European Commission

IDENTIFYING, MEASURING AND REDUCING LOW-VALUE CARE IN THE CONTEXT OF HEALTH SYSTEM PERFORMANCE ASSESSMENT

Report by the Expert Group on
Health Systems Performance Assessment

Health and Food Safety

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ABBREVIATIONS

ADHD	Attention-deficit hyperactivity disorder
COPD	Chronic obstructive pulmonary disease
CT	Computed tomography
DDD	Defined Daily Dose
EEA	European Economic Area
EU	European Union
HSPA	Health system performance assessment
MRI	Magnetic resonance imaging
OECD	Organisation for Economic Co-operation and Development
PET	Positron emission tomography
PSA	Prostate-specific antigen
USA	United States of America
VBHC	Value-based health care

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The report is based on an analysis of replies to a survey developed and conducted within the Expert Group on HSPA.

The report was developed under the supervision of the co-chairs of the Expert Group on HSPA, Maya Matthews (European Commission, DG SANTE) and Kenneth Grech (Malta).

EXECUTIVE SUMMARY

The *State of Health in the EU Companion Report 2019* highlighted that health systems show varying capacities to identify low-value care. While achieving value-based healthcare and the optimal use of resources are recognised as important goals, there is no consensus on which indicators should be used to identify and measure low-value care, particularly in the context of health system performance assessment (HSPA), and which measures and policies can facilitate reductions in its use.

Hence, there is substantial scope for better understanding of the system perspective on low-value care and further developing low-value care indicators within HSPA. This identification is anticipated to inform cross-country learning to maximise value for patients within and across health systems. As a result, the Expert Group on HSPA worked during 2023–2024 to address the gap in information about low-value care indicators that can be used in European Union (EU) Member States (and Norway) and how they can be leveraged to help reduce the use of low-value care.

Following a review of the literature, a survey was conducted between December 2023 and February 2024 among members of the Expert Group. The purpose of the survey was to arrive at a comprehensive definition for low-value care, to identify indicators used by European countries for measuring low-value care within HSPA and highlight methodological obstacles, and to identify current and new solutions to reduce the use of low-value care. Twenty experts from 17 EU Member States and Norway responded to the survey.

Key findings include:

- **Some existing definitions of low-value care were considered generally suitable by the majority of respondents**; however, the lack of certain aspects in these definitions was put forward by 11 of 18 participating country experts. Therefore, the Expert Group on HSPA proposes a new comprehensive definition of low-value care, as follows: *"From a health system perspective, low-value care encompasses overuse, misuse and underuse of healthcare services (for example, prevention, diagnostics, treatment, medication). Overuse and/or misuse comprise the delivery of harmful, ineffective, inappropriate, or not cost-effective healthcare services. Underuse refers to healthcare services not provided or used despite being necessary. Low-value care can lead to negative consequences for patients, their caregivers, the healthcare workforce, the health system as a whole and the wider environment."* This forward-thinking approach extends the concept of low-value care to include the underuse of services while highlighting that the physical, psychological, and financial consequences of low-value care reach beyond patients.
- **Types of low-value care:** This report presents a comprehensive framework of nine low-value care types. Five types cover overuse and misuse, two types cover underuse, and two types cover unwarranted variation, which can signal either underuse or overuse of healthcare. Identifying which part of the observed variation constitutes underuse or overuse, especially in the presence of differing patient preferences and needs, is crucial for designing efforts to combat low-value care.
- **Indicators for identifying low-value care** within HSPA are used in multiple countries covering prevention, diagnostics, treatment and medication as well as other areas. Simultaneously, a lack of indicators for specific areas (for example, mental healthcare, and end-of-life care) was identified.
- **The main methodological obstacles in measuring low-value care** identified in the survey relate particularly to data access and data quality.
- **The implementation of strategies to reduce low-value care** varies between the countries from multicomponent approaches to single measures such as guidelines, financial adjustments for purchasing agencies or health care providers, or auditing and quality transparency. Further solutions for reducing the use of low-value care were proposed in the survey and complemented with findings from the literature. These findings support the implementation and further development of multicomponent strategies tailored to the needs of individual countries.

PREAMBLE

The aim of this report from the Expert Group (see Box 1) on Health Systems Performance Assessment (HSPA) is to establish a comprehensive definition of low-value care in line with the concept of value-based healthcare and from a health system perspective, and to identify low-value care indicators and measures to facilitate the reduction of low-value care for national HSPA practices. To achieve this aim, a "value-based healthcare" working group was established as a subgroup of the Expert Group with country representatives from Belgium, Czechia, Estonia, France, Germany, Hungary, Italy, Poland, Portugal, Romania and Slovenia as well as the European Observatory on Health Systems and Policies, the Organisation for Economic Co-operation and Development (OECD) and the Directorate-General for Health and Food Safety (DG SANTE).

Box 1: Expert Group on Health Systems Performance Assessment

In 2014, the European Commission set up an Expert Group on Health Systems Performance Assessment (HSPA) to provide European Union (EU) countries with a forum to exchange experiences in this field and to support national policymakers by identifying tools and methodologies to develop HSPA.
International organisations such as the World Health Organization (WHO), the European Observatory on Health Systems and Policies and the Organisation for Economic Co-operation and Development (OECD) proactively contribute to the work of the Expert Group on HSPA.
The Expert Group on HSPA defines priority areas that it wishes to work on. Since July 2022, the Expert Group on HSPA has an extended mandate going beyond HSPA and providing EU countries with a forum to discuss and promote strategic innovative approaches to strengthening health systems.
Value-based healthcare with a focus on low-value care was selected as the priority topic for 2023–2024.

INTRODUCTION

Health systems generally aim to maintain and improve the health of the populations they serve. To achieve this goal, they need to make the best possible use of the limited resources they have at their disposal, for example, both financial and human. Against the backdrop of increasing healthcare expenditures and the overall aim to deliver high-quality and efficient healthcare in a person-centred way, efforts to reduce waste and inefficiencies have long been emerging in health systems worldwide and have especially intensified in the last decade (OECD, 2017; OECD/European Union, 2018). Given the substantial workforce constraints that most health systems face today (Džakula & Relić, 2022; World Health Organization, 2024), reconsidering the way in which care is provided has become a necessity.

In the endeavour to optimise resource distribution within health systems in the coming years, addressing low-value care seems to be an obvious choice. Low-value care traditionally refers to health services that provide little or no health benefits but expose patients to potential harm, incur unnecessary costs for health systems, and add to clinician workload (Sypes, Grood, Whalen-Browne et al., 2020). Hence, low-value care is an important component of waste in healthcare along with, but distinct from, other elements such as failures in care coordination, administrative complexity, pricing failures, fraud and abuse (Berwick, 2011). The observed reductions in certain elective services during the COVID-19 pandemic (see for example, Windfuhr & Günster, 2022) have rekindled discussions around the potential for disinvestment and reallocation to other areas of care, with the goal of maximising health outcomes and improving the resilience of health systems. An additional consideration is that low-value care contributes to the environmental footprint of health systems; in line with increasing commitments to climate change mitigation efforts (Lenzen et al., 2020), this provides additional motivation for action. Moreover, addressing low-value care can reduce out-of-pocket payments for individuals and thus financial hardship (for example, impoverishing health spending) (Thomson et al., 2024). An additional dimension that is interesting to note, also as improving financial protection is an important endeavour towards achieving universal health coverage.

At the same time, health systems demonstrate varying capacities to identify low-value care, as highlighted in the *State of Health in the EU Companion Report 2019* (European Commission, 2019b). However, understanding how low-value care can be measured is a prerequisite for designing and implementing actions to address it. Incorporating metrics on low-value care into Health System Performance Assessment (HSPA) could be a promising pathway to achieve this. HSPA is a comprehensive evaluation process based on rigorous measurement and analysis, aiming to monitor the extent to which health systems achieve their stated objectives. From a systems perspective, HSPA measures, for example, low quality or inefficiency at the macro level, thus highlighting potential for improvement in health systems. It is an essential tool for understanding how (effectively) health systems work, how they develop over time, how they compare with their counterparts in other countries, and which areas should be prioritised for action. In this understanding, low-value care can be found in various dimensions of HSPA (for example, quality, safety, efficiency) as a horizontal and trans-sectoral component. Taking this systems approach to low-value care can pave the way for comprehensive and sustainable efforts towards reducing it at the health system level.

The EC's Expert Group on HSPA is committed to helping national decision-makers with developing and/or identifying the right tools to evaluate their systems. Fully aware of the current constraints plaguing European health systems and the need to facilitate the optimal use of limited resources, it has selected low-value care as its priority topic for the 2023–2024 work programme.

Aim of the report

The primary aim of this report is to explore how low-value care can be measured, especially as part of HSPA processes, and which measures and policies can be adopted to reduce the extent of low-value care.

Methodology

The report is based on a literature review and the results of a survey conducted by the Expert Group on HSPA. It also draws on information from working group discussions with the country representatives and other stakeholders. The survey was conducted between December 2023 and February 2024; 20 experts from 17 EU Member States and Norway responded (see Box 2).

Box 2: Survey on low-value care among the Expert Group on HSPA

Between December 2023 and February 2024, a survey (see Annex I) was conducted among the Expert Group on HSPA. The purpose of the survey was to agree on a comprehensive definition for low-value care, to identify indicators used in the countries' HSPA for measuring low-value care, to highlight methodological obstacles for measuring low-value care, and to identify currently implemented, and innovative solutions for facilitating the reduction of the use of low-value care. Twenty experts from 18 countries participated (Austria, Belgium, Cyprus, Czechia, Estonia, Finland, Germany, Hungary, Latvia, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Spain, Sweden). Most experts worked for the Ministries of Health, but others were from other public institutions, such as Public Health Institutes, or Ministries of Social Affairs. Their roles varied among advisors, consultants, coordinators, programme officers, experts and other roles. The majority of responding countries (10 of 18) perform national HSPAs, whereas some countries (6 of 18) are still in the process of planning a national HSPA programme. Two countries had no ongoing HSPA programme at the time of the survey. Out of the 20 experts who participated in the survey, five reported being involved in commissioning, performing and planning their national HSPA. The remaining experts are involved with commissioning and planning (n = 3), planning and performing (n = 3), commissioning and performing (n = 1) and planning (n = 1). Three experts are not involved in a national HSPA. Countries conducting a national HSPA stated that most of them (n = 6) had no definition of low-value care within their HSPA, while one was still planning/in the process of developing or adopting one, and some (n = 3) have already incorporated a definition. Seven countries reported that they already use indicators to assess low-value care in their HSPA.

Members of the Expert Group on HSPA were asked to clarify, specify and/or add information for the final report. Information from the literature, the survey results and comments from the members of the Expert Group on HSPA were synthesised and are presented jointly.

Structure of the report

This report is divided into the following chapters:

- **Chapters 1 & 2** introduce the concept and definition of value-based healthcare with a focus on low-value care and identifies potential indicators for measuring low-value care.
- **Chapter 3** presents measures and policies to facilitate the reduction of the use of low-value care.
- **Chapter 4** provides conclusions and options for health systems.

CHAPTER 1: HOW CAN WE DEFINE AND CONCEPTUALISE LOW-VALUE CARE?

The concept of value-based healthcare

Value-based healthcare (VBHC) is proposed as a guiding principle for healthcare reform in various countries as it strives for the best use of limited resources for the maximum benefit of individuals and society as a whole. Low-value care is part of the overarching concept of VBHC because of its specific focus on care that needs to be reduced to optimise the value generated by healthcare services and the healthcare system. The concept of VBHC is briefly explained in the following before describing the specificities of low-value care.

VBHC is a term that was originally proposed by Michael Porter and Elizabeth Teisberg (Porter & Teisberg, 2006) in the USA, used to describe a healthcare delivery model that emphasises achieving the best outcomes for patients relative to the costs of providing those outcomes. A core aspect of this concept is hence the value equation:

Value = outcomes that matter most to patients / costs for the complete patient pathway

Building on this notion, Porter & Teisberg's model was seen as a shift from a fee-for-service approach for health service delivery to a more patient-centric, outcome-driven and cost-effective healthcare delivery system. Theoretically, VBHC promotes collaboration among healthcare providers across the entire continuum of care, from primary care to specialty care and beyond. This collaboration should ensure a seamless and integrated patient experience. Moreover, the concept reinforces the importance of outcome and cost measurement, especially highlighting that patient-relevant outcomes include those assessed by patients themselves, for example, through patient-reported outcome measures.

In the original US definition, the focus of VBHC is on stimulating competition between healthcare providers for achieving the relevant outcomes. In contrast, the European Commission Expert Panel on Effective Ways of Investing in Health (European Commission, 2019a) proposed a broader definition for the European context, taking a societal perspective on VBHC. This definition describes VBHC as a comprehensive concept that builds on four value pillars:

- appropriate care to achieve patients' personal goals (personal value)
- achievement of best possible outcomes with available resources (technical value)
- equitable resource distribution across all patient groups (allocative value) and
- contribution of healthcare to social participation and connectedness (societal value).

VBHC thematically builds on a long line of research and activities in the areas of evidence-based medicine (Cochrane, 1972), practice variation (Wennberg & Gittelsohn, 1973), health technology assessment (United States Congress Office of Technology Assessment, 1975) and investigations into the relationship between costs, risks and benefits (with early descriptions provided, for example by Bunker et al., 1977). The concept of VBHC moreover aligns well with other internationally established visions for improving healthcare such as the quintuple aim (improved patient experience, better outcomes, lower costs, clinician well-being and health equity) (Itchhaporia, 2021; Nundy et al., 2022).

