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## CURRENT APPROACHES OF HEALTH TECHNOLOGIES INTRODUCTION IN UKRAINIAN HOSPITALS

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The study **aimed** to gather insights regarding current decision-making approaches and identify challenges and opportunities related to health technology implementation in Ukrainian hospitals.

**Materials and methods.** A total of 28 respondents from three public hospitals across different regions of Ukraine participated in online semi-structured interviews conducted between September 2022 and March 2023. The respondents for this study encompassed a diverse range of stakeholders, including general managers, medical directors, economists, representatives from procurement departments, heads of clinical and diagnostic departments, clinicians, and pharmacists. To effectively guide the interview process, a comprehensive questionnaire was developed.

The data collected from the respondents were analyzed and synthesized to results and conclusions.

**Results.** The semi-structured interview study consistently revealed a common pattern in all the interviewed hospitals regarding the adoption of new health technologies.

The process of introducing these technologies entails several stages, each demanding meticulous planning, coordination, and active engagement from various stakeholders. What stood out was that stakeholders from the same speciality were consistently involved in the same decision-making stage across all the hospitals we studied.

The technical stages of implementing new health technologies, as outlined by the Law of Ukraine “On Public Procurement,” are well-established in Ukrainian hospitals. However, there is room for improvement in selecting which type of health technology to procure. The current assessment process often relies on limited sources of information, lacking comprehensive literature reviews or robust comparisons with existing practices or placebos. This information gap hampers the ability to make well-informed decisions that account for all relevant factors.

The study also identifies specific challenges for the future implementation of the Hospital Health Technology Assessment (HB-HTA) in Ukraine. These challenges necessitate investment in building HTA expertise at the hospital level, cultivating strong leadership support, providing professional staff training, and establishing robust data collection and management systems. Overcoming these obstacles is crucial for hospitals to bolster their capacity to effectively implement new health technologies and make informed decisions about their utilization.

**Conclusions.** Our study has revealed that all the technical stages involved in implementing new health technologies in Ukraine are well established. It was observed that there is room for improvement in the process of selecting which new health technology to purchase. This stage, known as the decision-making process based on HTA, requires implementation at the hospital level.

Our study highlights the evident interest and potential benefits associated with adopting HB-HTA in the hospitals under investigation. By integrating HB-HTA into existing practices and approaches, hospitals can significantly enhance their decision-making processes when introducing new health technologies.

There is an urgent need to introduce the term “hospital-based HTA” into Ukrainian legislation, as well as to activate the training of HTA experts at the hospital level

**Keywords:** hospital, health technology, health technology assessment (HTA), hospital-based health technology assessment (HB-HTA), hospital managers, semi-structured interview

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### 1. Introduction

The International Network of Agencies for Health Technology Assessment (INAHTA) defines Health Technology Assessment (HTA) as a multidisciplinary process that uses explicit methods to determine the value of a health technology at different points in its lifecycle. The purpose is to inform decision-making to promote an equitable, efficient, high-quality health system [1]. HTA

can be conducted at different levels, including national, regional and hospital levels, allowing for comprehensive assessments of health technologies across various healthcare settings [2].

In Ukraine, HTA was officially introduced to the healthcare system in 2017, with the establishment of an HTA Department under the State Expert Center (SEC) of the Ministry of Health (MoH) in 2019 [3]. Following a

Cabinet of Ministers (CMU) Decree No. 1300 from 23 December 2020, HTA has been mandatory for all medicines that will be covered by the public funds [4].

While HTA has been implemented at the national level, there are currently no regulations on how HTA principles should be applied to the hospital level in Ukraine [5].

The rapid advancement of health technologies has brought about significant changes in the healthcare industry. These innovations, from electronic health records and telemedicine to robotic surgery and artificial intelligence, hold great potential for improving patient outcomes, enhancing operational efficiency, and transforming healthcare delivery. As hospitals strive to stay at the forefront of technological advancements, the effective integration and implementation of health technologies on the hospital level become crucial. This is where Hospital-based Health Technology Assessment (HB-HTA) comes into play.

