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**REPRODUCTIVE TECHNOLOGIES AS AN INSTRUMENT  
FOR STRENGTHENING PUBLIC HEALTH:  
CONTEMPORARY CHALLENGES  
AND DEVELOPMENT PROSPECTS**

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**INTRODUCTION**

The issue of reproductive health has increasingly become a central concern in the broader discourse on public health, reflecting both demographic dynamics and evolving social expectations regarding the right to family life, reproductive choice, and gender equality<sup>1</sup>. In many countries, including Ukraine, declining fertility rates, rising incidence of infertility and the postponement of childbearing due to socioeconomic transformations have placed reproductive health policies at the intersection of demographic sustainability and public health security.

Against this background, assisted reproductive technologies (ART) have emerged as an indispensable component of modern medicine and social policy, offering not only solutions to individual health challenges but also contributing to the stabilization of demographic processes and the fulfilment of international obligations concerning human rights in healthcare.

The increasing application of ART—including in vitro fertilization, intracytoplasmic sperm injection, cryopreservation of gametes and embryos, preimplantation genetic diagnostics, and surrogacy—has not only transformed clinical practice but also redefined the scope of public health policy. Whereas initially these technologies were considered as individual medical interventions addressing infertility at the personal level, they are now widely acknowledged as instruments with significant societal, economic, and ethical implications.

Their integration into healthcare systems highlights the multidimensional nature of reproductive technologies, which simultaneously involve medical science, legal regulation, bioethics, sociology, and the principles of equity in access to health services.

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<sup>1</sup> Celia Karp. 'I am the master key that opens and locks': Presentation and application of a conceptual framework for women's and girls' empowerment in reproductive health. *Social Science & Medicine* Volume 258, August 2020, 113086 <https://doi.org/10.1016/j.socscimed.2020.113086>

In the context of public health, reproductive technologies perform several critical functions<sup>2</sup>. First, they expand access to parenthood for individuals and families who would otherwise be excluded due to medical or biological reasons. Second, they contribute to the stabilization of demographic indicators by counteracting the negative effects of low fertility rates, which have become a defining characteristic of European societies in recent decades.

Third, they embody the principles of modern public health, oriented toward the promotion of health equity, the reduction of social inequalities, and the assurance of high-quality medical services regardless of socioeconomic background. From this perspective, ART must be analyzed not merely as a set of biomedical procedures but as a structural component of national public health strategies.

At the same time, the proliferation of reproductive technologies has given rise to a wide range of challenges. Among them are issues of legal regulation, particularly in terms of defining the rights and responsibilities of parents, children, and donors; ensuring ethical standards in areas such as surrogacy and embryo preservation; and guaranteeing safety and quality of procedures. Moreover, questions of accessibility remain central, as significant disparities persist between high-income and low- or middle-income populations, both within and across nations.

This inequality creates a potential risk of transforming reproductive health into a privilege for the few rather than a universally protected human right. Such challenges are particularly relevant for transitional societies like Ukraine, where demographic decline coincides with insufficiently institutionalized public health mechanisms.

International experience demonstrates that countries with well-developed frameworks for regulating reproductive technologies are better positioned to integrate ART into comprehensive public health systems<sup>3</sup>. European Union member states, for example, have developed a diverse but structured approach, balancing ethical considerations, patient safety, and equitable access. Similarly, the United States and certain Asian countries have advanced in terms of both technological innovation and the development of supportive institutional environments.

These examples provide valuable insights for Ukraine, which is currently in the process of aligning its healthcare system with European standards and

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<sup>2</sup> Meaghan Jain; Manvinder Singh. Assisted Reproductive Technology (ART) Techniques. Treasure Island (FL): StatPearls Publishing; 2025 Jan. <https://www.ncbi.nlm.nih.gov/books/NBK576409/>

<sup>3</sup> Georgina M Chambers. The economic impact of assisted reproductive technology: a review of selected developed countries. July 2009 *Fertility and Sterility* 91(6):2281-94. <http://dx.doi.org/10.1016/j.fertnstert.2009.04.029>

facing the pressing necessity of addressing demographic decline through innovative public health instruments.

In this light, the study of reproductive technologies in the context of public health becomes especially relevant. It allows not only for a deeper understanding of the biomedical dimensions of infertility treatment but also for an exploration of the broader social, ethical, and policy-related implications of their use. The analysis of these technologies should therefore be positioned within the conceptual framework of public health, which emphasizes prevention, equity, and system-wide sustainability.

The purpose of this article is to examine reproductive technologies as an integral part of public health policy, to analyse their current challenges, and to outline the prospects for their development and integration into national healthcare strategies. The research aims to highlight the theoretical foundations of ART, explore their societal and demographic significance, evaluate the international experience of their regulation, and propose directions for optimizing the Ukrainian approach.