The concept of low-value care

Whereas VBHC outlines the goals to be achieved (positive connotation), low-value care encompasses care that ought to be reduced (negative connotation) to safeguard patient well-being, free up resources and optimise value generation. In light of current resource constraints and the risks that low-value care poses for patients, the identification and reduction of its extent are essential for health systems. The basis for identifying where low-value care lies is a clear definition of what it encompasses.

Over the years, various terms such as “inappropriate care”, “unnecessary care”, “outdated care”, “overuse”, “overtreatment”, “overdiagnosis”, “misuse” or “waste” have become part of the discourse around the delivery of services that bring little or no benefit for patients while exposing them to potential harm and expending health systems’ limited resources. In publications from the last two decades, particularly from the USA and Australia, the term “low-value care” has also emerged to characterise this phenomenon. However, this multitude of terms has led to a degree of confusion among policymakers regarding precise definitions and potential strategies for reducing the use of these types of services.

The broader concept of waste in health systems has been previously addressed in the Expert Group on HSPA report on *Tools and methodologies to assess the efficiency of health care services in Europe* (Expert Group on Health System Performance Assessment & European Commission, 2019). Within this context, it was noted that similarly to technical inefficiency, waste comprises healthcare services without benefit or causing harm and avoidable healthcare expenditures. The Organisation for Economic Co-operation and Development (OECD) disaggregates waste into “wasteful clinical care”, “operational waste” and “governance-related waste” (OECD, 2017). Wasteful clinical care refers to events where patients are not receiving the right care; for example, preventable adverse events (such as wrong-site surgery, infections), clinical errors, ineffective and inappropriate care (such as medically unnecessary caesarean sections or imaging). Looking at both these operationalisations for waste, low-value care would be congruent with wasteful clinical care, whereas operational and governance-related waste go beyond the delivery of clinical services per se (see Berwick, 2011).

With this distinction in mind, low-value care can be considered from different angles, operationalised from the perspective of care for the individual patient, over specific patient groups, to the population as a whole. For this report, three well-cited definitions (Colla, 2014; Elshaug et al., 2013; Sypes et al., 2020) were selected (see Box 3) to highlight the different perspectives on low-value care and the variety of concepts encompassed in the term, with the aim to provide a basis for discussion towards arriving at a definition suitable for the purposes of the work of the Expert Group on HSPA as described above. The suitability of these definitions was assessed (Figure 1) by the experts participating in the survey among the Expert Group members (see Box 2), and on this basis a new definition was proposed.

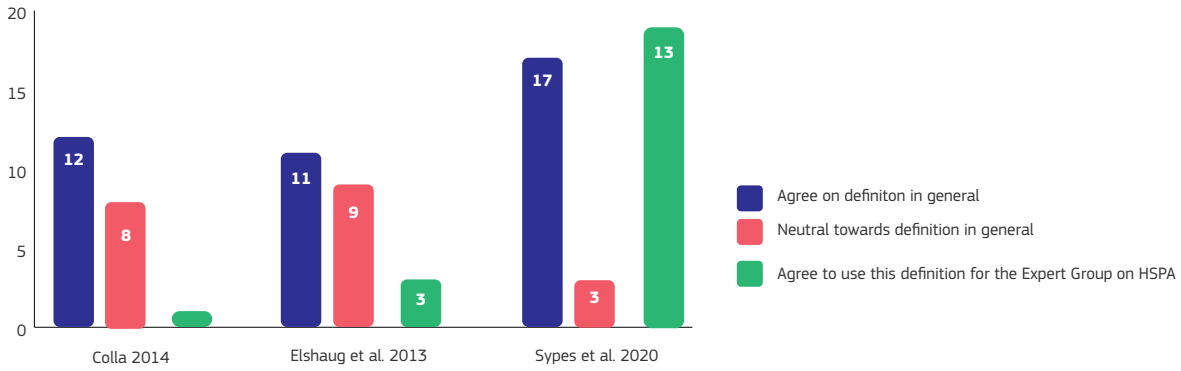
Box 3: Selected definitions of low-value care

According to Colla (2014), low-value care can be defined *“in terms of the net benefit [patient relevant outcome], a function of the expected […] benefit [patient relevant outcome] and cost for an individual or group, and is assessed relative to alternatives, including no treatment.”*

The definition of low-value care proposed by Elshaug et al. (2013) comprises *“health care services that provide little or no benefit – whether through overuse or misuse.”*

Sypes at al. (2020) describe low-value care as *“medical tests or treatments that lack efficacy, have risks that exceed benefit, or are not cost effective, impede the delivery of safe, efficient, and cost-effective health care”* **that can result in** *“physical, psychological, and financial consequences”* **for patients and caregivers.**

Figure 1: Agreement on the selected definitions of low-value care by experts from the Expert Group on HSPA (n = 20 experts)



Notes: The blue and orange bars indicate (a) the answers to the general agreement with the proposed definitions and the green bars indicate (b) the answer on agreement to use the definition as shared low-value care definition for the purposes of the Expert Group on HSPA.
Source: Authors' own compilation based on the survey among the Expert Group on HSPA.

New definition of low-value care

Although the definition proposed by Sypes et al. (2020) was the one with the highest general agreement, nine experts proposed that the Expert Group on HSPA should propose a new comprehensive definition for low-value care. This was further supported by the fact that 11 experts identified missing aspects in the proposed definitions based on their practice and experience. Reported missing aspects were, for example, underuse of healthcare, sustainability, and the impact on the health system as a whole and on the health workforce in particular.

This new definition expands the traditional definitions of low-value care in important ways (see Box 4). Coming from a health system perspective it aims to combine the traditional aspects of low-value care (overuse and misuse) with additional emerging concepts. Whereas previous definitions have focused solely on the overuse and/or misuse of health services, this new, expanded definition also encompasses the underuse of services not supplied despite being necessary. The underuse of (cost-)effective services does not only jeopardise patient outcomes but can in general also lead to preventable high costs for the health system later in the patient's life. Moreover, the new definition highlights that the physical, psychological and financial consequences of low-value care reach beyond patients and caregivers, impacting also the workforce, the health system as a whole and the wider environment.

Box 4: New comprehensive definition of low-value care

"From a health system perspective, low-value care encompasses overuse, misuse and underuse of healthcare services (for example, prevention, diagnostics, treatment, medication). Overuse and/or misuse comprise the delivery of harmful, ineffective, inappropriate, or not cost-effective healthcare services. Underuse refers to healthcare services not provided or used despite being necessary. Low-value care can lead to negative consequences for patients, their caregivers, the healthcare workforce, the health system as a whole and the wider environment."

New framework specifying types of low-value care

To operationalise this definition, an overarching low-value care framework was developed to distinguish between types of low-value care so as to better understand, measure and address them (for full framework see Table 4 on page 16). The following paragraphs provide more information on the reasoning behind each type of low-value care, gradually building up the framework component by component and the role of unwanted variation as a manifestation of low-value care in identifying and addressing it.

Overuse and misuse

As a first step, Table 1 presents the five types that fall under the more traditional definition of low-value care, encompassing overuse and misuse. Whereas types A to C depict previous operationalisations of low-value care (Busse et al., 2015), D and E were added based on the emerging focus on the fact that the suboptimal use of resources (human, financial and environmental) can be the result of services that are not provided in the right sector, by the right professional or could have been provided with equally effective but more environmentally friendly or cost-effective alternatives.

Table 1: Types of low-value care in the category "overuse and misuse"

CATEGORY OF LOW-VALUE CARE	OVERUSE AND MISUSE				
TYPE OF LOW-VALUE CARE	A. The service harms the patient	B. The service does not benefit the patient/ has no effect (no benefit or benefit/ harm relation unfavourable)	C. There are more cost-effective alternatives to the service	D. There are more environmentally sustainable alternatives with similar or higher benefits	E. The service is delivered in a costlier setting/ sector or by costlier professions than necessary
DEFINITION	Services that pose more risks (for example, adverse patient events, such as health-care-associated infections, surgical-care errors, and unsafe technologies) than benefits to the patients (costs are by definition unwarranted)	Services that lead to additional costs without expected health benefit, that is, the services have no known benefit for all patients, or the services are not appropriate for the individual patient, based on expected outcomes, medical criteria, guidelines, or preferences	Services for which alternatives exist that provide the same benefit for lower cost, or higher benefit for the same cost, that is, are more cost-effective	Services or resources for which alternatives exist that provide similar benefits while being more environmentally sustainable (or higher benefit for the same environmental impact)	Services that could be provided at a lower level of care (setting/ sector/ profession) incurring fewer costs (and reducing potential patient risks) or that could have been prevented by the provision of care at previous levels of care

Source: Authors' own compilation.

- **Type A** comprises services that harm patients, meaning those that pose risks to the patient, for example, through surgical errors or unsafe technologies. These services are not indicated and thereby have negative implications in terms of patient outcomes, costs and the environment. They should therefore not be provided at all and strategies for their reduction need to be implemented.
- **Type B** corresponds to services that either have no benefit or for which the benefit/harm relation is unfavourable. This can either be on a population level, meaning that a service does not benefit any patient and should therefore not be provided, or a service does not benefit a specific patient or patient group based on expected outcomes, medical criteria, guidelines or preferences and is hence inappropriate. Per definition, inappropriate services fall under this type of low-value care. Appropriate care is defined as follows: *"the expected health benefit (for example, increased life expectancy, relief of pain, reduction in anxiety, improved functional capacity) exceeds the expected negative consequences (for example, mortality, morbidity, anxiety, pain, time lost from work) by a sufficiently wide margin that the procedure is worth doing, exclusive of cost"* (Brook et al., 1986; Park et al., 1986).
- **Type C** covers services for which more cost-effective alternatives exist, namely, alternatives that provide the same benefit for lower cost, or higher benefit for the same cost. This can vary considerably, depending on which services are most common in the individual health system context, based on, for example, negotiated prices or availability of alternatives.
- **Type D** includes services or resources for which alternatives exist that provide similar benefits while being more environmentally sustainable (or higher benefit for the same environmental impact). Although the reduction of the other low-value care types is likely to reduce the ecological footprint of the healthcare system already, this specific low-value care type highlights the importance of targeted sustainability efforts in, for example, replacing carbon-intensive services with less carbon-intensive services.

- **Type E** refers to services that are delivered in a costlier setting/sector or by costlier professions than necessary and therefore increase costs without generating more patient benefits. These types of services can also increase patient risk and create resource and time constraints for healthcare professionals in a provider setting that should be reserved for treating higher-need patients. An example is hospital admissions that could have been prevented by the provision of care at previous levels, for example, ambulatory care sensitive conditions.

Underuse

The second category of low-value care from a health system perspective – underuse – entails services that are not provided despite being necessary. The necessity of clinical procedures according to Kahan et al. (1994) is a more stringent criterion than appropriateness (referred to in low-value care type B) and refers to procedures that must be offered to all patients fitting a particular clinical description. Underuse has previously not been considered part of low-value care, as exemplified by the definitions in Box 3, probably based on the fundamental assumption that care needs to be provided in order for its value to be considered. It has been integrated in the new definition proposed in this report to emphasise the negative consequences (for example, worse proximal and distal outcomes, higher costs) of skipping beneficial services from a health system perspective, and from a patient perspective too. Underuse is perceived as an important contributor to the value of care generated by the system being low and the need for (later, more complex) care that could have been prevented. Overuse and underuse both require targeted actions to address them and increase the generated value in healthcare. Discussing these concepts together allows for redistribution of resources from services that are overused to services that are necessary but underused. The framework presented in this report distinguishes two types of low-value care belonging to the underuse category (see also Table 2):

- **Type H** refers to services that are necessary and considered cost-effective but are not provided to/not used by patients fitting a particular clinical description. This category includes both services not offered to/used by individual patients as well as patient groups within the system (for example, a certain age bracket not being covered for necessary screening). Which services are considered cost-effective can vary between countries (as in low-value care type C). The lack of provision or utilisation of these services not only risks leading to worse patient outcomes, but can also result in higher costs for compensatory services in the future.
- **Type I** includes services that are necessary and save costs. These are services considered to be of high value, like immunisations, that are not provided despite their clear population and patient benefit.

Table 2: Types of low-value care in the category "underuse"

CATEGORY OF LOW-VALUE CARE	UNDERUSE	
TYPE OF LOW-VALUE CARE	H. Services which are necessary and considered cost-effective	I. Services which are necessary and save costs
DEFINITION	Cost-effective services not provided despite necessity – meaning that services are not offered to patients fitting a particular clinical description while such services are considered cost-effective.	Services that are not provided despite being considered high value, as they both improve health outcomes and save costs ("dominating" in the cost-effectiveness plane).

Source: Authors' own compilation.

Unwarranted variation

As a last step, the framework considers the significance of unwarranted variation in the provision of health services, that is variation that is not explained by different needs, for identifying low-value care. Unwarranted variation can be a sign of either overuse or underuse of services, or both. This variation can occur within or across countries as well as across patient groups. Accordingly, unwarranted variation is included in the framework for low-value care presented here, encompassing two subcategories (for consistency, subcategories are also labelled "types" in the following – highlighted in orange in Table 4): geographic variation (Type F) and variation between patient groups (Type G) (see Table 3).

- **Type F** refers to geographic variation in the provision, costs and/or quality of services. Detecting this variation should be followed up with an evaluation to identify whether it is due to overuse, underuse or both, and the design and implementation of policies to overcome it.
- **Type G** covers variation between patient groups distinguished for example by sociodemographic aspects, in terms of the provision, costs and/or quality of services.

Table 3: Types of low-value care in the category "unwarranted variation"

CATEGORY OF LOW-VALUE CARE	UNWARRANTED VARIATION as a sign of potential over- and/or underuse (not explained by different need)	
TYPE OF LOW-VALUE CARE	F. Geographic variation (entire population and service provision in one area versus another)	G. By patient groups (social, demographic etc.)
DEFINITION	Provision/ costs/ quality of services vary between geographic regions not explained by different need.	Provision/ costs/ quality of services vary between patient groups (segmented by social, demographic and or other characteristics) not explained by different need.