HB-HTA refers to the performance of HTA activities tailored to the hospital context, providing information to inform managerial decisions regarding different health technologies. It involves the processes and methods used to produce HTA reports, specifically in or for hospitals [6, 7].

The concept of HB-HTA has been discussed since the late 1970s [2, 6]. The first HB-HTA agency in Europe was Comité d'Evaluation et de Diffusion des Innovations Technologies, founded in 1982 in one of the hospitals in Paris (Assistance Publique Hôpitaux de Paris) [8]. Currently, the methodology of HB-HTA exists in Canada, the

USA, Australia, Asia, UAE and many European countries [2, 9–14]. In Europe, the AdHopHTA project (Adopting hospital-based Health Technology Assessment) was launched to adopt hospital-based HTA, with the participation of various countries and the development of a comprehensive guide on HB-HTA methodology [2].

Formal steps towards developing HB-HTA began in 2021 in Ukraine, following awareness-raising activities and an analysis of the regulatory framework for health technology introduction at the hospitals in Ukraine [15]. However, further elaboration is required to establish the legal procedures for assessing health technologies within hospitals [5].

To explore the implementation of HB-HTA in Ukraine, the authors conducted semi-structured interviews with hospital stakeholders from different regions. The study aimed to understand the current decision-making approaches and identify challenges and opportunities related to new health technologies implementation in hospitals.

By gaining insights from these stakeholders, valuable information can be obtained to inform future developments and improve the decision-making process regarding health technologies implementation in Ukrainian hospitals.

## 2. Planning (methodology) of the research.

The study required meticulous planning and was divided into several sequential sections, as illustrated in Fig. 1.