Through such an analysis, the article seeks to contribute to both academic discourse and practical policymaking, demonstrating the role of reproductive technologies not only in overcoming individual medical barriers but also in shaping the future of public health

## **1. Theoretical and Methodological Foundations of the Study of Reproductive Technologies**

The phenomenon of reproductive technologies has become an essential object of interdisciplinary research, standing at the crossroads of medicine, sociology, law, bioethics, and public health<sup>4</sup>. The study of these technologies requires not only an understanding of their biomedical foundations but also a theoretical and methodological framework that situates them within the broader domain of social development and health policy. This chapter provides a systematic exploration of the conceptual foundations of reproductive technologies, their classification, ethical and legal dimensions, and methodological approaches that can be applied to their study in the context of public health.

Reproductive technologies, more commonly referred to in biomedical discourse as assisted reproductive technologies (ART), encompass a broad spectrum of clinical and laboratory practices aimed at addressing infertility and facilitating human reproduction outside the natural process of conception. According to

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<sup>4</sup> Gavino Faa. Assisted Reproductive Technologies: A New Player in the Foetal Programming of Childhood and Adult Diseases? *Pediatr. Rep.* 2024, 16(2), 329-338; <https://doi.org/10.3390/pediatric16020029>

the World Health Organization (WHO), infertility is defined as a disease of the reproductive system characterized by the failure to achieve pregnancy after 12 months or more of regular unprotected sexual intercourse. In response to this medical and social challenge, ART emerged as a complex of techniques designed to enable conception where natural processes have proven insufficient.

The conceptualization of reproductive technologies is inherently dynamic. In their early stages, these technologies were primarily viewed as experimental interventions, often criticized for their high level of uncertainty and potential risks. Over time, however, they have acquired legitimacy as established medical procedures, incorporated into mainstream healthcare systems, and recognized as an essential element of the right to reproductive health. From a theoretical standpoint, ART should be analyzed not only as clinical interventions but as social technologies that mediate the relationship between biological capacities and societal expectations of family, parenthood, and demographic sustainability.

Furthermore, reproductive technologies can be regarded as a manifestation of biopower in the Foucauldian sense—mechanisms through which states, institutions, and medical systems regulate biological life and population dynamics. This perspective highlights the fact that ART is not merely about enabling individual reproduction but about shaping collective outcomes in terms of fertility, population health, and the intergenerational continuity of societies<sup>5</sup>.

The classification of reproductive technologies reflects their diverse applications and technical complexity. At the core of ART are *in vitro* fertilization (IVF) and its variations, which involve the extracorporeal fertilization of an oocyte with sperm, followed by the transfer of the embryo into the uterus. Complementary techniques include intracytoplasmic sperm injection (ICSI), which allows fertilization even in cases of severe male infertility, and cryopreservation of gametes and embryos, which ensures the possibility of delayed parenthood or preservation of reproductive material for medical reasons, such as oncology patients facing chemotherapy.

Another dimension of ART is preimplantation genetic testing (PGT), which enables the screening of embryos for chromosomal or genetic disorders prior to implantation. This raises significant ethical and legal debates, particularly concerning the extent to which such technologies may lead to selective reproduction or even genetic enhancement. Surrogacy, as an additional form of reproductive technology, involves the use of another woman's womb for gestation, thus separating the genetic, gestational, and social aspects of motherhood. The classification of ART is therefore not only a technical matter

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<sup>5</sup> Amanda Fleetwood. *The Impact of Infertility: Why ART Should Be a Higher Priority for Women in the Global South*. *Cancer Treat Res*. Author manuscript; available in PMC: 2011 Apr. [https://doi.org/10.1007/978-1-4419-6518-9\\_18](https://doi.org/10.1007/978-1-4419-6518-9_18)

but also a sociocultural one, as each category introduces distinct ethical dilemmas and regulatory challenges.

The ethical analysis of ART constitutes one of the most complex and contentious areas of contemporary bioethics. On the one hand, reproductive technologies embody the realization of fundamental human rights, such as the right to found a family, the right to healthcare, and the right to autonomy over one's reproductive choices. On the other hand, they pose risks of commodification of human life, the instrumentalization of women's bodies, and the potential exploitation of vulnerable populations in the global reproductive market.

The principle of autonomy is central to the ethical justification of ART, emphasizing the right of individuals and couples to make reproductive decisions based on their own values and circumstances. However, autonomy must be balanced with the principles of justice and non-maleficence. For instance, in the case of commercial surrogacy, questions arise as to whether the economic vulnerabilities of surrogate mothers compromise the voluntariness of their participation. Similarly, embryo selection and genetic screening introduce dilemmas related to eugenics and the moral status of embryos<sup>6</sup>.

Bioethical frameworks, such as principles (autonomy, beneficence, non-maleficence, justice) and feminist bioethics, provide valuable tools for analysing these dilemmas. They highlight the importance of ensuring informed consent, protecting the dignity of all participants, and safeguarding the best interests of children born through ART. Ethical considerations therefore shape not only clinical practice but also public health policy, as governments are compelled to regulate ART in ways that reflect societal values while respecting individual rights.