Source: Authors' own compilation.

Table 4 shows the overarching low-value care framework depicting the categories of overuse and misuse (Types A–E), underuse (Types H and I), and unwarranted variation (Types F and G). Unwarranted variation logically connects the two categories of overuse/misuse and underuse as it can indicate either or both, and is therefore positioned between them in the framework. From left to right, the framework starts with the type that has the clearest impact in terms of the benefit/harm relationship and is therefore considered a "never-do" service (overuse/misuse – Type A) and ends on the opposing pole with the "always-do" services (underuse – Type I). For each column (Types A–I), a definition, the different terms used to describe it, the implications for the value dimensions (here patient outcomes, costs and the environment), examples and strategies for the reduction of the use of low-value care are presented.

Table 4: Types of low-value care

CATEGORY OF LOW-VALUE CARE	OVERUSE AND MISUSE					UNWARRANTED VARIATION as a sign of potential overuse and/or underuse (not explained by different need)		UNDERUSE	
TYPE OF LOW-VALUE CARE	A. The service harms the patient	B. The service does not benefit the patient/has no effect (no benefit or benefit/ harm relation unfavourable)	C. There are more cost-effective alternatives to the service	D. There are more environmentally sustainable alternatives with similar or higher benefits	E. The service is delivered in a costlier setting/sector or by costlier professions than necessary	F. Geographic variation (entire population and service provision in one area versus another)	G. By patient groups (social, demographic etc.)	H. Services which are necessary and considered cost-effective	I. Services which are necessary and save costs
DEFINITION	Services that pose more risks (for example, adverse patient events, such as health-care-associated infections, surgical-care errors, and unsafe technologies) than benefits to the patients (costs are by definition unwarranted)	Services that lead to additional costs without expected health benefit, that is, the services have no known benefit for all patients or the services are not appropriate for the individual patient, based on expected outcomes, medical criteria, guidelines or preferences	Services for which alternatives exist that provide the same benefit for lower cost, or higher benefit for the same cost, that is, are more cost-effective	Services or resources for which alternatives exist that provide similar benefit while being more environmentally sustainable (or higher benefit for the same environmental impact)	Services that could be provided at a lower level of care (setting/ sector/ profession) incurring fewer costs (and reducing potential patient risks) or that could have been prevented by the provision of care at previous levels of care	Provision/ costs/ quality of services vary between geographic regions not explained by different need	Provision/ costs/ quality of services vary between patient groups (segmented by social, demographic and or other characteristics) not explained by different need	Cost-effective services not provided despite necessity – meaning that services are not offered to patients fitting a particular clinical description while such services are considered cost-effective	Services that are not provided despite being considered high value, as they both improve health outcomes and save costs ("dominating" in the cost-effectiveness plane)
LOW-VALUE CARE TERMS	Harm Patient safety risks	Overutilisation/ Overdiagnosis/ Overtreatment "No-value care" Inappropriate care Outdated care	Low value for money Cost-ineffective Low-priority care	Unsustainability Carbon-intensive care	Low value for money Inefficient care Not cost-saving	Geographic variation Small area variation Inequity	Inequity	Underuse Necessity Untimely care	Underuse Necessity Untimely care
IMPLICATIONS FOR PATIENT OUTCOMES	Negatively impacted	Unchanged, exposure to risk	Unchanged or negatively impacted	Unchanged	Unchanged	Unchanged or negatively impacted	Unchanged or negatively impacted	Negatively impacted	Negatively impacted
IMPLICATIONS FOR COSTS/ THE ENVIRONMENT	Unnecessary in terms of costs and the environment. Reduction saves costs and resources.	Unnecessary in terms of costs and the environment. Reduction saves costs and resources	Unnecessarily high costs. Reduction saves costs	Unnecessarily negative environmental impact Reduction saves resources	Unnecessarily high costs Reduction saves costs	Unnecessary in terms of costs and the environment either now or in the future Reduction saves costs and resources	Unnecessary in terms of costs and the environment either now or in the future Reduction saves costs and resources	Lower costs now, but potentially higher costs for compensatory services in the future	Lower costs now, but potentially higher costs for compensatory services in the future
EXAMPLES	Surgical errors (for example, wrong-side surgery) Prescription of contraindicated medications	Computed tomography/imaging of the sinuses for uncomplicated acute rhinosinusitis Cancer screening in patients outside the recommended age group	PCSK9-inhibitors for secondary prevention of cardiovascular disease	Single-use medical material that could be sterilised for multiple use	Inpatient stay instead of day surgery for eligible conditions; unnecessary hospitalisation; services that can be provided by a nurse practitioner but are provided by a physician (for example, wound care)	Share of caesarean sections Length of stay for the same service/condition Patient-reported outcomes post-hip replacement surgery		Indicated cancer screening Indicated chronic disease follow up (for example, diabetes)	Immunizations
POSSIBLE MITIGATION STRATEGIES	Do not provide at all and develop strategies how to eliminate these	Provide alternative or no service	Provide alternative (more cost-effective) service	Promote the use of "more sustainable services" with better reimbursement	Provide service in alternative setting/ sector or by an alternative profession	Evaluate whether variation is due to overuse and/or underuse Implement policies to overcome variation		Provide to more individuals	Always provide

Source: Authors' own compilation (as extension of Busse et al., 2015).

CHAPTER 2: IDENTIFYING AND MEASURING LOW-VALUE CARE

The identification of low-value care is a necessary prerequisite for measuring and monitoring its extent, as well as for the design and implementation of strategies to address it. Different complementary methods are already in use (Miller et al., 2018). One method is the identification of healthcare services that are considered of low value based on evidence-based approaches (for example, services not recommended in Cochrane reviews, national and clinical guidelines, Council of the EU recommendations, Health Technology Assessments). In addition, unwarranted variation in healthcare provision between geographical regions or patient groups is used for identifying low-value care, particularly, when evidence-based approaches and recommendations do not exist or are outdated.

The European Commission's report *Defining value in "value-based health care"* (European Commission, 2019a) highlights different options for identifying low-value care: among clinician-led initiatives, *Choosing Wisely* is the most prominent example. Moreover, a number of European countries have piloted or launched initiatives to identify low-value interventions, for example, Germany (Over-, under- and misuse care 2001 - Sachverständigenrat für die Konzertierte Aktion im Gesundheitswesen, 2002), Spain (GuNFT 2007 - Ibargoyen-Roteta et al., 2010), the Netherlands (Zinige Zorg Initiativ 2013 - VGZ, 2023), Belgium (Healthy Belgium, 2021), and Sweden (Kloka kliniska val "Wise clinical choices" 2023 - Almquist et al., 2023). Non-EU countries, such as the UK (NICE „DoNotDo"-Database 2006 - NICE, 2024), and Canada (Canadian Institute for Health Information, 2022), also implemented notable initiatives. However, translating evidence-based lists of low-value care (for example, *Choosing Wisely*) into meaningful measures and indicators that can be applied to available data sources (such as claims data) is methodologically challenging (Schwartz et al., 2014).

It is also important to understand the limitations of comparing countries and their underlying health systems. For the low-value care types C–E, which are considered to be particularly system-dependent, countries should prevent inappropriate comparative assessments. For example, the German National Cancer Plan introduced the concept of informed decision-making but gave more value to informed decision-making for or against a specific cancer screening than to high uptake rates (Bundesministerium für Gesundheit, 2017). Furthermore, the uptake of Council of the EU recommendations (for example, for cancer screening, see Council of the European Union, 2022) can be delayed in some countries. This needs to be considered when comparing low-value care across countries.

Indicators for measuring low-value care

Indicators for measuring low-value care on a system level have been proposed by different initiatives described in the literature. What is more, several regional, national and international HSPA initiatives incorporate low-value care indicators. According to the OECD, three main criteria can be used to inform priority setting in the measurement of low-value care and guide the selection of indicators at the system level: a) high-cost and high-volume care; b) policy relevance and c) data availability (OECD, 2014). The following sections look first at the indicators that can be identified in the literature, followed by more contextualised information from the survey among the Expert Group on HSPA.

What are the possible indicators for measuring low-value care identified in the literature?

The indicators identified in the literature (see Annex II) cover different fields of healthcare: prevention, diagnostics, treatment and medication. Low-value care indicators in the field of prevention include screening (for example, mammography screening in women 75+ years), while diagnostic indicators encompass specific laboratory testing (for example, bleeding time testing) and imaging services (for example, head imaging for uncomplicated headache). Treatment indicators of low-

value care incorporate specific procedures and surgeries (for example, hysterectomy for benign disease). Indicators for assessing low-value medication cover both patients with certain medical conditions (such as opioids for headache) and broader population groups without a specific medical condition (such as polypharmacy among the elderly). Options for assessing unwarranted variation in healthcare delivery identified in the literature cover a broad variety of healthcare services, for instance, knee replacement, caesarean section, tonsillectomy and pharmaceutical consumption (for example, antimicrobial consumption in the EU/European Economic Area – see European Centre for Disease Prevention and Control, 2023).

Annex II provides an indicative, non-exhaustive overview of the variety of indicators identified in the literature. The selection is meant to highlight different examples and provide a sense of the broad spectrum of available options. However, it is important to note that some of the selected indicator examples might be controversial (within and across countries), might no longer be recommended for measuring low-value care (for example outdated or changing evidence base), and might be limited by methodological obstacles. At the country level, indicators must be chosen based on the country's guidelines and recommendations, and data availability.

Which indicators have been used in national HSPA initiatives?

Seven countries (Austria, Belgium, Finland, Hungary, Malta, Norway and Sweden) reported indicators already in use to measure low-value care within their national HSPA initiatives, whereas three countries (Estonia, Poland and Slovakia) reported planned indicators for future use (for indicators, see Annex III). Table 5 maps identified indicators from the literature and the survey onto the subcategories of the framework in Table 4 according to the different types of low-value care (Type A–I). These examples might be country-specific or system-specific (for example, branded medications in the context of the availability of generic medicines).

In addition, all survey participants were asked to provide what they consider as the most important indicators ("key indicators") for measuring low-value care within HSPA, irrespective of current HSPA efforts in their countries (Table 6). These indicators can be considered as a starting point for countries planning to select and implement indicators for assessing low-value care within HSPA as these might be easier to operationalise based on other countries' experiences. Other countries have stated that they use low-value care indicators without having implemented a comprehensive HSPA, for example in the context of quality assurance procedures. For example, in Germany, services in various areas (such as orthopaedics and trauma surgery, gynaecology, cardiology and heart surgery, perinatal medicine) are continuously reviewed on the basis of quality indicators in order to identify low-value care and introduce targeted improvement measures. These results are then published for the inpatient area on various comparison portals. Established quality assurance indicators may be used when selecting indicators for the purpose of implementing an HSPA initiative in the future.

Table 5: Indicator examples clustered into the framework of the different types of low-value care

CATEGORY OF LOW-VALUE CARE	OVERUSE AND MISUSE					UNWARRANTED VARIATION as a sign of potential overuse and/ or underuse (not explained by different need)		UNDERUSE	
TYPE OF LOW-VALUE CARE	A. The service actively harms the patient	B. The service does not benefit the patient/has no effect (no benefit or benefit/ harm relation unfavourable)	C. There are more cost-effective alternatives to the service	D. There are more environmentally sustainable alternatives with similar or higher benefits	E. The service is delivered in a costlier setting/sector or by costlier professions than necessary	F. Geographic variation (entire population and service provision in one area versus another)	G. By patient groups (social, demographic ...)	G. Services which are necessary and considered cost-effective	H. Services which are necessary and save costs
PREVENTION		- Non-targeted screening - Non-indicated health check-ups				- Indicated cancer screening		- Indicated cancer screening - Health check-ups	- Immunisation (for example, flu)
DIAGNOSTICS		- Imaging for low back pain without presence of red flags - Number or percentage of tests that do not need to be carried out, for example, PSA testing; tumour markers; chest radiography pre-operatively - Reliability of tests (false-positive may lead to overtreatment) - Vitamin D screening	- MRI: Avoid inappropriate surcharges during non-urgent outpatient services			- Diagnosis, for example, of ADHD in children - CT, MRI and PET examinations per 1 000 population		- Reliability of tests: false-negative may lead to lack of treatment - Follow up for chronic diseases (for example, diabetes)	
TREATMENT	- Nosocomial infections - Pressure ulcers - Wrong-site surgery - Health-care-associated infections caused by multidrug-resistant pathogens	- Percentage of caesarean section in low-risk births - Hernia operations - Routine operating for acute appendicitis - Chemotherapy in the last weeks of life - More than one emergency department visit in last 30 days of life		- Single use medical material that could be sterilised for multiple use	- Unnecessary inpatient visits which could be handled in outpatient care (ambulatory care sensitive conditions like asthma, hypertension, COPD, congestive heart failure, diabetes) - Avoidable specialist visit	- Elective surgery, such as knee replacement or benign hysterectomy - Caesarean section - Procedures with the highest costs - Implantation of defibrillator - Day care of services performed as such - Average waiting time, for example, for trauma surgery			
MEDICATION	- Share of individuals aged over 70 receiving potentially inadequate medication	- Overprescribing of certain medication (for example, antibiotics or polypharmacy) - Alternative medical therapies or treatments without proven benefit (for example, homoeopathy)	- Brand name medication when generic medication is available			- Antibiotic prescription - Antidepressants - Self-reported use of non-prescribed medicines		- Cost-effective medication for chronic diseases (for example, insulin for diabetes, blood-pressure-lowering medication for hypertension)	
OTHER	- Treatment not in line with guidelines - Doctors are not providing easy-to understand explanations			- Non-clinical required visits to doctors (proof for work, school)		- Inpatient mortality - Avoidable hospital (re-)admissions - Causes of hospitalisation - Length of stay - Bed occupancy rates - Case-mix per physician - Number of specialist consultations			

Note: ADHD: attention deficit hyperactivity disorder; COPD: chronic obstructive pulmonary disease; CT: computed tomography; MRI: magnetic resonance imaging; PET: positron emission tomography; PSA: prostate-specific antigen. *Source*: Authors' own compilation based on survey among the Expert Group on HSPA.