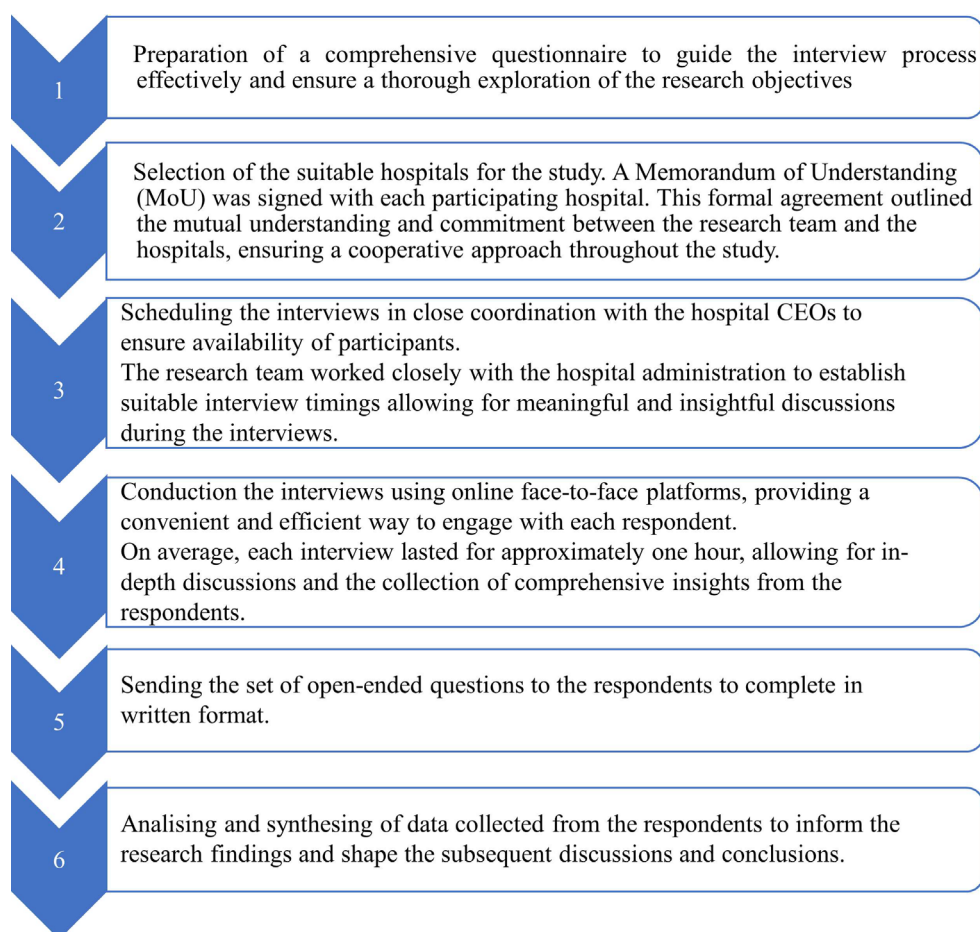


Fig. 1. Sections of the study

### 3. Material and methods

This study employs a mixed-methods approach, combining qualitative and quantitative components. In our study, we carefully selected hospitals, and each met specific criteria to ensure a thorough and meaningful analysis. The criteria for inclusion were as follows:

1. Geographic representation: We included hospitals from different regions of Ukraine to capture a comprehensive view of healthcare approaches and challenges across the country, considering different healthcare facilities' unique perspectives and circumstances.

2. High operational and diagnostic activity: Priority was given to hospitals with a strong track record of high operational and diagnostic activity. By including these hospitals, we gained valuable insights from institutions that regularly implement new health technologies.

3. Supportive general management: Hospitals with supportive and forward-thinking general managers were included to ensure top leadership's commitment to our research objectives and facilitate the smooth execution of the study.

By adhering to these inclusive criteria, our study was designed to yield reliable findings, providing valuable insights into the approaches of new health technology adoption in Ukraine hospitals.

The stakeholder's selection was based on their significant role in the decision-making process related to introducing new health technologies. A total of twenty-eight respondents from three public hospitals across different regions of Ukraine participated in the online semi-structured interviews (Table 1).

Table 1  
Distribution of Respondents per Each Hospital

Hospital	Number of respondents
National Scientific Center "M.D. Strazhesko Institute of Cardiology"	9
Zhytomir Regional Clinical Hospital named by O.F. Gerbachevskiy	11
Kyrovograd Regional Oncocenter	8

The respondents for this study encompassed a diverse range of stakeholders, including general managers, medical directors, economists, representatives from procurement departments, heads of clinical and diagnostic departments, clinicians and pharmacists (Fig. 2).

The interviews conducted for this study were semi-structured and involved a series of open-ended questions. The choice of using semi-structured interviews was deliberate, as it provided the flexibility to explore specific areas of interest while allowing participants to share their unique experiences and per-

spectives regarding implementing health technologies [16]. This approach ensured that valuable insights and unexpected insights could be captured during the interviews.

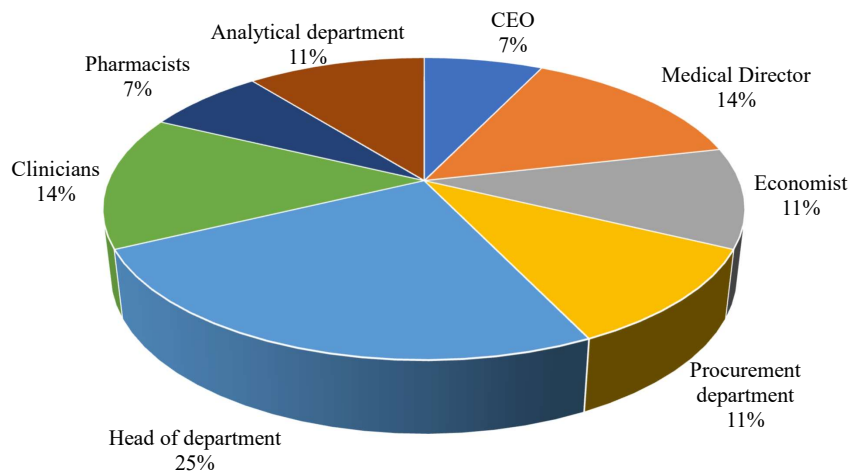


Fig. 2. Respondents distribution

The interviews took place between September 2022 and March 2023. Online video platforms such as Zoom or Google Meet were utilized to facilitate the interviews. Each interview session had an average duration of about 60 minutes, providing sufficient time for participants to share their thoughts, experiences, and insights related to the topic at hand.