The legal dimension of reproductive technologies varies considerably across jurisdictions, reflecting cultural diversity and differing policy priorities. Some countries adopt highly permissive frameworks, allowing a wide range of ART practices with minimal restrictions, while others impose strict limitations, particularly on issues such as surrogacy, embryo research, and access for single individuals or same-sex couples. The European Union, while leaving ART regulation largely to member states, has sought to harmonize certain aspects, particularly concerning patient safety and cross-border healthcare.

In the context of public health governance, legal regulation plays a crucial role in ensuring the safety, quality, and equity of ART services. Standards for licensing fertility clinics, protocols for informed consent, rules governing the use of donor material, and provisions for the legal status of children born

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<sup>6</sup> Dorit Barlevy. Eugenics and polygenic embryo screening: Public, clinician, and patient perceptions of conditions versus traits. *Genetics in Medicine* Volume 27, Issue 9, September 2025, 101507. <https://doi.org/10.1016/j.gim.2025.101507>

through ART are all fundamental elements of reproductive health governance<sup>7</sup>. Furthermore, international conventions, such as the Oviedo Convention on Human Rights and Biomedicine, establish principles that shape national legislation, particularly with regard to human dignity and the prohibition of commercial exploitation of the human body.

For Ukraine and other transitional societies, the challenge lies in balancing the demand for innovative reproductive services with the need to align with international ethical and legal standards. Weak regulatory environments can give rise to “reproductive tourism,” in which countries with permissive laws become destinations for individuals seeking services prohibited in their own jurisdictions<sup>8</sup>. This underscores the necessity of developing coherent legal frameworks that integrate ART into the broader system of public health governance.

From a methodological perspective, the study of reproductive technologies requires an interdisciplinary approach that combines biomedical, legal, sociological, and public health research methods. Biomedical research focuses on the safety, effectiveness, and innovation of ART procedures, employing clinical trials, laboratory studies, and long-term follow-up of patients and children. Legal scholarship examines the regulatory frameworks, judicial decisions, and comparative analyses of national legislations, often utilizing doctrinal and normative methodologies.

Sociological approaches emphasize the lived experiences of patients, the cultural meanings of parenthood, and the social consequences of ART for gender relations and family structures. Qualitative methods such as in-depth interviews, ethnographic observation, and discourse analysis are frequently employed to capture these dimensions. Meanwhile, public health methodologies focus on population-level outcomes, including access to ART, its demographic impact, and the equity of service provision. Quantitative methods such as epidemiological surveys, demographic modeling, and health economics analyses are critical in this regard.

An integrative methodological framework for studying reproductive technologies should combine these perspectives in order to reflect the multifaceted nature of ART. “Such an approach enables scholars and policymakers

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<sup>7</sup> Vitalii Cherniha. Rights of a child born through the use of assisted reproductive technologies in the EU countries and Ukraine. July 2022 *Revista Amazonia Investiga* 11(53):101-110. <http://dx.doi.org/10.34069/AI/2022.53.05.10>

<sup>8</sup> Seema Mohapatra. Adopting an International Convention on Surrogacy -- A Lesson from Inter-Country Adoption. [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=2617896#](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2617896#)

<sup>9</sup> Edit Sápi. The Complex Legal Framework of Assisted Reproductive Techniques and Its Role in Addressing Demographic Challenges: A Hungarian Perspective. December 2024 *Law Identity and Values* 4(2):181-195. <http://dx.doi.org/10.55073/2024.2.181-195>

to capture the interplay between individual rights, societal interests, and health system sustainability. It also underscores the importance of evidence-based policymaking, where empirical data on safety, efficacy, and social outcomes guide the formulation of regulations and public health strategies.

The theoretical and methodological foundations of the study of reproductive technologies demonstrate their complexity as both medical and social phenomena. Conceptually, ART extends beyond the domain of infertility treatment, representing a transformative instrument that shapes demographic trajectories, social norms, and the realization of human rights. Ethically, it challenges societies to reconcile principles of autonomy, justice, and human dignity with the realities of technological innovation. Legally, it requires coherent regulation that ensures safety, equity, and compliance with international standards. Methodologically, it demands interdisciplinary approaches capable of integrating biomedical, social, and public health perspectives.

As a result, the study of reproductive technologies in the context of public health must be framed within a comprehensive, multidimensional framework that addresses not only technical and medical issues but also societal, ethical, and governance challenges. Only through such an approach can ART be effectively incorporated into national health systems as a means of advancing both individual reproductive rights and collective public health goals.

## **2. Reproductive Technologies in Public Health Systems**

The integration of reproductive technologies into public health systems is one of the most significant developments in modern healthcare, reflecting the growing recognition that infertility is not merely an individual medical issue but also a public health concern with profound demographic, social, and economic implications.