Table 6: Key indicators for measuring low-value care according to the country experts of the Expert Group on HSPA

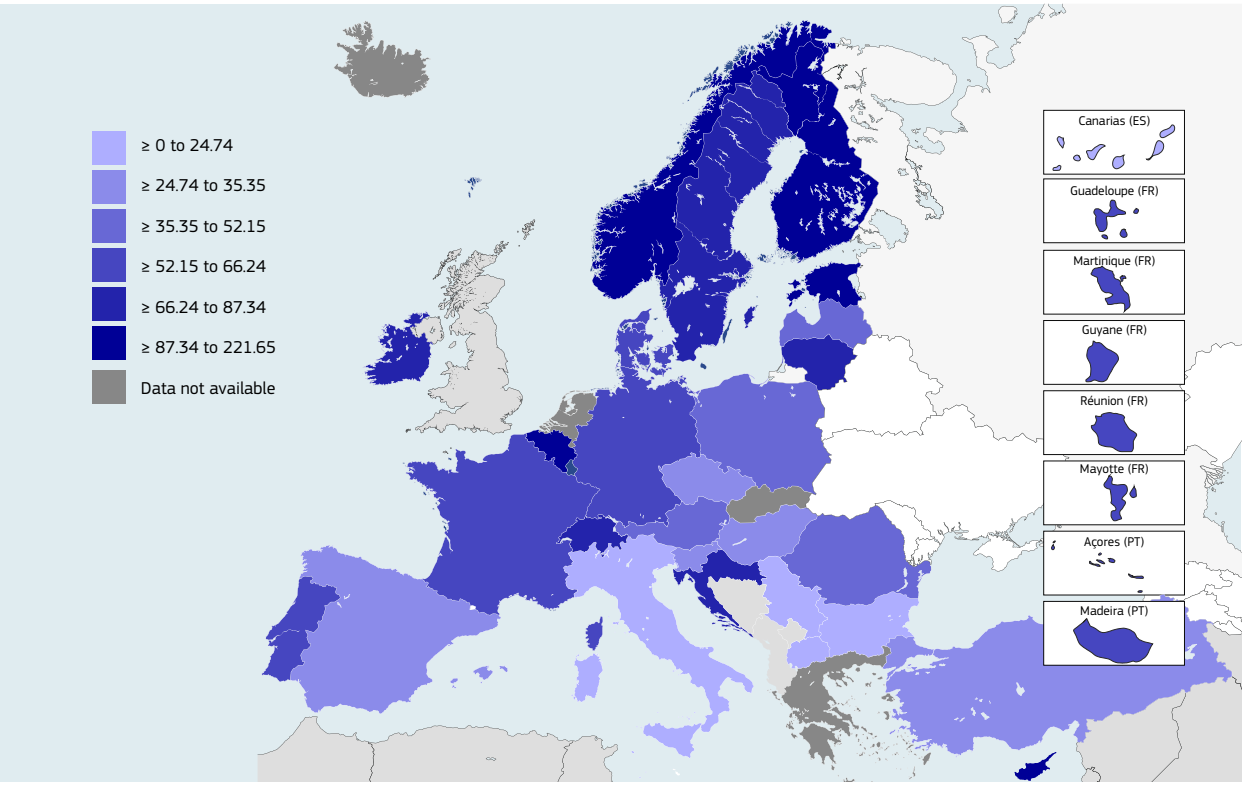
	KEY INDICATORS BY REPORTING COUNTRY/-IES
PREVENTION (SCREENING)	• Cancer screening coverage: cervical, breast and colorectal cancer [Estonia] • Cancer screening services other than those which are covered by the national (statutory) reimbursement systems of the EU Member States and which are based on recognised international and/or national recommendations [Germany] • Over-screening (screening of selected cancer diagnoses) [Czechia] • Repetition of tests [Belgium]
DIAGNOSTICS	Number or percentage of tests that do not need to be carried out [Czechia, Malta], such as: • Laboratory tests not needed (for example, vitamin D measurement without renal failure or hypercalcaemia, cholesterol measurement too often measured per year, PSA testing and tumour markers) [Cyprus, Czechia, Malta] • Imaging not needed (for example, preoperative chest radiography) [Czechia, Malta] • Costly radiology tests are performed before other, less costly radiology tests (for example, MRI before plain X-ray in low back pain for the first time) [Cyprus]
TREATMENT (PROCEDURES AND SURGERIES)	• % of caesarean sections for low-risk births (share of caesarean sections in the case of a single birth in the first child) [Estonia, Portugal, Luxembourg] • Unnecessary procedures (for example, surgical procedures) [Czechia] • Rate (%) of low-value care procedures/procedures by specialty [Belgium] • Average waiting time for trauma surgery, for example, hip fracture surgery [Malta] • Proportion of inpatient surgeries that could have been carried out as day care [Malta] • Surgeries (for example, tonsillectomy, caesarean section, uncomplicated day-case surgeries staying in hospital more than overnight) [Cyprus] • Rate (%) of nosocomial infections [Portugal] • Number of pressure ulcers [Portugal]
MEDICATION	• Polymedication (%) in people who are 75+, with five or more different medicines [Estonia] • Overprescribing (overuse of certain medications) [Czechia] • Antibiotic prescription [Use of antibiotics (total DDD/1 000 population/day or percentage of population that used antibiotics at least once in the year)] [Estonia, Luxembourg, Malta] • Using brand medication instead of biosimilars and generics [Belgium]
OTHERS (FOR EXAMPLE, SERVICES DELIVERED IN A COSTLIER SETTING)	• Rate of emergency department admissions leading to hospital admission/ inappropriate attendance at emergency department [Luxembourg, Malta] • Age-standardised rate for acute care hospitalisation for particular conditions where appropriate ambulatory care prevents or reduces the need for admission to hospital, (per 100 000 population younger than age 65) [Grand mal status and other epileptic convulsions, chronic lower respiratory diseases (except asthma), asthma, hypertension, diabetes, cardiac failure] [Germany, Latvia, Luxembourg]

Note: DDD: defined daily dose; HSPA: health system performance assessment; MRI: magnetic resonance imaging; PSA: prostate-specific antigen.
Source: Authors' own compilation based on survey among the Expert Group on HSPA.

Selected examples of indicators measuring low-value care based on European data

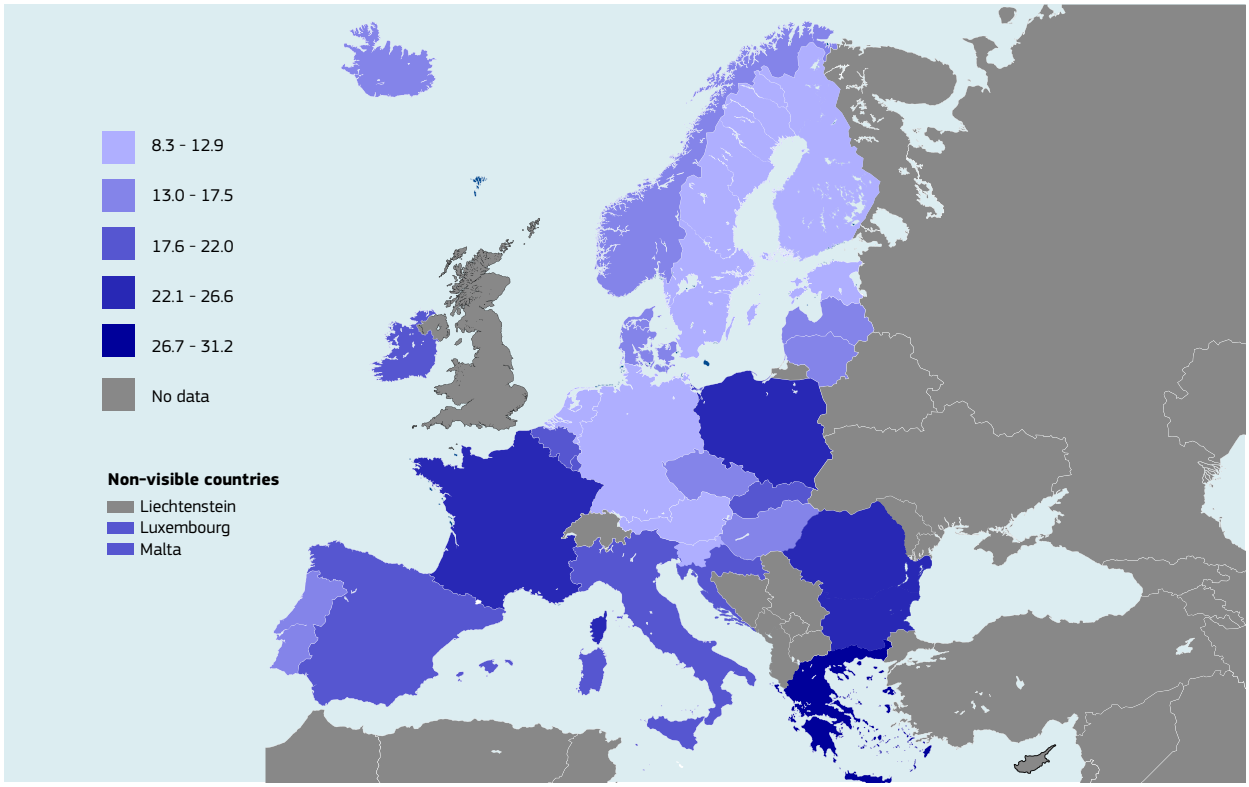
Unwarranted variation between European countries in the delivery of certain services can be assessed based on data from Eurostat or the European Centre for Disease Prevention and Control. Figures 2 and 3 show two examples, for tonsillectomies and the consumption of antibacterials, respectively.

Figure 2: Variation across European countries shown for the indicator "Tonsillectomies per 100 000 inhabitants"



Source: Eurostat (2024).

Figure 3: Unwarranted variation shown for the indicator "Population-weighted mean consumption (in DDD per 1 000 inhabitants per day) of antibacterials for systemic use in the community (that is, outside the hospital sector) in EU/EEA countries" in 2022



Note: DDD, defined daily dose; EU/EEA, European Union/ European Economic Area.
Source: European Centre for Disease Prevention and Control (2023).

For which areas are suitable indicators lacking?

Twelve survey respondents perceived a lack of indicators for low-value care in certain areas. These pertained to particular services or settings, for example, primary care, ambulatory care, follow ups, mental health, digital care, rehabilitation, long-term care, end-of-life and palliative care. Individual respondents also signalled that available indicators were not sufficient for measuring safety, harm, overuse, environmental impact, the appropriateness of the healthcare settings where care is delivered, and the appropriateness of certain treatments and diagnostics. It needs to be noted that theses perceptions are the views of the participating experts, but other countries or initiatives may have already identified and/or used indicators in these areas. This emphasises the importance of cross-country learning in general and the work of the Expert Group on HSPA in particular for supporting experts from different countries to share experiences.

Methodological obstacles with indicators measuring low-value care

All approaches for measuring low-value care have methodological complexities that limit their applicability to a comprehensive exercise at the system level.

Challenges with identifying services that are considered low value

The extensive range of services that could potentially be of low value complicates the identification of low-value care at the system level. Restricting the identification process mainly to a small subset of services expected to contribute significantly to expenditures could effectively identify a significant portion of low-value care. However, this narrow approach might leave potentially inappropriate services unmeasured. Another challenge is that many low-value services necessitate an understanding of the clinical specifics associated with their use to determine whether a specific use constitutes low-value care. In certain instances, this clinical nuance surpasses what can be inferred from claims data, which are the most readily available data for measuring low-value care.

Challenges with the unwarranted variation approach to measuring low-value care

When the unwarranted variation approach is employed to assess supply (for example, hospital beds and the health workforce) or overall expenditures, it does not necessarily pinpoint to individual services contributing to low-value care. However, this limitation can be addressed by looking at unwarranted variation in the delivery of specific services [see some analyses as part of the Dartmouth Atlas project (Weinstein et al., 2014)]. Other challenges include the complexity of adjusting for all patient characteristics that may lead to warranted variations in utilisation among regions, and the incapacity to detect low-value care that is pervasive across all regions. When a particular service is inappropriately used in a uniform manner across all regions, the geographical variation approach may fail to identify some of this wasteful utilisation. Nevertheless, this method offers a practical means of approximating low-value care in situations where service-level information is not available or otherwise impractical. Furthermore, geographical variation in healthcare is not only relevant within countries but also for comparisons between countries (ECHO Project, 2017).

Challenges and obstacles reported by the experts in the survey

In addition to the methodological challenges above, data gaps, availability issues, methodological and other obstacles (see Table 7) were highlighted by the survey respondents when measuring low-value care. Whereas these challenges are relevant for all activities involving the use of healthcare data, they remain key in the context of low-value care identification. Data-related obstacles range from data issues (for example, poor data quality, lack of detail in the data, lack of data availability on a national level), over lack of access to data sources (for example, services provided via out-of-pocket payments), to certain areas where data are generally lacking (for example, laboratory test results). Additionally, methodological issues were reported (for example, validation of indicators and international comparisons) for which the European Health Data Space might be one future solution. Lastly, political obstacles, such as pushbacks from stakeholders or a low political commitment to change, were also highlighted by the experts. Table 8 shows three examples of indicators for measuring low-value care, their operationalisation and usual data sources to highlight the complexities that arise. Difficulties with agreeing on and specifying the respective target group, inclusion and exclusion criteria, not only within but also across countries are discussed in the literature (Mafi et al., 2021). Additionally, data availability and data quality will strongly rely on the underlying data source, depending on the context.

