1959). *The Theory of Public Finance: A Study in Public Economy*. New York: McGraw-Hill.

Niżnik J. (2004). *W poszukiwaniu racjonalnego systemu finansowania ochrony zdrowia w Polsce*. Bydgoszcz–Kraków: Oficyna Wydawnicza Branta.

OECD. (2020). Health at a Glance: Europe 2020 State of Health in the EU Cycle, OECD/ European Union, How resilient have European health systems been to the Covid-19 crisis? Paris: OECD Publishing. 10.1787/82129230-en https://www.oecd-ilibrary.org/docserver/85e4b6a1-en.pdf?expires=1626885283&id=id&accname=guest&checksum=4FEF317B8B7F6F41683457811D208F99

Ott A.F., Cebula R.J. (2008). "Introduction to the Special Issue in Honor of Richard Abel Musgrave". *Journal of Economics and Finance* 32(4): 324–329. 10.1007/s12197-008-9049-z

Owsiak S. (2017). *Finanse publiczne. Współczesne ujęcie*. Warszawa: Wydawnictwo Naukowe PWN.

Picciotto R. (1999). *Personal Reflection on the Policy Dialogue*, W- *Inclusion, Justice, and Poverty Reduction*, G. Kochendörfer-Lucius, B. Pleskovic (red.), Bonn: German Foundation for International Development (DSE).

Płonka M. (2019). *Principle of Co-payment for Health Care - European Experience*. [in:] Beňová Z., Jančovič P., Kajánek T., Karas M., Szabó J., Vlková E. (red.), Medzinárodné vzťahy 2019: aktuálne otázky svetovej ekonomiky a politiky: zborník vedeckých prác (Medzinárodné vzťahy: aktuálne otázky svetovej ekonomiky a politiky), Bratislava: Publishing Ekonóm, 864–870. https://fmv.euba.sk/www_write/files/veda-vyskum/konferencia-smolenice/2019/Smolenice_2019_Final.pdf

Płonka M., Stanienda J., Gądek A. (2021). *Medical tele-consultation in the opinion of patients of the medical entity in Poland In 2021*, Proceedings of the 37th International Business Information Management Association Conference (Ibima), 1-2 April 2021 Cordoba, Spain/Ed. Khalid S. Soliman.

Płonka M., Stanienda J. (2020). *The development of telemedicine in the context of Revolution 4.0 and the Covid-19 pandemic on the example of Poland*, 36th International Business Information Management Association Conference (IBIMA), Granada, Spain, 04-05/11/2020, [in:] *Sustainable Economic Development and Advancing Education Excellence in the era of Global Pandemic*: Proceedings, ed. Khalid S. Soliman.

Rosen H.S., Gayer T. (2010). *Public Finance*. McGraw-Hill, 9th ed .

Rubinow I.M. (1934). *The Quest for Security*. New York: Holt.

Rudawska I. (2007). Opieka zdrowotna, aspekty rynkowe i marketingowe, Warszawa: Wydawnictwo PWN.

Samuelson P.A., Nordhaus W.D. (1997). *Ekonomia t. II*. I polskie. T. II. Warszawa: PWN.

Sen A., 1999. *Development as Freedom*. Oxford: Oxford University Press.

Sturn R. (2007). "Richard Abel Musgrave 1910 – 2007". *The European Journal of the History of Economic Thought* 14 (3): 587–595. 10.1080/09672560701570401.

Słownik terminów z zakresu psychologii dowodzenia i zarządzania, Warszawa, 2000.

Ustawa (2004). Ustawa z dnia 27 sierpnia 2004 r. o świadczeniach opieki zdrowotnej finansowanych ze środków publicznych (Dz. U. 2020, poz. 1398).

Wang X., Zhang Z., Zhao J., Shi Y. (2019). "Impact of Telemedicine on Healthcare Service System Considering Patients' Choice". *Discrete Dynamics in Nature and Society*, 2019, Article ID 7642176.

WHA (2018). *Digital Health*. Geneva, Switzerland: 71st World Health Assembly. https://apps.who.int/gb/ebwha/pdf_files/WHA71/A71_R7-en.pdf?ua=1 (accessed 23.04.2021).

WHO Executive Board, 101. (1998). *Health-for-all policy for the twenty-first century*: "Health telematics". World Health, Executive Board 101st session, agenda item 8, EB101/INF.DOC./9, https://apps.who.int/iris/bitstream/handle/10665/79722/angid9.pdf?sequence=1&isAllowed=y

WHO (2015). Atlas of eHealth country profiles: the use of eHealth in support of universal health coverage: based on the findings of the third global survey on eHealth Global Observatory for eHealth. Library Cataloguing-in-Publication Data, https://www.who.int/publications/i/item/9789241565219

WHO (2016). Global difusion of eHealth: making universal health coverage achievable. Report of the third global survey on eHealth. Global Observatory for eHealth. World Health Organization, https://apps.who.int/iris/bitstream/handle/10665/252529/9789241511780-eng.pdf;jsessionid=3DA6DB7BB98725D133A621D63C3BC00B?sequence=1. (accessed 12.03.2021).