While assisted reproductive technologies (ART) have traditionally been positioned within the realm of specialized clinical care, their expansion and normalization demand a rethinking of their place in health systems and their contribution to broader public health objectives<sup>10</sup>. This chapter examines the role of reproductive technologies in public health, exploring dimensions of accessibility, equity, safety, and health system sustainability. It also considers the socio-political challenges associated with embedding ART into national health strategies.

Public health, as conceptualized by the World Health Organization, is defined as “the art and science of preventing disease, prolonging life, and

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<sup>10</sup> M. Wiersma. Commercial Impacts on Assisted Reproductive Technology: A Scoping Review. *Journal of Bioethical Inquiry*. Published: 11 September 2025. <https://link.springer.com/article/10.1007/s11673-025-10456-1>

promoting health through the organized efforts of society.” Within this framework, reproductive health occupies a central place, encompassing not only maternal and child health but also the capacity of individuals to exercise control over their reproductive lives. Reproductive technologies, therefore, should be understood as tools that contribute directly to the realization of public health objectives, particularly in the domains of equity, demographic stability, and health promotion.

Infertility, affecting approximately 15% of couples worldwide, has been recognized as a disease with profound psychological, social, and demographic consequences. Left unaddressed, infertility contributes to declining fertility rates, challenges to family stability, and, in the case of certain societies, social stigmatization of individuals unable to conceive. Public health systems, by integrating ART into their services, have the potential to mitigate these negative effects and ensure that infertility treatment is not limited to private, market-driven provision but is instead incorporated into universal health coverage.

Thus, ART represents both an individual right and a collective interest. The ability to provide effective reproductive services strengthens societal resilience to demographic decline, reduces health inequities, and contributes to the fulfilment of Sustainable Development Goals (SDGs), particularly those related to health, gender equality, and social inclusion.

One of the central questions in the public health analysis of ART is accessibility. The availability of reproductive technologies varies widely across countries, often reflecting differences in economic capacity, healthcare infrastructure, and political priorities<sup>11</sup>. In many high-income countries, ART is partially or fully covered by national health insurance schemes, ensuring that treatment is accessible to a wide range of patients. For example, countries such as France, Belgium, and Israel provide generous coverage for multiple cycles of in vitro fertilization (IVF), recognizing the demographic and social value of reproductive assistance.

By contrast, in low- and middle-income countries, ART is frequently available only in private clinics and remains prohibitively expensive for the majority of the population. This creates stark inequities, where the ability to access reproductive healthcare is determined not by medical need but by socioeconomic status. Such disparities contradict the principles of public health, which are grounded in universality, equity, and the reduction of health inequalities.

From a policy perspective, addressing these inequities requires not only financial mechanisms—such as insurance coverage or government subsidies—but

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<sup>11</sup> Gamal I. Serour. Ethical issues in infertility. *Best Practice & Research Clinical Obstetrics & Gynaecology* Volume 43, August 2017, Pages 21-31. <https://doi.org/10.1016/j.bpobgyn.2017.02.008>

also investments in infrastructure, training of specialists, and regional distribution of services. In transitional contexts such as Ukraine, the concentration of ART clinics in major urban centers exacerbates inequalities between urban and rural populations, further underscoring the need for systemic integration of ART into public health planning.

The integration of ART into public health systems also necessitates robust mechanisms for ensuring patient safety and the quality of care. Reproductive technologies, while increasingly standardized, involve complex laboratory and clinical procedures that carry inherent risks<sup>12</sup>. Multiple pregnancies, ovarian hyper stimulation syndrome, and long-term health implications for children conceived through ART are among the most pressing concerns.

Public health governance must therefore establish clear standards for the accreditation of clinics, the training of medical personnel, and the monitoring of outcomes. International organizations, such as the European Society of Human Reproduction and Embryology (ESHRE), have developed guidelines to support clinical best practices, but their implementation depends on national regulatory frameworks. Equally important is the creation of registries and databases that allow for systematic tracking of ART outcomes, enabling policymakers to evaluate safety, efficacy, and long-term health implications.

Ethical oversight also forms an indispensable part of quality assurance in ART. Issues such as informed consent, embryo handling, gamete donation, and surrogacy require consistent ethical review and adherence to internationally recognized standards. By embedding ART within public health systems, governments are better positioned to establish transparent oversight mechanisms that protect patients while ensuring accountability of providers.

One of the most compelling arguments for incorporating ART into public health systems lies in its potential contribution to demographic sustainability. Many countries, particularly in Europe and parts of Asia, are experiencing declining fertility rates that fall below the replacement level of 2.1 children per woman<sup>13</sup>. This demographic trend poses significant challenges to economic growth, labour markets, pension systems, and intergenerational solidarity.