Table 7: Data issues and other obstacles reported by experts

	EXAMPLES
GENERAL DATA ISSUES, DATA GAPS AND AVAILABILITY ISSUES	• Lack of any input data (and/or methodology) / limited or poor data availability • Poor data quality and validity • Data are not aggregated or available on national level • Lack of methodological description • Lack of (medical) data digitalisation • Various sources of error and bias in data • Data from different sources need to be combined • Data not collected in a structured and electronic way • Lack of enough details within the data
SPECIFIC AREAS WITH LACK OF DATA	• Laboratory test results • Diagnoses and specific procedures in extramural healthcare • Quality outcomes • Specific treatments/medication • Inpatient level (patient data accessible on national level)
LACK OF DATA SOURCES	• Lack of data for services covered from the private market/out-of-pocket • Lack of registry data • Lack of data for specific healthcare services stratified by patient characteristics • Lack of age-standardisation for indicators • Lack of evidence-based medicine data, for example, for rare diseases/small medical disciplines • Lack of data linkage to mortality statistics
OBSTACLES DUE TO DEFINITIONS AND OPERATIONALISATION	• Definition of low-value care (can vary depending on circumstances) • Defining indicators, particularly in areas with lacking/ contradictory treatment guidelines and for healthcare not defined by specific procedures (for example, mental healthcare, rehabilitation services, appropriate level of care) • Defining the “patient group” (that is, for some patients the treatment might be appropriate, for others not)
OTHER METHODOLOGICAL ISSUES	• Limited availability of competences in data mining • Decision support and prediction methods are not available • National data protection/GDPR (general data protection regulation) law • International consensus lacks (that is, developing indicators internationally and agreeing on a uniform methodology)
POLITICAL OBSTACLES	• Political sensitivity • Political pushback from certain stakeholders in system (for example, laboratories) • Low willingness of political commitment to changes • Lack of prioritisation to measure low-value care

Source: Authors’ own compilation based on survey.

Table 8: Examples of necessary definitions and potential data sources in the process of operationalising indicators for measuring low-value care

INDICATOR	TARGET GROUP	EXCLUSION OF	DATA SOURCE
Antibiotics for acute upper respiratory and ear infections	Patients (1+/18+) with an oral antibiotic prescription within 7 days of upper respiratory tract or ear infection	Patients with comorbidities, competing diagnoses, previous otitis media (14 days)	Prescription data and diagnoses
Imaging (X-ray) for low back pain	Patients (18+) with a low back pain imaging within 6 weeks after diagnosis of unspecific back pain	Patients with previous episode of low back pain (within last 1–2 years), with spine surgery, with hospital admission	Insurance claims data with procedures/ diagnoses in ambulatory and inpatient care
Geographic variation for tonsillectomy	Numbers of patients with a tonsillectomy	Not applicable	Insurance claims data with number of procedures and place of surgery

Source: Authors' own elaboration based on Mafi et al. (2021).

CHAPTER 3: WHICH MEASURES CAN BE ADOPTED TO REDUCE LOW-VALUE CARE?

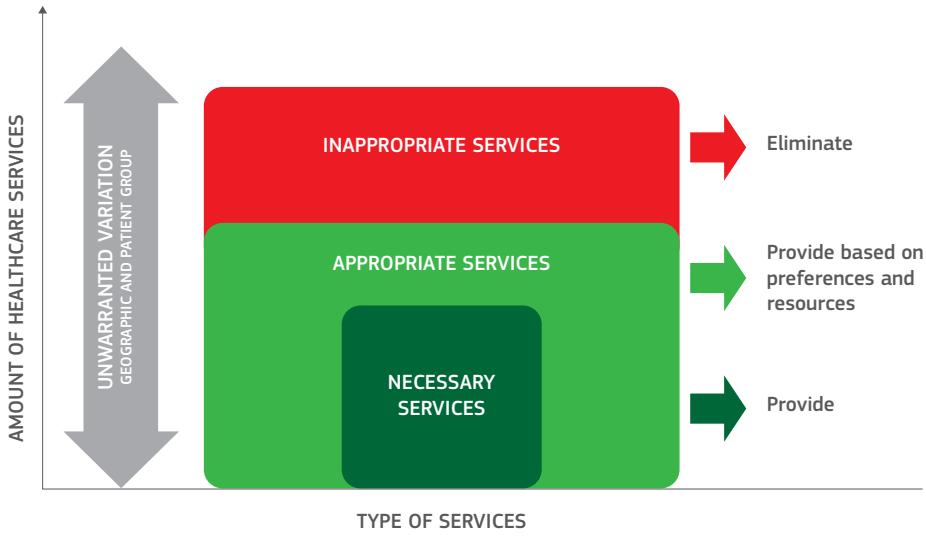
There is a strong need to not only identify but to actively reduce low-value care due to ethical, quality, economic and environmental considerations. As part of *Choosing Wisely*, the following phases for reducing the use of low-value care were identified (the *Choosing Wisely De-Implementation Framework*):

- **Phase 0:** identification of potential areas of low-value healthcare;
- **Phase 1:** identification of local priorities for the implementation of recommendations;
- **Phase 2:** identification of barriers and potential interventions to overcome these;
- **Phase 3:** rigorous evaluations of implementation programmes;
- **Phase 4:** spread of effective implementation programmes (Grimshaw et al., 2020).

After identifying the areas of low-value care relevant in a country or region, implementing measures and policies that reduce low-value care can aid in distributing resources to services that create the highest value for patients under given resources. In line with the new definition of low-value care proposed in this report, increasing value for patients in the healthcare system can be facilitated through three overarching actions: providing necessary services, providing appropriate services based on preferences and resources, and eliminating inappropriate services.

The distinction between the concepts of necessity and appropriateness of care in the context of low-value care is illustrated in Figure 4. Necessary services are narrower: all patients fitting a particular clinical description must receive these services to maintain or improve their health (for example, all patients in a certain age group) and it would be improper/unethical not to do so (RAND/UCLA, 2001). "Necessity" in this context applies to the individual patient and the health system overall. One example of a necessary service for the health system and the individual was the receipt of the COVID-19 vaccination during the pandemic, as the benefits outweigh the risks while protecting resources (financial and personnel). Appropriate services are wider: those services may not be necessary, but can be used based on the preferences of patients and considering the resource limitations of a health system, as they are expected to lead to health benefits (for example, a variety of treatment options exist out of which one is used based on the patient's preference, such as hospitalisation during end-of-life care). Lastly, inappropriate services are services that are expected to lead to no health benefits or even cause harm to patients and should hence be completely eliminated. In alignment with the low-value care framework presented in this report (Table 4), the overarching actions required to reduce inappropriate care and increase necessary care differ, while various specific strategies for the reduction of different types of low-value care exist.

Figure 4: Distinguishing the concepts of necessity and appropriateness of healthcare services



Source: Authors' own compilation.

Measures to reduce low-value care based on the literature

Measures to reduce low-value care based on the literature include a wide variety of strategies, which can be used separately or in combination (see Table 9). They have been described more generally/conceptually, such as "remove, reduce, replace and revise" (Tyack et al., 2022; Wang et al., 2018), as well as from specific settings in countries (Verkerk et al., 2022) or for specific areas of care (Kini et al., 2022). Low-value care reduction measures ultimately address either patient or provider behaviour (Alishahi Tabriz et al., 2022). There is an increasing body of evidence exploring their impact as well as potential barriers and facilitators for their implementation (Beks et al., 2024; Heus et al., 2023; Kroon et al., 2023; Leigh et al., 2022; Maratt et al., 2019; Parker et al., 2022; Sypes, Grood, Clement et al., 2020; Sypes, Grood, Whalen-Browne et al., 2020; van Bodegom-Vos & Marang-van de Mheen, 2022). Riganti et al. (2023) refer to multiple studies showing that when information on benefits and harms is shared with patients, low-value care tends to decline.

Table 9: Measures to reduce the extent of low-value care identified in the literature

ADDRESSING	LOW-VALUE CARE REDUCTION MEASURES
HEALTHCARE PROFESSIONALS	• Quality assurance systems like auditing and providing feedback, for example, through scorecards (Alishahi Tabriz et al., 2022; Ingvarsson et al., 2022) • Education through developing, disseminating and implementing new guidelines (Alishahi Tabriz et al., 2022; Ingvarsson et al., 2022) • (Electronic) decision support tools (Alishahi Tabriz et al., 2022; Patey & Soong, 2023) • Financial systems including removing services from the benefits basket, applying financial penalties and pay-for-performance schemes (Ingvarsson et al., 2022; Patey & Soong, 2023) • Behavioural science measures such as behavioural substitution strategies or nudges (Patey et al., 2023; Patey & Soong, 2023) • Regulatory structures such as policy implementations (Patey & Soong, 2023)
PATIENTS	• Education through information material, guidelines and campaigns (Patey & Soong, 2023; Sypes, Grood, Clement et al., 2020; Sypes, Grood, Whalen-Browne et al., 2020) • Shared decision-making (Riganti et al., 2023) • Incentives for use of prevention, such as vouchers, gift cards or cash, if they are part of a comprehensive strategy to address underuse of preventive services, if they target people at high risk of underuse and if the focus is on removing financial barriers (Coury et al., 2021; Sutherland et al., 2008)

Source: Authors' own compilation.

Different measures for reducing the extent of low-value care have had success so far. Multicomponent interventions, especially those including educational components, appear to be the most effective (Kjelle et al., 2021; Patey & Soong, 2023). However, a review of randomised-controlled trials on low-value care reduction strategies did not find a relationship between the effect size and the number of strategies implemented (Heus et al., 2023). Moreover, improving knowledge and promoting health literacy not only on the patient side but also on the healthcare provider side and assisting them with, for example, decision support tools and feedback about their own practice have also been described as promising strategies in the Expert Group on HSPA survey. Similarly, the literature also supports that multicomponent interventions addressing both patient and clinician roles were most effective in reducing the use of low-value care (Colla et al., 2017). This is also seen in the example for a successful reduction strategy in the USA (see Box 5). Members of the Expert Group added that education should not only address current personnel but also students, by upgrading their education. Although financial disinvestments have shown mixed results (Patey & Soong, 2023), passive interventions including the publication of guidelines were often not sufficient to change behaviour (Parker et al., 2019). In the survey, some countries have proposed that instead of financial penalties, financial incentives for countries or regions successfully addressing low-value care are preferable. Moreover, updating the benefits basket and clinical guidelines on a regular basis (perhaps yearly) based on an assessment of the economic use of resources (for example, as in health technology assessment) was described as a future promising strategy to facilitate the

low-value care reduction process. As reflected in the recent WHO report on financial protection in 40 European countries (World Health Organization Regional Office for Europe, 2023), out-of-pocket payments by individuals lead to financial hardship across countries and especially negatively impact low-income families. Moreover, even small user charges can hinder people from seeking essential health services, consequently affecting clinical outcomes, which is why out-of-pocket payments are not listed here as a measure to reduce low-value care (Fusco et al., 2023; Rättö et al., 2021). Based on the literature, clinical decision support and performance feedback are evidence-based effective elements of multicomponent strategies (Colla et al., 2017).

Box 5: Example for a successful strategy to reduce low-value care from the USA

Clinicians committing to Choosing Wisely recommendations reduced low-value care for older patients

Kullgren et al. (2024) conducted a study (cluster randomised clinical trial) at eight primary care clinics in the USA between 2017 and 2019 to analyse whether committing to Choosing Wisely recommendations could lead to a reduction of low-value care for older patients (n = 8 030). The three chosen recommendations – which are commonly used in the USA – involve both clinicians and patients in decision-making:

- Avoid using medications other than metformin to target tight glycaemic control to an HbA1c (glycated haemoglobin) level less than 7.0% in most older adults with diabetes
- Avoid use of benzodiazepines or sedative-hypnotics in older adults as the first choice for insomnia, agitation or anxiety
- Do not routinely perform prostate-specific antigen-based screening for prostate cancer in older men

For clinicians following the Choosing Wisely recommendations, the authors found a low-value care reduction of 21%. Older patients with diabetes were more likely (85% higher odds) to have their blood-glucose-lowering medications reduced. On the other hand, no significant reduction was found for example for reducing sedative–hypnotic medications for insomnia or anxiety. The authors concluded that this divergence might be due to clinicians and patients having more difficulties in avoiding the use of low-value services for symptomatic conditions (for example, insomnia and anxiety) than for generally asymptomatic conditions (such as diabetes) (Kullgren et al., 2024).

Overarching supporting facilitators to low-value care reduction strategies based on the literature can be: aligning top-down policies with the interests of clinicians, patients and policymakers through tailored measures (Patey & Soong, 2023); providing alternatives or substitutes (Whittington et al., 2019); building coalitions and conducting needs assessment (Parchman et al., 2021). Moreover, recommendations, health technology assessment, controlling pharmaceutical products and having a system for knowledge management can be useful for the reduction of low-value care (Augustsson et al., 2022). Further facilitators include senior leadership support and aligning low-value care initiatives with unifying organisational values and priorities; physician leadership and empowerment; data-driven techniques to measure and track low-value care, benchmark performance, and embed or link reduction targets within payment, network design and care pathways; and ongoing relations with internal teams and external stakeholders and partners to disseminate and scale reduction best practices (Sorenson et al., 2022). Overall, the insufficient and quickly evolving evidence base can be a barrier to the implementation of low-value care reduction techniques (Leigh et al., 2022). Hence, providing an electronic software infrastructure with clinical data that is accessible to everyone supporting the collection of data on low-value care, the communication of results and the monitoring of the reduction process was described as a promising facilitator in the survey.