At the outset of each interview, a clear introduction was provided to the respondents, outlining the purpose and objectives of the interview. This ensured that all respondents were aligned and understood the focus of the discussion. Additionally, the interview process and steps were explained, creating a transparent and structured environment for the conversation. Furthermore, to establish a common understanding, the terminology related to health technology was reiterated, ensuring that all respondents were on the same page and could effectively contribute their insights and perspectives during the interview.

The interview guide was carefully designed to explore the perspectives and experiences of key stakeholders, with a specific focus on the following key areas:

1. Background information: This section aimed to gather relevant details about the respondent and their involvement with the hospital, including the type of hospital, number of beds, volume of operations, and the position and responsibilities of the respondent. By understanding these background factors, we could contextualize the insights provided by the respondents.

2. Current decision-making approaches: This section delved into the existing approaches used in hospitals for the introduction of new health technologies. It aimed to explore how decisions were made, the roles of different stakeholders, the factors considered during the decision-making process, and any established guidelines followed. This line of inquiry provided valuable insights into the current landscape of health technology implementation within the hospitals.

3. Challenges and opportunities: This section sought to identify the challenges faced by hospitals in relation to health technology implementation and the opportunities that could potentially enhance the process. Respondents were encouraged to share their perspectives on barriers, resource limitations, regulatory constraints, stakeholder collaboration, and any potential areas for improvement. By exploring these challenges and opportunities, we aimed to gain a comprehensive understanding of the current state and identify potential areas for intervention and improvement.

#### 4. Results

The results section provides a comprehensive overview of the key findings derived from the semi-structured interview study involving hospital managers in Ukraine. Respondents were drawn from a diverse range of hospitals, including a multi-profile hospital and two specialized hospitals in cardiology and oncology.

##### *Respondents characteristics.*

The selection of participants for this study was based on their significant involvement in the decision-making process regarding the introduction of new health technologies. These stakeholders possessed a range of key features and characteristics that were considered during the selection process (Table 2).

Key features of respondents

Sex	Mail		Femail	
	10		18	
Age	31–40 y.o.	41–50 y.o.	more then 50 y.o.	
	12	9	7	
Work experience in the hospital healthcare sector	6–10 years	11–15 years	16–20 years	more than 20 years
	5	4	6	13
Scientific degree	yes		no	
	6		22	
Qualification category* (just for MD – medical doctors) [17, 18]	second	first	high	total
	5	6	10	21

Note: certification of doctors is carried out in order to assess their professional level and the complexity of the work performed, compliance with qualification requirements and job duties. The qualification of specialist doctors is determined by the attestation commission according to three qualification categories: second, first, and high

##### *Financial system and funding sources.*

In Ukraine, hospitals operate on the principle of “money follows the patient,” as introduced by the Law of Ukraine “On State Financial Guarantees of Medical Service to the Population,” which came into effect in 2018 [17]. Doctors receive funding based on the services they provide rather than the size of the premises, number of beds, or medical personnel in the hospital.

The interviewed hospitals had similar sources of financing, but the distribution among the channels differed based on each hospital’s specific circumstances. The primary channel for Zhytomir Regional Clinical Hospital named by O. F. Gerbachevskiy and Kyrovo-grad Regional Oncocenter was the National Health Service of Ukraine (NHSU). However, the number of packages covered by NHSU varied between hospitals

due to their specific requirements. The share of NHSU funding has been increasing annually. In contrast, the main channel for National Scientific Center “M.D. Strazhesko Institute of Cardiology” was the State budget, and then NHSU, income from paid services, clinical studies, grants, and other sources following NHSU and the State budget. Other sources of income for all hospitals included medical subventions, charitable contributions in monetary terms, renting out premises, reimbursement by tenants for consumed energy carriers, property sales, centralized supply of drugs, and blood components obtained free of charge.