Although ART cannot serve as a comprehensive solution to demographic decline, it can play a meaningful role in offsetting the negative effects of infertility on population dynamics. Empirical studies have demonstrated that in countries with widespread access to ART, the contribution of these technologies

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<sup>12</sup> Giovanni Coticchio. Fertility technologies and how to optimize laboratory performance to support the shortening of time to birth of a healthy singleton: a Delphi consensus. *J Assist Reprod Genet.* 2021 Feb 18;38(5):1021–1043. <https://doi.org/10.1007/s10815-021-02077-5>

<sup>13</sup> Bart C J M Fauser. Declining global fertility rates and the implications for family planning and family building: an IFFS consensus document based on a narrative review of the literature. *Hum Reprod Update.* 2024 Jan 10;30(2):153–173. <https://doi.org/10.1093/humupd/dmad028>

to total fertility rates is measurable and significant, particularly when combined with broader family-friendly policies such as parental leave, childcare support, and gender equality measures.

From a public health perspective, the demographic impact of ART underscores the need to view reproductive technologies not as isolated medical procedures but as components of national strategies for population health and sustainability. Their integration into demographic planning highlights the intersection between clinical medicine and societal well-being, reflecting the multidimensional role of ART in modern societies.

Despite the potential benefits, integrating reproductive technologies into public health systems poses numerous challenges. Financial constraints are among the most prominent, as ART is resource-intensive and requires sophisticated laboratory infrastructure. Policymakers must weigh the costs of ART against competing health priorities, particularly in resource-limited settings where basic health services may still be underfunded.

Another challenge concerns cultural and ethical diversity. In societies where religious or cultural norms oppose certain forms of ART, such as gamete donation or surrogacy, public health integration may face significant resistance. Balancing respect for cultural values with the promotion of reproductive rights requires sensitive policymaking and broad public dialogue.

Finally, the rapid pace of technological innovation in ART complicates regulatory oversight. Emerging techniques such as mitochondrial replacement therapy, gene editing in embryos, and artificial gametogenesis raise new questions about safety, ethics, and societal impact<sup>14</sup>. Public health systems must remain adaptive, capable of responding to innovation while maintaining safeguards that protect both individual patients and society at large.

For Ukraine, the integration of reproductive technologies into the public health system presents both opportunities and challenges. On the one hand, Ukraine has developed a reputation as a global hub for certain ART services, particularly surrogacy, attracting international clients due to its relatively permissive legal environment and comparatively lower costs. This has created economic opportunities but also raised ethical concerns about the commercialization of reproduction and the potential exploitation of vulnerable populations.

On the other hand, within the national population, access to ART remains limited and largely dependent on private provision. Public funding is scarce, and inequalities in access are significant, particularly between urban and rural

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<sup>14</sup> Gómez-Tatay L. Mitochondrial Modification Techniques and Ethical Issues. *J Clin Med.* 2017 Feb 24;6(3):25. <https://doi.org/10.3390/jcm6030025>

populations. Integrating ART into the Ukrainian public health strategy would require systemic reforms, including the development of insurance coverage, investment in infrastructure, alignment with European Union standards, and stronger regulatory frameworks. Given Ukraine's demographic challenges, with declining fertility rates and population loss due to migration and conflict, ART could play an important role in national demographic resilience if integrated responsibly into public health policy.

The analysis of reproductive technologies within public health systems demonstrates their dual significance as both individual medical interventions and collective public health instruments. By addressing infertility, ART not only responds to the needs of individuals and families but also contributes to demographic stability, equity in healthcare, and the promotion of reproductive rights<sup>15</sup>. At the same time, their integration into public health systems requires careful attention to issues of accessibility, safety, ethical oversight, and financial sustainability.

For countries like Ukraine, the challenge is to transition from a market-driven model of ART provision toward a public health-oriented approach that ensures universality, equity, and alignment with international standards. By embedding reproductive technologies into the structures of public health, societies can harness their potential not only to treat disease but also to strengthen demographic resilience and advance the broader goals of human well-being.

### ***2.1. Societal Impact of Reproductive Technologies***

The development and diffusion of reproductive technologies (RT), particularly assisted reproductive technologies (ART), have profound implications that extend well beyond the medical treatment of infertility. While their clinical value in enabling conception is evident, their societal impact is far more complex, encompassing demographic dynamics, social structures, cultural norms, and ethical considerations.

Reproductive technologies play a pivotal role in addressing contemporary demographic challenges. Many developed and transitional countries face persistent declines in fertility rates, aging populations, and shrinking labour forces. While ART cannot single-handedly reverse these trends, it contributes to fertility by enabling individuals and couples who would otherwise remain childless to become parents. Studies in European countries indicate that ART births now account for between 2% and 5% of total live births, and in some nations, such as Denmark and Belgium, this proportion is significantly higher.