Overall, successfully tackling low-value care requires a multicomponent approach, and intervening at different levels; strategies should be tailored to the country/ setting for which they are intended. This is emphasised by a statement from Sweden's expert (Box 6).

Box 6: Statement from Sweden's expert on the successful reduction of low-value care

" To de-implement care that should not be conducted, change needs to be enabled at various levels of the health system:

- *At national, regional, and local level there is a need to spread knowledge and enable competence development. The need for change, status of current evidence and results from monitoring and evaluation also need to be communicated and discussed.*
- *Change needs to be facilitated at organisational and structural levels within health care and dentistry: decision-makers at regional level have the possibility and mandate to influence, for example, hospital bed availability, financial models and the workforce.*
- *At caregiver level, organisations can develop to become learning organisations that promote cooperation and collegial support. NBHW's [National Board of Health and Welfare] evaluation has shown that soft steering mechanisms are often used to de-implement care that should not be conducted. These often include educational and communication efforts directed toward health care staff. Often these are sufficient to de-implement care practices. However, practices that have been used for a long time and despite recommendations are still used may warrant structural or financial steering mechanisms."*

Currently implemented solutions for reducing low-value care reported by the Expert Group on HSPA

In the survey, 14 out of 18 countries reported experiences with reduction measures for low-value care and rated the perceived success of these solutions. The reported strategies can be clustered into four overarching categories:

- Multicomponent low-value care campaigns and initiatives
- Quality transparency / auditing
- Financial adjustments
- Clinical guidelines

In the first category, encompassing multicomponent low-value care campaigns, multiple examples were provided by respondents. The *Spanish Do Not Do Initiative* project started in 2013, aiming to disseminate Do Not Do recommendations among professionals and users (GuíaSalud, n.d.); 170 recommendations were developed between 2013 to 2018 by 51 scientific societies and 789 panellists. This project helped to create a culture of Do Not Do, supporting the initiatives' objective of reducing the use of unnecessary health interventions, and raise public awareness. A new stage of the initiative was recently started to make the Do Not Do recommendations measurable and thereby enable monitoring of the impact of the campaign. In this new stage, dissemination to professionals and patients will be facilitated through an accessible and constantly updated list of recommendations, the catalogue of "Don't recommendations" (GuíaSalud, 2024). The updates will be based on recommendations by scientific associations having to undergo a methodological and clinical evaluation before being shared in the "Don't recommendations". The *Finland Smart to Avoid Recommendations* were developed in a research setting called the PROSHADE consortium (PROSHADE consortium, n.d.). As the term low-value care is negatively connotated in the Finnish setting, a new term was established in collaboration with the Finnish Medical Society: *vähähyötyinen hoito* – "treatment of little benefit" (PROSHADE consortium, n.d.). A tailored, multifactorial reduction strategy and the concept of "treatment of little benefit" were presented at the Science Festival in Helsinki with a broadcast on YouTube and radio programmes aimed to inform the general public. Latvia combines the use of clinical guidelines with corresponding algorithms, clinical pathways and indicators in priority health areas (Slimību profilakses un kontroles centrs, 2020). Similar multicomponent reduction initiatives have been implemented in Sweden and Norway.

The second category encompasses quality transparency and auditing measures to reduce low-value care. In Cyprus and Luxembourg, auditing for unnecessary magnetic resonance imaging is conducted as a strategy (Bouëtté et al., 2019). In Slovakia and Belgium, findings on low-value

care are published, creating public pressure (OECD/European Observatory on Health Systems and Policies, 2017). In Norway, transparency efforts include publicly available atlases reflecting the geographical inequalities in specialist healthcare, including chronic diseases, mental healthcare, obstetrics, gynaecology, orthopaedics, day surgery, chronic obstructive pulmonary disease, elderly healthcare, neonatal healthcare and child healthcare (Helseatlas, n.d.).

Measures in the third category encompass financial adjustments for purchasing agencies or health care providers, such as cost and spending reductions or non-payment. Such initiatives were implemented by a small number of countries. In Slovakia, spending reviews aim to reduce low-value care (Ministerstvo financií / Ministerstvo zdravotníctva, 2019). In Germany and Belgium, if services of low value are identified, they are removed from the benefit basket of the statutory health insurance. In Czechia, subsidies exist to address regional variations in primary care.

For measures in the fourth category encompassing clinical guidelines, Belgium, Czechia, Germany, Hungary, Luxembourg and Malta reported experiences with the development of clinical guidelines explicitly aiming to support the reduction of low-value care. In Malta, for instance, this includes guidance on the use of chest X-rays in emergency departments to aid reduction of X-ray use, whereas in Luxembourg a guideline by the Luxembourg Society for Gynaecology and Obstetrics and the national perinatal group on the indication for planned caesarean sections complemented by leaflets for pregnant women was developed to tackle overuse (Alkerwi et al., 2021).

Annex IV provides links to national low-value care reduction programmes and related documents are summarised per country, hoping to provide additional inspiration and information for stakeholders interested in addressing low-value care.

CHAPTER 4: CONCLUSIONS AND OPTIONS FOR HEALTH SYSTEMS

This report set out to explore possible ways to identify, measure and address low-value care, and the extent to which relevant measures have been implemented. Based on the findings of a survey among members of the Expert Group on HSPA, it underscores the need for addressing low-value care within the European health systems. A majority of experts (11 out of the 19 who provided answers) thought low-value care should be a priority area on the political agenda in the upcoming years, which underlines the significance of embedding considerations of low-value care in HSPA. This report can help guide countries in measuring and addressing low-value care, thereby promoting more efficient and sustainable health systems.

New definition of low-value care

One of the main contributions of this report is the proposal for a new, comprehensive definition of low-value care. This definition expands the concept of low-value care to include the underuse of services not supplied despite being necessary (leading to worse patient outcomes and potentially higher costs in future). Based on this new definition, overuse, misuse, underuse and unwarranted variation (geographical and/or among patient groups) of healthcare services are manifestations of low-value care. Although unwarranted variation is not part of the definition, it is an important method to identify and quantify low-value care. Additionally, the new definition highlights that physical, psychological and financial consequences of low-value care reach beyond patients, impacting the health workforce, the health system and the wider environment. This forward-thinking approach ensures that efforts to measure and combat low-value care are aligned with the broader goal of sustainability.

Types of low-value care

Overall, the overuse, misuse and underuse of care are considered low-value care, with unwarranted variation in service provision as a manifestation of the existence of at least one of those phenomena. More specifically, this report identifies nine types of low-value care. Five types cover overuse and misuse, two types cover underuse, and two types cover unwarranted variation, which can signal underuse and/or overuse of healthcare. Identifying which part of the observed variation constitutes underuse or overuse, especially in the presence of differing patient preferences and needs, is crucial for designing efforts to combat low-value care.

Indicators for low-value care measurement already in use in national HSPA initiatives

The report sheds light on the existing indicators used to measure low-value care as part of HSPA and reveals different experience levels among countries. Around half of countries participating in the survey measure low-value care currently within their HSPA, whereas others are planning to expand their measurement efforts in the future to include it. The indicators already used cover a broad range of services from prevention and diagnostics to procedures and medication. Activities to facilitate cross-country learning including targeted research endeavours (via programmes such as Horizon Europe) or joint and uniform recommendations (for example, Council of the EU recommendations) are necessary to prevent the duplication of efforts in identifying and continuously revising appropriate indicators of low-value care.

Need for the development of further indicators

Reviewing currently utilised indicators revealed the importance of developing additional indicators and proxies, particularly in areas such as mental health or end-of-life care. Standardising current and future indicators is crucial for facilitating cross-country and within-country comparisons, a step essential for fostering collaboration and shared learning among countries.

Tackling indicator challenges to measure low-value care

Addressing challenges in measuring low-value care indicators is a prerequisite for the effective utilisation of indicators and later reduction efforts. The lack of data and methodological issues across countries highlighted the need to ensure access to high-quality data and joint operationalisation

efforts. The European Commission's proposed regulation on a European Health Data Space has the potential to contribute to such efforts, and the exact specifications currently under discussion should take this area into account.

Implementation of multicomponent reduction strategies

This report underscores the importance of adopting multicomponent reduction strategies to effectively reduce the extent of low-value care. Drawing on evidence from various studies and country experiences, interventions should be comprehensive and encompass components such as education for clinicians and patients, clinical decision support, auditing and feedback. The report highlights some good practice examples from selected countries, providing inspiration for those planning their reduction strategies. The need for a comprehensive approach targeting both patient and clinician roles is a key learning for the successful reduction of the use of low-value care.

This report hopes to provide impetus for positive change towards addressing low-value care in health systems. By embracing a new, more comprehensive definition of low-value care, showcasing indicators in use and potential areas for extending measurement, while also highlighting reduction strategies, the report can help countries advance towards more efficient, sustainable and patient-centred healthcare. The report highlights opportunities for innovation, collaboration and shared learning, ultimately contributing to improving the performance of health systems across the EU and beyond.

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ANNEX

ANNEX I : Survey on low-value care among the Expert Group on HSPA

Priority topic value-based healthcare with a focus on low-value care

Survey among the EU Expert Group on HSPA

This survey accompanies the draft in progress "Identifying, measuring and de-implementing low-value care in the context of health system performance assessment" (working title). The topic value-based healthcare with a focus on low-value care was selected as the EU Expert Group on HSPA's priority topic for 2023/2024.

Value-based healthcare is recognized as an important area within Health System Performance Assessment (HSPA). However, there is no consensus on how to identify low-value care, which metrics should be used to measure low-value care, and which strategies facilitate the de-implementation of low-value care. This survey aims to explore this field and draws on the EU Member States' experiences and expertise.

Please answer the following questions to the best of your knowledge and expertise, and as completely as possible. If possible, we would like to receive one consolidated response document per Member State.

If you should have any questions or need guidance concerning this survey, please contact: Katharina Achstetter (katharina.achstetter@tu-berlin.de) and Viktoria Steinbeck (steinbeck@tu-berlin.de)

Section 1: General Questions

Which country do you represent? |

Which institution do you represent? |

What is your professional role in the institution? |

Section 2: Experiences in the national health system performance assessment (HSPA) context

1) Does your country/institution conduct a HSPA on a regular basis?

Yes ☐

Since: ☐

Frequency: ☐

No ☐

Planned ☐ Starting from: ☐

Discontinued ☐

(If no, please proceed to Section 3)

2) Are you personally involved in your country's/institution's HSPA? (*multiple answers possible*)

Involved in commissioning ☐

Involved in performing ☐

Involved in planning ☐

Not involved ☐

Other (please specify): ☐

3) Do you have an overarching definition of "low-value care" informing your country's/institution's HSPA?

Yes ☐

No ☐

Planned/in process ☐

If yes, please provide the definition here: ☐

4) Do you use indicators measuring low-value care in your HSPA?

Yes ☐

No, but is planned ☐

No ☐

Not applicable ☐

If yes or planned, please list your indicators (indicate if already used and since when or still in planning):

☐

Section 3: Defining low-value care

5) Do you use a definition of "low-value care" in your country/your institution?

- Yes ☐
- Yes, it is the same as mentioned in question 3 ☐
- Planned/in process ☐
- No ☐

If yes, please provide this definition:

6) Do you agree on each of the following three definitions of low-value care?

"Low-value care can be defined in terms of the net benefit [patient relevant outcome], i.e. a function of the expected benefit and cost for an individual or group, and is assessed relative to alternatives, including no treatment." (Colla 2014)

- Yes ☐
- Neutral ☐
- No ☐

"Health care services that provide little or no benefit—whether through overuse or misuse." (Elshaug et al. 2013)

- Yes ☐
- Neutral ☐
- No ☐

"The ongoing use of low-value healthcare practices (i.e., low-value care), broadly defined as medical tests or treatments that lack efficacy, have risks that exceed benefit, or are not cost effective, impedes the delivery of safe, efficient, and cost-effective healthcare. For patients and their caregivers, receiving a low-value test or treatment can lead to physical, psychological, and financial consequences." (Sypes at al. 2020)

- Yes ☐
- Neutral ☐
- No ☐

If you do not agree with any of these definitions, please explain:

7) Do you agree:

a) to use one of the above definitions as core definition of low-value care for the HSPA Expert Group Report on low-value care?

Yes ☐
No ☐

If yes, which of these three definitions above fits best to define low-value care?

Colla 2014 ☐
Elshaug et al. 2013 ☐
Sypes et al. 2020 ☐

b) that the Expert Group should agree on an alternative definition?

Yes ☐
No ☐

If yes, please propose an alternative definition here:

8) Do you consider that there are missing aspects in these definitions?

9) In your opinion, which of the following terms cover low-value care the best? (*select all applicable*)

- Overuse ☐
- Overtreatment ☐
- Overutilization ☐
- Appropriateness ☐
- Indication and process quality ☐
- Misuse ☐
- Inappropriate care ☐
- Harm ☐
- Patient safety risk ☐
- Other terms:

10) Based on your expertise, how important do you find the following measurement methods and types of low-value care within HSPA?