Hospital financial planning involves preparing a document at the end of each year for the subsequent year, reflecting the planned distribution of the hospital budget. This plan can be revised up to two times during the year, and financial reports are prepared at the end of each quarter. The largest portion of the budget typically goes towards staff salaries, accounting for approximately 60–70 % of the total budget. Expenditures on medicines and medical devices make up around 20–30 % of the budget, while other expenses, such as energy and stationery, constitute 10–20 %. It’s important to note that these percentages may vary depending on the specific circumstances of each hospital.

##### *Departmental purchasing of medical devices and equipment.*

Table 2

During the interviews, respondents were asked about the departments within their hospitals that most frequently engage in the purchasing of new medical devices and equipment. The responses from all hospitals highlighted the departments with high operational and diagnostic activities. These departments play a crucial role in patient care and often require the use of advanced health technologies to support their services.

The departments frequently involved in the procurement of medical devices and equipment across the interviewed hospitals included abdominal, traumatology, urology, proctology, gynaecology, ENT (Ear, Nose, and Throat), ICU (Intensive Care Unit), endoscopy, functional diagnostics, radiology, and laboratory departments. These departments are at the forefront of delivering specialized healthcare, diagnostics, and interventions. Understanding these departmental preferences can inform future decision-making processes related to the introduction of health technologies within the hospital setting.

##### *Process of health technology introduction.*

Introducing new health technologies in Ukraine follows a defined process governed by the Law of Ukraine “On Public Procurement” [18]. The duration of this process varies depending on factors such as the type of health technology, budget availability, and the level of



bureaucracy within the hospital. On average, it can take anywhere from 2 months to 1 year for a health technology to be adopted and implemented.

The process of introducing health technologies involves several stages, each requiring careful planning, coordination, and the active involvement of various stakeholders. These stakeholders, including hospital administrators, medical directors, procurement departments, and clinical departments, play essential roles in the decision-making process. Their collective expertise and perspectives contribute to the evaluation of health technologies' suitability and potential impact on patient care and healthcare delivery. Such a multidisciplinary approach ensures that diverse perspectives and expertise are considered, resulting in more informed decisions and better outcomes (Table 3).

Collaborative engagement and effective communication among all stakeholders is essential for informed decision-making regarding introducing health technologies. Each stakeholder brings unique expertise, perspectives, and considerations, contributing to a comprehensive evaluation of the technology's suitability, benefits, and potential impact on patient care and healthcare delivery.

While respondents were found to be involved in all stages of the decision-making process, the extent of their involvement varied significantly, reflecting differences in their experience and understanding of each stage. We noted a consistent pattern where respondents within the same speciality were engaged in the same stage of the decision-making process across all interviewed hospitals.

Technical stages of implementing new health technologies are well-established and executed at a high level

in Ukrainian hospitals. There is noticed a zone of improvement in the process of selecting which type of new health technology has to be purchased. This stage, the scientific-based decision-making process, requires more attention and development.

By conducting thorough literature reviews and making relevant comparisons, decision-makers can obtain evidence-based insights into the benefits and drawbacks of implementing these health technologies in hospital settings. However, our interviews revealed that the current assessment process often relies on limited sources of information, lacking comprehensive literature reviews or robust comparisons with existing practices or placebos. This deficiency in information hinders the ability to make well-informed decisions that consider all relevant factors.

Another important aspect of evaluation is an assessment of the budget impact of introducing new health technologies. This evaluation entails analyzing the financial implications of adopting and implementing the technology, including direct and indirect costs. These costs may include the initial acquisition cost, ongoing maintenance and operational expenses, training and education requirements, and potential cost savings or revenue generation resulting from the technology's use.

The process of introduction of new health technologies in Ukraine follows a defined process, but some areas require further attention and improvement. There is a need to enhance the assessment of efficacy, safety, organizational impact and economic implications. By improving these aspects, healthcare organizations can make informed decisions, optimize resource allocation and improve healthcare delivery and patient outcomes.