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<sup>15</sup> Amanda Mackay. Inequity of Access: Scoping the Barriers to Assisted Reproductive Technologies. *Pharmacy (Basel)*. 2023 Jan 16;11(1):17. <https://doi.org/10.3390/pharmacy11010017>

From a demographic standpoint, ART helps counteract not only biological infertility but also socio-economic trends that delay parenthood. The availability of cryopreservation of oocytes and embryos, for instance, provides opportunities for women to postpone childbearing while pursuing education and careers, potentially stabilizing fertility at later ages. However, this shift also generates questions about the sustainability of relying on technological solutions to address broader demographic decline, raising concerns about over-medicalization of reproduction<sup>16</sup>.

In the Ukrainian context, the demographic impact of ART is especially significant. The country faces declining fertility rates, population aging, and migration-related losses. Reproductive technologies could play a role in mitigating these demographic challenges, yet their potential remains underutilized due to limited accessibility and uneven integration into public health policy.

Reproductive technologies also exert a transformative influence on family structures and gender relations. By decoupling biological reproduction from sexual intercourse and traditional family norms, ART expands the definition of parenthood and reconfigures social understandings of kinship.

For women, ART has both empowering and challenging effects. On one hand, it expands reproductive autonomy, allowing women to overcome infertility, delay childbearing, or pursue motherhood outside traditional marital frameworks. On the other hand, technologies such as surrogacy may reinforce gender inequalities by commercializing women's reproductive labour, often in contexts where economic vulnerabilities compel women to become surrogates.

Gender relations are further reshaped by ART's impact on men, particularly through techniques such as intracytoplasmic sperm injection (ICSI), which can enable fatherhood despite severe male infertility. The possibility of fatherhood independent of traditional reproductive capacities challenges established cultural narratives of masculinity.

At the level of family diversity, ART contributes to the recognition of non-traditional family forms, including single-parent households and same-sex couples. While this development enhances inclusivity and pluralism, it also generates resistance in societies where cultural or religious values strongly endorse conventional family structures. This tension underscores the need for careful policy balancing between individual rights and collective norms.

The societal impact of reproductive technologies cannot be understood without addressing the ethical controversies they generate. Among the most debated issues are the moral status of embryos, the permissibility of

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<sup>16</sup> Narcyz Ghinea. Situating commercialization of assisted reproduction in its socio-political context: a critical interpretive synthesis. *Hum Reprod Open*. 2022 Nov 21;2022(4):hoac052. <https://doi.org/10.1093/hropen/hoac052>

embryo selection, the boundaries of surrogacy, and the commercialization of reproductive processes.

One of the most contentious dilemmas concerns embryo creation and disposal. In IVF, surplus embryos are often produced, raising questions about their moral status and the ethical acceptability of freezing, discarding, or using them for research. The principle of respect for human dignity, enshrined in numerous bioethical frameworks, complicates these decisions.

Preimplantation genetic testing (PGT) further intensifies these debates, as it allows parents to select embryos free from genetic disorders. While this is a powerful tool for preventing inherited diseases, it also raises concerns about eugenics and the potential for “designer babies.”<sup>17</sup>

Surrogacy, particularly commercial surrogacy, represents another ethical flashpoint. Critics argue that it commodifies women’s bodies and exploits economically disadvantaged women, especially in countries where regulatory frameworks are weak. Proponents, however, emphasize autonomy and contractual freedom, viewing surrogacy as a legitimate form of reproductive assistance. The divergence of opinions across societies reveals the deeply cultural and moral nature of these debates.

A crucial dimension of ART’s societal impact is its contribution to social inequalities. Access to reproductive technologies remains highly stratified, shaped by income, geography, and legal frameworks. In high-income countries where ART is subsidized or included in health insurance schemes, broader segments of the population benefit. In contrast, in many low- and middle-income countries, ART remains an expensive service available only to elites.

This unequal access risks reinforcing reproductive stratification, whereby affluent individuals enjoy expanded reproductive opportunities while disadvantaged groups face systemic exclusion. Such inequities contradict the principles of public health, which emphasize universality and equity. Moreover, global disparities give rise to “reproductive tourism,” where individuals travel across borders to access services unavailable or unaffordable in their home countries<sup>18</sup>. Ukraine, for example, has become a destination for international surrogacy, reflecting both its permissive laws and lower costs compared to Western Europe.

From a sociological perspective, these dynamics reveal how ART both democratizes and stratifies reproduction, simultaneously expanding possibilities and creating new forms of inequality.

<sup>17</sup> Sarah Franklin. *Born and Made: An Ethnography of Preimplantation Genetic Diagnosis*. October 2006. <https://doi.org/10.2307/j.ctt4cgd33>

<sup>18</sup> Michal Nahman. *Reproductive Tourism: Through the Anthropological “Reproscope”*. November 2016 Annual Review of Anthropology 45(1). <https://doi.org/10.1146/annurev-anthro-102313-030459>

The societal reception of reproductive technologies is strongly influenced by cultural and religious values. In predominantly secular societies, ART is often normalized as part of modern healthcare. However, in more religious contexts, opposition persists, rooted in concerns about interfering with natural processes, the sanctity of embryos, or the moral acceptability of surrogacy and gamete donation.