Methods of low value care measurement	**Highly important**	**Mostly important**	**Not important**	**Not part of low-value care**
Identifying healthcare services which under certain circumstances are considered low-value building on evidence-based approaches (e.g., Cochrane reviews, clinical guidelines)	☐	☐	☐	☐
Assessing unwarranted geographical variation in care provision, where low-value care is either an over- or undersupply/payment in certain regions compared to others	☐	☐	☐	☐

Types of low value care	**Highly important**	**Mostly important**	**Not important**	**Not part of low-value care**
Services that actively harm patients	☐	☐	☐	☐
Services that do not benefit the patient/has no effect (no benefit or benefit/ harm relation unfavourable)	☐	☐	☐	☐
There are more cost-effective alternatives to the service	☐	☐	☐	☐
The service is delivered in a costlier setting/sector than necessary	☐	☐	☐	☐
Other types (please specify below)	☐	☐	☐	☐

Other methods and/or types:

Section 4: Indicators measuring low-value care

The indicators you list in the following questions do not have to be part of your low-value care measurement.

11) Can you please provide the most suitable indicators (up to 5) for the following areas?

- Clinical low-value care (e.g., inappropriate procedures, overtreatment):

- Low-value care on a system-level (e.g., cancer screenings, ambulatory care sensitive conditions):

- Unwarranted geographic variation in healthcare delivery (e.g., regional differences in the numbers of hospital admissions, knee surgeries):

12) Which indicators do you consider as the most important ones ('key indicators') for measuring low-value care within HSPA? Please provide a top 5 list of these indicators (*these can be among the ones listed under question 11, or additional*):

13) Do you feel there are areas of low-value care with a lack of indicators?

Yes ☐
No ☐

If yes, please list these areas/potential indicators:

Section 5: Methodological obstacles when measuring low-value care

14) Regarding the data availability for indicators measuring low-value care, which statement(s) apply to your country/institution? (*multiple answers possible*)

- Data are available for all indicators included in HSPA mentioned in question 4 above ☐
- Data are available for the key indicators mentioned in question 12 above ☐
- Data are available for some indicators ☐
- No data available ☐

15) Please specify any (potential) data gaps and/or data availability issues for the measurement of low-value care in your country/institution:

16) Apart from data availability, are you aware of other methodological obstacles when measuring low-value care?

17) Do you know about previous or ongoing discussions in your country/institution, which have resulted or might result in the removing of particular indicators for low-value care? (e.g., after changes in the recommendations for cancer screenings)

- Yes ☐
- No ☐
- Not applicable/don't know ☐

If yes, please specify removed /planned to be removed indicators:

Section 6: Strategies and solutions for de-implementing low-value care

18) Does your country/institution have any experiences with and/or tested strategies for de-implementing low value care?

Yes ☐
No ☐

If yes, please provide these strategies and rate their success:

-

Successful ☐ Neither nor ☐ Unsuccesful ☐

-

Successful ☐ Neither nor ☐ Unsuccesful ☐

-

Successful ☐ Neither nor ☐ Unsuccesful ☐

-

Successful ☐ Neither nor ☐ Unsuccesful ☐

19) Do you have any other ideas and innovative solutions which might be helpful for de-implementing low value care (which might not have been tested yet)?

Section 7: Outlook and developments in the future

20) How do you hope low-value care measurement will change in the next 10 years in your country/institution? Please state your thoughts.

- Regarding the **health service** areas (e.g. inclusion of prevention, palliative care):

- Regarding the considerations for the geographical **variation of care:**

- Regarding **other measurement aspects:**

21) How do you hope strategies for de-implementing low-value care will change in the next 10 years in your country/institution? Please state your thoughts.

- Regarding the **health service** areas included:

- Regarding the considerations for the geographical **variation of care:**

- Regarding **other aspects:**

22) Do you expect that identifying, measuring, and de-implementing low-value care will be a priority on the agenda of your country/institution in the following years?

- Yes ☐
- No ☐
- Don't know ☐

23) Have we forgotten anything in this survey? Would you like to share other comments, ideas, or experiences?

24) If you have any additional material that we should consider, please provide a link or the supporting documents as an attachment.

We truly appreciate your time and thank you for sharing your expertise and experiences.

ANNEX II :

Overview of areas/clusters with low-value care indicators and respective examples identified from the literature.

DISCLAIMER:
The following table is a snapshot which provides an indicative, non-exhaustive and not comprehensive overview of the variety of indicators identified in the literature. The selection is meant to highlight different examples and provide a sense of the broad spectrum of available options. However, it is important to note that some of the selected indicator examples might be controversial (within and across countries), might no longer be recommended for measuring low-value care (for example, outdated or changing evidence base), and might be limited by methodological obstacles. Therefore, this table should NOT be understood as a consolidated list of recommended indicators. At the country level, indicators must be chosen based on the country's guidelines and data availability.

CLUSTER OF LOW-VALUE CARE	INDICATOR EXAMPLES (IN ALPHABETICAL ORDER)
LOW-VALUE CANCER SCREENING	• Cervical cancer screening/cervical smear for women over age 65 who have been screened regularly (Schwartz et al., 2014; de Vries et al., 2016) • Colorectal cancer screening for older elderly patients/adults 80 years and older (Schwartz et al., 2014; de Vries et al., 2016; Ganguli et al., 2021) • Performing tumour marker studies in asymptomatic women with previously treated breast cancer (de Vries et al., 2016) • Screening mammography in women 75 years and older (de Vries et al., 2016)
LOW-VALUE DIAGNOSTIC AND PREVENTIVE TESTING	• 1,25-dihydroxyvitamin D testing in the absence of hypercalcaemia or decreased kidney function (Miyawaki et al., 2022) • Bleeding time testing (Mafi et al., 2021; Ganguli et al., 2021) • Bone mineral density testing at frequent intervals (Schwartz et al., 2014; Miyawaki et al., 2022) • Immunoglobulin G testing or an indiscriminate battery of immunoglobulin E tests, in the evaluation of allergy (Ganguli et al., 2021; Mafi et al., 2021) • Nasal endoscopy for uncomplicated sinusitis diagnosis (de Vries et al., 2016) • Screening for vitamin D deficiency (Mafi et al., 2021) • Serological tests for Helicobacter pylori (de Vries et al., 2016) • Serum triiodothyronine level testing for hypothyroidism (Miyawaki et al., 2022)
LOW-VALUE PREOPERATIVE TESTING	• Preoperative baseline laboratory studies in patients without significant systemic disease (ASA I or II) undergoing low-risk surgery [specifically complete blood count, basic or comprehensive metabolic panel, coagulation studies when blood loss (or fluid shifts) is/are expected to be minimal] (Mafi et al., 2021) • Preoperative chest/ breast radiography/X-ray MRI (in the absence of a clinical suspicion for intrathoracic pathology) (Schwartz et al., 2014; Ganguli et al., 2021; Mafi et al., 2021; Miyawaki et al., 2022) • Preoperative stress testing or stress testing for stable coronary disease (Ganguli et al., 2021; Mafi et al., 2021; Miyawaki et al., 2022)
LOW-VALUE IMAGING	• Back imaging/MRI of lumbar spine for patients with non-specific low back pain (Schwartz et al., 2014; de Vries et al., 2016; Ganguli et al., 2021) • CT/imaging of the sinuses for uncomplicated acute rhinosinusitis (Schwartz et al., 2014; de Vries et al., 2016; Ganguli et al., 2021; Mafi et al., 2021; Kjelle et al., 2022) • Head imaging/Electroencephalogram for (uncomplicated) headache/migraine (Schwartz et al., 2014; Mafi et al., 2021) • Head/brain CT for sudden-onset hearing loss (Ganguli et al., 2021; Mafi et al., 2021) • MRI in individuals with mild traumatic brain injury (de Vries et al., 2016) • Positron emission tomography, CT and radionuclide bone scans in individuals with low-risk prostate cancer (de Vries et al., 2016)

LOW-VALUE CARDIOVASCULAR TESTING AND PROCEDURES	• Annual electrocardiography or cardiac screening in asymptomatic population (Ganguli et al., 2021; Mafi et al., 2021) • Carotid endarterectomy in asymptomatic patients (Schwartz et al., 2014) • Percutaneous coronary intervention with balloon angioplasty or stent placement for stable coronary disease (Schwartz et al., 2014) • Pulmonary artery catheter in intensive care unit (Miyawaki et al., 2022) • Routine monitoring of digoxin in patients with congestive heart failure (de Vries et al., 2016) • Screening for asymptomatic carotid artery stenosis in the adult population (de Vries et al., 2016) • Stress echocardiography for detection of coronary artery disease/risk assessment in symptomatic or ischaemic equivalent acute chest pain (de Vries et al., 2016)
LOW-VALUE SURGICAL PROCEDURES	• Arthroscopic surgery/lavage/debridement for knee osteoarthritis (Schwartz et al., 2014; Ganguli et al., 2021; Mafi et al., 2021) • Hysterectomy for benign disease (de Vries et al., 2016) • Surgery for vesicoureteral reflux (Miyawaki et al., 2022) • Vertebroplasty/kyphoplasty for osteoporotic vertebral fractures (Ganguli et al., 2021; Schwartz et al., 2014)
LOW-VALUE PROCEDURES, THERAPY, TREATMENT AND UNSAFE/WRONG TECHNOLOGIES	• Artificial liver support for acute liver failure (Miyawaki et al., 2022) • Early elective delivery (de Vries et al., 2016) • Electroconvulsive therapy in children (Miyawaki et al., 2022) • Endoscopy for dyspepsia for people aged <55 years or colonoscopy for constipation in people <50 years old (Miyawaki et al., 2022) • Endotoxin apheresis for sepsis (Miyawaki et al., 2022) • Fibreoptic laryngoscopy for patients with a diagnosis of sinusitis (de Vries et al., 2016) • Inferior vena cava filters for the prevention of pulmonary embolism (Schwartz et al., 2014; Miyawaki et al., 2022) • Peripherally inserted central catheters in Stage 3–5 chronic kidney disease patients (, Ganguli et al., 2021; Mafi et al., 2021) • Spinal injection for low back pain (Ganguli et al., 2021; Miyawaki et al., 2022) • Spinal fusion/laminectomy for lumbar stenosis (Miyawaki et al., 2022) • Traction therapy for (low) back pain or neck pain (Miyawaki et al., 2022)
LOW-VALUE MEDICATION	• Antibiotics prescription for common cold / for viral infections / adenoviral conjunctivitis / acute upper respiratory and ear infections / acute bronchitis / pharyngitis / upper respiratory tract infection (de Vries et al., 2016; Ganguli et al., 2021; Mafi et al., 2021; Miyawaki et al., 2022) • Antidepressants monotherapy in bipolar disorder (Ganguli et al., 2021; Mafi et al., 2021) • Antipsychotics as first choice to treat behavioural and psychological symptoms of dementia (Ganguli et al., 2021) • Concurrent use of two or more antipsychotic medications (Ganguli et al., 2021; Mafi et al., 2021) • Intravenous anti-herpes drugs for sudden sensorineural hearing loss (Miyawaki et al., 2022) • Intravenous beta-mimetics for inhibiting preterm labour, >48 hours (Miyawaki et al., 2022) • Intravenous sivelestat for acute respiratory disease syndrome (Miyawaki et al., 2022) • Medication use for urinary incontinence (de Vries et al., 2016) • Non-steroidal anti-inflammatory drugs for hypertension, heart failure, chronic kidney disease (Mafi et al., 2021)

LOW-VALUE MEDICATION	• Opioids for acute (non-specific) back pain (Ganguli et al., 2021; Mafi et al., 2021) • Opioids for headache/migraine (de Vries et al., 2016) • Oral beta-mimetics prescription (Miyawaki et al., 2022) • Polypharmacy among +75 years population (Pickering et al., 2022) • (Potentially) inappropriate medication for 65+ years population (de Vries et al., 2016) • Pregabalin prescription for back pain (Miyawaki et al., 2022) • Tricyclic antidepressants prescription for children without other psychological disorders (Miyawaki et al., 2022)
LOW-VALUE HEALTH CARE UTILISATION	Unnecessary hospitalisations for Ambulatory Care Sensitive Conditions (for example, asthma, diabetes, heart failure, hypertension, chronic lower respiratory diseases) (Rocha et al., 2021)
UNDERUSE	Share of patients under glycaemic control (Pitak et al., 2023)
UNWARRANTED GEOGRAPHICAL VARIATION IN HEALTH CARE DELIVERY	• Hospital medical admissions (not surgical) (OECD, 2014) • Coronary artery bypass graft (Bertelsmann Stiftung, 2011; OECD, 2014) • Percutaneous transluminal coronary angioplasty (OECD, 2014) • Cardiac catheterisation (OECD, 2014) • Admission/surgery after hip fracture (selected as an expected low-variation procedure, given that there is little discretion to admit and operate a patient after hip fracture) (OECD, 2014) • Knee replacement (OECD, 2014) • Knee arthroscopy (OECD, 2014) • Caesarean section (Bertelsmann Stiftung, 2011; OECD, 2014) • Hysterectomy (Bertelsmann Stiftung, 2011; OECD, 2014) • MRI scan (OECD, 2014) • CT scan (OECD, 2014) • Tonsillectomy (Bertelsmann Stiftung, 2011) • Implantation of defibrillator (Bertelsmann Stiftung, 2011) • Prostatectomy (Bertelsmann Stiftung, 2011) • Appendectomy (Bertelsmann Stiftung, 2011) • Cholecystectomy (Bertelsmann Stiftung, 2011) • Hernia surgery (inpatient instead of ambulatory) (Bertelsmann Stiftung, 2011) • Day cases (short stay in hospital) (Bertelsmann Stiftung, 2011) • Inpatient mortality in 75+ years patients (Bertelsmann Stiftung, 2011)

Note: ASA: American Society of Anesthesiologists; CT: computed tomography; MRI: magnetic resonance imaging.
Source: Authors' own compilation based on Bertelsmann Stiftung, 2011; Corallo et al., 2014; Ganguli et al., 2021; Kjelle et al., 2022; Mafi et al., 2021; Miyawaki et al., 2022; Nilsen & Johnson, 2017; OECD, 2014; Pickering et al., 2022; Pitak et al., 2023; Rocha et al., 2021; Schwartz et al., 2014; Segal et al., 2022; Vries et al., 2016

ANNEX III :

Indicators to measure low-value care (overuse, misuse, underuse, and unwarranted variation) used in national HSPA initiatives of responding countries

DISCLAIMER:
Indicator list is shown as provided by the countries. Note that the assessment based on cost effectiveness implies different outcomes across countries, which shows the variety of situations.