Table 3

The roles of the respondents in the decision-making process

Roles of Respondents	CEO		Medical Director			Economist			Procurement			Head of Department (clinical & diagnostic)			Clinicians		Analytical department* (involved in requests of other stakeholders)			Pharmacist		
	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	1	2	3	1	2	3
Definition of clinical needs	+	+	+	+	+	-	-	-	-	-	-	+	-	+	+	+	+	-	-	-	-	-
Market analyses	-	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Definition of technical requisites for tenders	-	-	+	-	-	-	-	-	-	-	-	+	+	-	-	-	+	+	+	-	-	-
Assessment of efficacy, safety, and organizational impact in comparisons with current practices or placebo	-	-	+	+	+	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-
Assessment of economic impact and calculation of project estimates, preparation of documents re changing of estimates	-	-	-	-	-	+	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-
The final choice of model of health technology which are planning for purchasing	+	+	+	+	+	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-
Procurement process	-	-	-	-	-	-	-	-	+	+	+	-	-	-	-	-	-	-	-	-	-	-
Offers analysis and final decision	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-
Logistics	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	+	+

Note: 1 – National Scientific Center “M.D. Strazhesko Institute of Cardiology”; 2 – Zhytomir Regional Clinical Hospital named by O. F. Gerbachevskiy; 3 – Kyrovograd Regional Oncocenter

*Sources of information are considered in the decision-making process of introduction health technologies.*

In the decision-making process, it is essential to consider various sources of information to ensure well-informed and comprehensive decisions. This data presents the rankings of different sources of information, ranging from 1 (seldom used) to 5 (often used), based on their importance in the current decision-making process in Ukrainian hospitals. The sources of information include clinicians, heads of departments, medical directors, hospital chief executive managers, national guidelines/orders, and international guidelines/orders. The percentages provided depict the distribution of responses across these ranking categories, shedding light on the extent to which each source of information is utilized in the decision-making process (Table 4).

Table 4

Sources of information are considered in the decision-making process of introduction health technologies

Sources of information	1	2	3	4	5
Clinicians	4 %	18 %	36 %	28 %	14 %
Head of Departments	–	18 %	28 %	18 %	36 %
Medical Directors	–	–	43 %	18 %	39 %
Hospital Chief Executive manager	–	8 %	41 %	16 %	35 %
National guidelines, orders and others	4 %	7 %	14 %	32 %	43 %
International guidelines, orders and other	–	14 %	32 %	29 %	25 %

These rankings provide insights into the reliance on various sources of information in the decision-making process, highlighting the significance of input from clinicians, medical directors, and guidelines/orders in informing decision-making in the new health technology's introduction.

*Key areas for improvement in the current decision-making process.*

Effective decision-making in implementing health technologies is vital for ensuring optimal patient care and healthcare outcomes. We identified key areas for improvement in the current decision-making/approaches of new health technology introduction in Ukraine:

- each stakeholder should take responsibility for their assigned tasks and avoid delegating their duties to others;
- strong collaboration among different hospital units is crucial at every stage of health technology implementation;
- deep calculation of the economic expediency of technologies is vital;
- approval of legal acts regulating the specified issue is important;
- conducting practical scientific-based training for stakeholders will allow to improve the decision-making process;
- creating a reliable tool will allow us to evaluate all the advantages of new health technology and, therefore, make an informed decision;
- improve the availability of information sources;

- clarity of the regulatory framework in terms of the use of funds of the National Healthcare Service for the purchase of health technologies;

- adequate funding to support purchasing health technologies and prompt decision-making, particularly for urgent and critical healthcare needs.

These valuable comments shed light on several areas for improvement in the decision-making process, including collaboration, financial evaluation, regulatory frameworks, evaluation tools, financing mechanisms, and communication. Incorporating these suggestions can help enhance the decision-making process and ultimately contribute to better outcomes in health technology acquisition.

*Potential challenges that hospitals may encounter during the implementation of HB-HTA.*

During our study, we identified several challenges that hospitals may face during the implementation of HB-HTA. One of the major challenges is the absence of HTA experts at the local level. This lack of expertise can hinder the effective implementation of HB-HTA and limit the availability of valuable insights and evidence-based decision-making.

Secondly, respondents emphasized the crucial role of full support from the general manager in successfully implementing HB-HTA. The commitment and backing from top-level management are essential to drive the necessary changes, allocate resources, and create an environment conducive to the integration of HTA practices within the hospital setting.