For example, the Catholic Church opposes most forms of ART, particularly IVF and surrogacy, on the grounds that they separate procreation from marital union and involve embryo destruction. In contrast, many Protestant traditions adopt more permissive positions, emphasizing compassion for infertile couples. Islamic perspectives vary, with some schools permitting ART within marriage but prohibiting third-party involvement, such as donor gametes or surrogacy.

Cultural differences also shape attitudes toward family diversity. In some societies, ART's role in enabling same-sex parenting is celebrated as progress toward equality, while in others it is rejected as incompatible with prevailing moral norms. These cultural and religious dimensions highlight the need for context-sensitive public health policies that respect diversity while safeguarding fundamental rights.

At the micro-social level, ART has significant psychological and community impacts. For individuals and couples, access to ART can alleviate the profound distress associated with infertility, improving mental health and quality of life<sup>19</sup>. The success of ART often contributes to stronger family bonds and the psychological well-being of parents.

However, ART also introduces new forms of stress. The financial burden, emotional intensity of repeated treatment cycles, and potential stigmatization of ART-conceived children in certain contexts can generate psychosocial challenges. Public health systems must therefore complement ART services with psychological support, counselling, and community education to mitigate these effects.

At the community level, ART reshapes collective norms around parenthood and reproduction. Over time, it contributes to the normalization of technological intervention in reproduction, fostering new understandings of family and human life.

The societal impact of reproductive technologies is multifaceted, encompassing demographic, cultural, ethical, and social dimensions. While ART contributes to demographic sustainability, expands reproductive rights, and diversifies family forms, it simultaneously raises ethical dilemmas, reinforces inequalities, and challenges deeply held cultural values.

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<sup>19</sup> Aditi Gupta. The influence of assisted reproductive technologies-related stressors and social support on perceived stress and depression. *BMC Womens Health*. 2024 Jul 27;24:431. <https://doi.org/10.1186/s12905-024-03262-1>

Understanding ART in its societal context requires moving beyond biomedical frameworks toward a holistic analysis that recognizes its role in shaping human relationships, social structures, and collective futures. Policymakers, scholars, and healthcare professionals must therefore approach ART as both a medical intervention and a social phenomenon, requiring governance strategies that balance innovation with equity, ethics, and respect for cultural diversity.

Only by acknowledging this societal dimension can reproductive technologies fulfill their potential not only to treat infertility but also to contribute to the broader objectives of public health and human well-being.

### **3. Comparative Analysis of Ukraine and EU Approaches**

In the European Union, the regulation of reproductive technologies is characterized by diversity and subsidiarity. Health policy remains largely within the competence of individual member states, which has resulted in a mosaic of regulatory models. Some countries, such as Belgium, Denmark, and Spain, have adopted liberal frameworks that provide broad access to assisted reproductive technologies, including gamete donation and surrogacy under regulated conditions. These states emphasize inclusivity, allowing single individuals and same-sex couples to benefit from reproductive technologies, thereby promoting equity and alignment with contemporary human rights standards.

Conversely, other EU member states, such as Germany, Italy, and Poland, impose significant restrictions, often driven by ethical, cultural, or religious considerations<sup>20</sup>. For example, embryo research and certain forms of surrogacy remain prohibited in these jurisdictions. Despite this diversity, however, the European Union has developed overarching guidelines that ensure patient safety, the quality of procedures, and the protection of donors and recipients, particularly through directives on tissues and cells, which establish minimum standards across member states.

Ukraine, by contrast, has pursued a relatively liberal approach in the regulation of reproductive technologies, albeit within a less structured institutional framework. The country permits practices such as *in vitro* fertilization, gamete donation, and both gestational and traditional surrogacy, positioning itself as one of the most open jurisdictions in Europe in this domain. This permissive legal environment has contributed to Ukraine's emergence as a global center for reproductive tourism, attracting patients from countries where restrictive regulations prevent access to certain procedures.

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<sup>20</sup> Piotr Mazurkiewicz. Policy on Religion in the European Union. *Religions* 2020, 11(10), 534. <https://doi.org/10.3390/rel11100534>

While this has generated economic benefits and stimulated the development of medical expertise, it has also raised ethical and legal concerns, particularly in relation to the protection of the rights of surrogate mothers and children, the prevention of exploitation, and the regulation of cross-border arrangements<sup>21</sup>. Unlike in the EU, where ethical debates are mediated through strong institutional and legal mechanisms, Ukraine's framework remains relatively fragmented, relying heavily on clinical practice standards and contractual agreements rather than comprehensive legislation.