COUNTRY	LIST OF INDICATORS USED IN NATIONAL HSPA
AUSTRIA	• Share of individuals aged over 70 receiving potentially inadequate medication (since 2016) • Proportion of individuals aged over 70 with more than five simultaneously prescribed medicines (since 2018) • Share of surgeries carried out as ambulatory cases (since 2014) • Hospitalisations due to ambulatory care sensitive conditions (since 2016) • Premature mortality, potential years of life lost (since 2016) • Mortality amenable to health care (since 2016) • Geographical variations for different treatments and procedures (Austrian Inpatient Quality Indicators Project)
BELGIUM	**Appropriateness of care:** • Appropriate follow up of diabetes (% of people 18+ living with diabetes and under insulin) • Appropriate follow up of diabetes (% of people 18+ living with diabetes and receiving glucose-lowering drugs other than insulin) • Use of antibiotics (total defined daily dose (DDD)/1 000 population/day) • Use of antibiotics at least once in the year (% of population) • Use of antibiotics of second intention (% total defined daily dose antibiotics) • Inappropriate medical imaging: Spine imaging (X-ray, CT scan, MRI per 100 000 population) • Caesarean section rate (per 1 000 live births) • Patients with early testicular cancer (seminoma) receiving adjuvant treatment after surgery (% of patients with early testicular cancer Stage I treated with orchiectomy) • Cancer patients who received chemotherapy in the last 14 days of life (% of cancer patients with poor prognosis who died) • Polypharmacy among older people (five or more drugs of >80 DDD per year) (% of population 65+) • Use of antidepressants (total DDD/1 000 population/day) • Use of antidepressants (% of adult population, at least once in the year) • Use of short (<3 months) antidepressant treatment episodes (% of adult population under antidepressant) • Prescription of anticholinergic drugs >80 DDD in older people (% of pop. 65+) • Use of antipsychotics ≥1 DDD in homes for older people (% of residents 65+) • Use of antidepressants ≥1 DDD in homes for older people (% of residents 65+) • Use of antipsychotics ≥1 DDD outside homes for older people (% of pop. 65+) • Use of antidepressants ≥1 DDD outside homes for older people (% of pop. 65+) **Unwarranted medical practice variation:** • International comparison / by gender / by age group / geographical (by region, province and district, in Belgium) / by social status (according to the reimbursement regimen) / by category of care (hospitalisation or one-day hospital visit and outpatient) / by trend in rate of use / by technique used • Safety • Prevalence of health care-associated infections (% of patients hospitalised) • Incidence of hospital-associated MRSA infections (per 1 000 hospital admissions, median)

BELGIUM	• Proportion of MRSA in acute-care hospitals (% of S. aureus isolates, median) • Proportion of Escherichia coli resistant to third-generation cephalosporins in acute-care hospitals (% E. coli infections, median) • Prevalence of pressure ulcers (Grade II–IV) in homes for older people (% of residents) Fall incidence during the last month in homes for older people (% of residents) **Efficiency** • One day surgical admissions (%) • Length of stay, normal delivery (days, mean) • Use of low-cost medication (%, ambulatory care) • Biosimilar treatments (%) • Low-care dialysis (% hospitals with ≥40% of low-care dialysis) **Prevention** • Breast cancer screening and organised programme • Cervical cancer screening • Colorectal cancer screening (% pop aged 50–74 years) • Regular contacts with dentist (% pop aged ≥3 years) • Polio (%, fourth dose) • Diphtheria, tetanus and pertussis vaccination in children (%, fourth dose) • Measles vaccination in children (%, first dose) • Measles vaccination in adolescents (%, second dose) • Pneumococcus vaccination in children (%, third dose) • Influenza vaccination (% pop aged ≥65 years) • Human papillomavirus vaccination in girls (%, second or third doses following vaccines) **Efficacy** • Asthma/ chronic obstructive pulmonary disease/ diabetes hospital admissions in adults (/100 000 population)
ESTONIA	• Avoidable specialist visit – selected chronic diseases (hypertension, diabetes) • Avoidable admissions due to: asthma, hypertension, chronic obstructive pulmonary disease, congestive heart failure, diabetes • Share of caesarean sections in the case of a single birth in the first child (Robson 1+2) • Share of people with diabetes prescribed the first-line medications according to the treatment guideline, in the past year • Prevalence of hospital-acquired infections (% of patients hospitalised/admissions) including MRSA, extended spectrum beta-lactamase-producing organisms, Clostridioides difficile etc. • Use of antibiotics (total DDD/100 population/day or percentage of population at least once in the year) • Polymedication (%) of 75+ who took five or more different medicines • Share of emergency department visits with triage (family nurse/doctor/primary care level conditions) • Cancer screening coverage: cervical, breast and colorectal cancer • New anxiety disorders and depression cases diagnosed in primary health care (more cases should be diagnosed at the primary care level and fewer cases at the secondary care level)
FINLAND	• Patients with a recorded diagnosis of acute upper respiratory infection, unspecified, who received a prescription of antibiotics at the same service event, % of all patients with diagnosis • Those aged 75 or over who have obtained medicines that should be avoided (reimbursable and non-reimbursable prescription medicines), % of the population of the same age • Annual consumption of antibiotics daily defined dose (DDD) per 1 000 inhabitants per day • Consumption of benzodiazepines defined daily dose (DDD) per 1 000 inhabitants per day • The proportion of those aged 75 years or over using multiple medications (reimbursed and non-reimbursed prescription medicines), % of the population of the same age • Emergency hospital admissions for ambulatory care sensitive conditions, periods of care in specialised somatic inpatient health care, age-standardised

FINLAND	• Emergency hospital admissions for ambulatory care sensitive conditions, periods of care in general practitioner-led inpatient wards and specialised somatic inpatient health care, age-standardised • Emergency hospital admissions for ambulatory care sensitive conditions, periods of care in specialised somatic inpatient health care, income disparities, relative index of inequality • Emergency hospital admissions for ambulatory care sensitive conditions, periods of care in general practitioner-led inpatient wards and specialised somatic inpatient health care, income disparities, relative index of inequality
HUNGARY	• Composite indicator for basic care of diabetic patients over 18 years of age • Caesarean section rates in low-risk births • Rate of hospital emergency re-admissions within 30 days • Occurrence of infections associated with health care caused by multidrug-resistant pathogens • Rate of avoidable deaths / Rate of preventable deaths per 100 000 people • Rate of actual one-day care of services that can be performed within the framework of one-day surgical care • Rate of laparoscopic surgeries • Avoidable hospital admissions
MALTA	• Day case discharges as a % of curative care discharges • Hospital readmission rates within 30 days, by specialty • Avoidable hospital admission rates (standardised by age and sex) for asthma/chronic obstructive pulmonary disease/chronic heart failure
NORWAY	**Unwarranted variation:** • Unwarranted geographical variation in various medical areas • Unwarranted variations in quality and utilisation rates of health care delivery on (i) effective care and patient safety (ii) preference sensitive care and (iii) supply sensitive care **Indicators from primary care:** • Medications with a significant anticholinergic effect for the elderly from general practitioners • Non-steroidal anti-inflammatory drugs for the elderly from general practitioners • Addictive medications for the elderly from general practitioners • Antibiotic use in nursing homes • Antibiotic treatment for respiratory infections in children aged 0–9 years • Antibiotic treatment for respiratory infections in the population aged 10–79 years • Antibiotic treatment for urinary tract infections in women aged 20–79 years • Antibiotic prescription consumption • Emergency medical services Triage of patients attending emergency medical services **Indicators from specialist care:** • Antibiotics – consumption of a selection of broad-spectrum antibiotics in hospitals • Carotid artery – drug treatment not in accordance with national guidelines after surgery for stenosis • Infection – postoperative infections after aortocoronary bypass surgery • Infection – postoperative infections after gallbladder removal (cholecystectomy) • Infection – postoperative infections after total hip replacement **National Assignment on reducing low-value health care services – proposed procedures for de-implementation:** • Acromial resection and rotator cuff surgery for chronic shoulder pain • Upper endoscopy in people younger than 45 years with no red flags • Coronary angiography in patients with stable chronic heart disease
POLAND	• Overuse
SLOVAKIA	• Excessive health care resources (imaging, tests) compared with countries & European Union average, while at the same time producing worse health outcomes

SWEDEN	• Levels of unnecessary or harmful drug use in the elderly • Levels of prescribing of antibiotics • Prescription of antibiotics for asthma, exacerbation without suspected bacterial infection • Prescribing D-vitamin for COPD without verified D-vitamin deficiency • Prescribing benzodiazepines to adults with generalised anxiety disorder • Treatment with acetylsalicylic acid for primary prevention of cardiovascular disease for patients with diabetes • Group-based educational programmes provided by individuals without pedagogical competence to patients with type-2 diabetes • Treatment with antihistamines or neuroleptics to people with alcohol withdrawal syndrome • Treatment with gamma-hydroxybutyrate to people with alcohol addiction • Treatment with neuroleptics or central stimulants to people with cocaine addiction • Peri-oral treatment of naltrexone to people with opioid addiction • Acupuncture with or without electric stimulation to patients with hip arthritis • Manual therapy as only treatment for knee or hip arthritis • Arthroscopic surgery for knee arthritis or suspected degenerative meniscus injury (does not include arthroscopic procedures due to trauma in knee joint) or pain in knee • Anti-hypertensive drugs to patients in the acute phase of ischaemic stroke • Systemic treatment with antibiotics for peri-implantitis as only treatment • Occlusal correction for acute jaw joint pain

Note: COPD: chronic obstructive pulmonary disease; CT: computed tomography; DDD: defined daily dose; HSPA: health system performance assessment; MRI: magnetic resonance imaging; MRSA: methicillin-resistant *Staphylococcus aureus.*

Source: Authors' own compilation based on survey among the Expert Group on HSPA.

ANNEX IV :

Useful links to national low-value care reduction programmes and related documents

COUNTRY	USEFUL LINKS TO NATIONAL PROGRAMMES AND RELATED DOCUMENTS
BELGIUM	**Medical imaging** • https://www.health.belgium.be/nl/medische-beeldvorming-belmip • https://www.becaremagazine.be/speciale-editie-werelddag-patientveiligheid/belmip • https://www.becaremagazine.be/becare-juni-2023/belmip • https://www-health-belgium-be.translate.goog/nl/medische-beeldvorming-belmip?_x_tr_sl=nl&_x_tr_tl=en&_x_tr_hl=nl&_x_tr_pto=wapp • https://www.healthybelgium.be/en/key-data-in-healthcare/general-hospitals/quality-and-innovation/medical-imaging **Antibiotics** • Accueil – Parlonsantibiotiques.be **Psychotropics** • Psychotropes : quels risques pour vos patients ? Ensemble, favorisons un usage adapté | Santé publique, sécurité de la chaîne alimentaire et environnement (usagepsychotropes.be) **Variation** • Medical Practice Variations – For a Healthy Belgium **Clinical Guidelines** • https://kce.fgov.be/fr/le-reseau-belge-devidence-based-practice-est-sur-les-rails • https://www.health.belgium.be/en/combating-antimicrobial-resistance-amr **Improve evidence-based practice** • https://www.evidencelinker.be/nl/info • https://www.evidencelinker.be/fr/info **Decision tools** • Ebpracticenet : https://ebpnet.be/nl • https://ebpnet.be/fr • CDLH : https://www.cdlh.be/nl • https://www.cdlh.be/fr **Online benchmark :** • https://www.intego.be/barometers • https://www.intego.be/fr/barometres
FINLAND	**Improve evidence-based practice** • https://www.kaypahoito.fi/en/guidelines **Indicators** • www.sotekuva.fi • https://tietotarjotin.fi/tilasto/2855160/tilasto-tyoterveyshuollosta **Register** • https://thl.fi/aiheet/sote-palvelujen-johtaminen/arviointi-ja-seuranta/sote-tietopohja/terveydenhuollon-kansalliset-laaturekisterit/kansallisten-laaturekisterien-raportit

LUXEMBOURG	**Medical Imaging** • https://sante.public.lu/fr/espace-professionnel/domaines/radioprotection/radioprotection-etablissement-autorisation/etablissements-medicaux/audit-clinique.html **Caesarean section** • https://conseil-scientifique.public.lu/fr/publications/perinat/indications-de-la-cesarienne-programmee-a-terme-au-Luxembourg-version-courte-maj-2021.html • https://sante.public.lu/fr/publications/r/rapport-pratique-cesarienne.html
MALTA	**Prevention and Containment of Antimicrobial Resistance** • https://healthservices.gov.mt/en/nac/Documents/AMR%20Strategy%20Final%20Jul%202020.pdf
NETHERLANDS	**Do not do recommendations** • https://todoornottodo.nl/nieuws/
SPAIN	**Not to do recommendations** • https://portal.guiasalud.es/no-hacer
SWEDEN	**Do not do recommendations** • https://www.socialstyrelsen.se/om-socialstyrelsen/pressrum/press/socialstyrelsen-onodig-och-skadlig-vard-behover-fasas-ut/

Source: Authors' own compilation based on survey among the Expert Group on HSPA.

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