Lastly, the quality of local data plays a critical role in HB-HTA. Ensuring the availability of high-quality local data, including clinical outcomes, patient data, and cost-related information, is vital for accurate and meaningful HB-HTA processes.

## 5. Discussion

This semi-structured interview study consistently revealed a prevailing pattern across each of the interviewed hospitals regarding the introduction of new health technologies.

The process of introducing health technologies involves several stages, each requiring careful planning, coordination, and the active involvement of various stakeholders. It was observed that stakeholders within the same speciality were engaged in the same stage of the decision-making process across all interviewed hospitals. The achievements in successfully integrating health technologies underscore the significance of interdisciplinary participation and continuous collaboration within decision-making processes, a notion that is also underscored by the findings of other researchers [13, 19, 20].

The technical stages of implementing new health technologies are well-established in Ukrainian hospitals. A zone for improvement is detected in the process of selecting which type of new health technology has to be purchased. The current assessment process often relies on limited sources of information, lacking comprehensive literature reviews or robust comparisons with exist-

ing practices or placebos. This deficiency in information hinders the ability to make well-informed decisions that consider all relevant factors.

In parallel, another study delved into the complexities of decision-making when introducing new health technologies, emphasizing the need for context-sensitive information. The proposed program exemplifies an approach to integrating scientific evidence with local needs, values, and resources [19].

Based on the results of our study, we emphasize the significance of enhancing the assessment of efficacy, safety, organizational impact, and economic implications. By improving these aspects, healthcare organizations can make informed decisions, optimize resource allocation, and enhance healthcare delivery, ultimately leading to improved patient outcomes.

The study also identifies specific challenges for the future introducing HB-HTA in Ukraine, as it necessitate investment in building HTA expertise at the hospital level, fostering strong leadership support, professional staff training and establishing robust data collection and management systems. Overcoming these obstacles is crucial for hospitals to enhance their capacity to effectively implement new health technologies and make well-informed decisions regarding their utilization.

These findings resonate with experiences from other countries. Challenges and success of new health technology implementation identified in hospitals in Switzerland, Denmark, Spain, Swiss, Poland, Turkey and others align with obstacles and benefits found during our study. The importance of structured approaches, involving relevant stakeholders, training of stakeholders and the role of data retrieval and librarians were consistent themes across studies. Notably, the expectations and challenges of hospitals unfamiliar with HB-HTA align with those of experienced units worldwide [2, 13, 19, 20].

One recurring theme in the respondents' comments is the pursuit of obtaining a larger budget from the NHSU and accessing medicines through centralized procurement. However, it is worth noting that this process often prioritizes quantity over quality, highlighting the need for a more balanced approach.

Addressing the identified challenges and investing in the necessary expertise and infrastructure can enhance hospitals' ability to implement HB-HTA and make informed decisions about health technology adoption.

**Study limitations.** A limitation of this research is the unavailability of budget resources and distribution information from one of the three hospitals included in the study.

**Prospects for further research.** An avenue for future research could involve conducting a follow-up study to evaluate the impact of hospital-based HTA implementation on the decision-making process in the examined hospitals.

## 6. Conclusions

Our study has revealed that all the technical stages involved in implementing new health technologies in Ukraine are well established. It was observed that there is room for improvement in the process of selecting which new health technology to purchase. This stage, known as the decision-making process based on HTA, requires implementation at the hospital level.

Our study brings to light the evident interest and potential benefits associated with the adoption of HB-HTA in the hospitals under investigation. By integrating HB-HTA into existing practices and approaches, hospitals can significantly enhance their decision-making processes when introducing new health technologies.

There is an urgent need to introduce the term "hospital-based HTA" into Ukrainian legislation, as well as to activate the training of HTA experts at the hospital level.

## Conflict of interest

The authors declare that they have no conflict of interest in relation to this research, whether financial, personal, authorship or otherwise, that could affect the research and its results presented in this article.

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The study was performed without financial support.

## Data availability

Data will be made available on reasonable request.

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