One of the key differences between Ukraine and the EU lies in the accessibility and equity of reproductive health services. In the European Union, although disparities remain between countries, there is a general trend toward integrating assisted reproductive technologies into public health systems. In countries such as France, the Netherlands, and the United Kingdom, these services are partially or fully covered by public insurance, ensuring that financial status does not become an insurmountable barrier to parenthood.

In contrast, in Ukraine, reproductive technologies are predominantly financed through out-of-pocket payments, limiting access to wealthier segments of the population and reinforcing social inequality. This discrepancy highlights a broader divergence in public health philosophy: while the EU increasingly frames reproductive technologies as a matter of social justice and public health, Ukraine still treats them largely as private medical services, accessible only to those who can afford them.

Ethical considerations further illustrate the contrast between Ukraine and the EU<sup>22</sup>. European states, influenced by long-standing traditions of bioethical deliberation, place strong emphasis on questions such as embryo protection, informed consent, and the prevention of commercialization of human reproductive capacities. Institutions such as ethics committees and bioethics councils play a significant role in shaping policy and ensuring accountability.

Ukraine, while formally committed to ethical principles, often lacks institutionalized mechanisms to enforce them, leading to challenges in monitoring compliance, particularly in the surrogacy sector. The absence of robust oversight raises concerns not only about potential abuses but also about the international reputation of the Ukrainian medical system.

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<sup>21</sup> Paola Frati. Bioethical issues and legal frameworks of surrogacy: A global perspective about the right to health and dignity. December 2020 *European Journal of Obstetrics & Gynecology and Reproductive Biology* 258(a). <https://doi.org/10.1016/j.ejogrb.2020.12.020>

<sup>22</sup> Milada Anna Vachudova. Ukraine's Challenge to Europe: The EU as an Ethical and Powerful Geopolitical Actor. Published online by Cambridge University Press: 23 January 2025. <https://www.cambridge.org/core/journals/ethics-and-international-affairs/article/abs/ukraines-challenge-to-europe-the-eu-as-an-ethical-and-powerful-geopolitical-actor/742D2A0510C5088E1CC82B2F899B35D1>

At the same time, there are important similarities between Ukraine and the EU. Both recognize the need to balance individual reproductive rights with societal interests, and both are engaged in ongoing debates regarding the role of the state in regulating intimate domains of life. Moreover, both confront the demographic imperative of declining fertility rates, which amplifies the significance of reproductive technologies as instruments of public health.

In this respect, Ukraine's openness to a wide range of practices reflects a pragmatic response to its acute demographic challenges, whereas the EU's more cautious approach reflects a commitment to harmonizing innovation with ethical safeguards and social consensus.

The process of European integration provides Ukraine with an opportunity to align its legal and institutional framework with EU standards while preserving its comparative advantages in terms of medical expertise and accessibility of services. This requires strengthening the legal regulation of reproductive technologies, ensuring protection of all stakeholders, and integrating these services into the broader public health system.

Lessons from the EU suggest that comprehensive oversight, public funding mechanisms, and ethical deliberation structures are essential to achieving sustainability and public trust. At the same time, Ukraine can offer the EU valuable insights into the practical implementation of reproductive services in contexts of demographic decline and limited public resources, demonstrating the adaptability and resilience of healthcare systems under conditions of economic and political stress<sup>23</sup>.

In conclusion, the comparative analysis underscores both the potential and the challenges of reproductive technologies as instruments of public health in Ukraine and the European Union. While the EU provides models of regulation, equity, and ethical oversight that Ukraine can adopt, Ukraine's experience highlights the importance of flexibility and openness in addressing urgent demographic issues. The dialogue between these approaches can facilitate the development of a more integrated and balanced model, combining the strengths of European legal traditions with Ukraine's pragmatic orientation toward demographic resilience and reproductive freedom.

### ***3.1. Recommendations for Reforming Ukraine's System of Reproductive Technologies***

The reform of reproductive technologies in Ukraine requires a comprehensive and systematic approach that integrates legal, ethical, medical, and public health perspectives. Current developments demonstrate that Ukraine possesses

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<sup>23</sup> Christel Querton. Durable Protection in the European Union: The Case of Persons Fleeing Armed Conflicts. *Laws* 2025, 14(5), 70. <https://doi.org/10.3390/laws14050070>

significant potential in this field, including advanced clinical practices, highly skilled specialists, and comparatively liberal regulations that allow for a wide range of procedures. At the same time, the absence of comprehensive oversight mechanisms, limited integration into the public health system and reliance on private financing create vulnerabilities that hinder equitable access and raise questions regarding the protection of rights and ethical standards.

To ensure sustainability, legitimacy, and alignment with European integration processes, a set of interrelated recommendations can be formulated, aimed at strengthening institutional capacity, enhancing legal frameworks, improving accessibility, and embedding reproductive technologies more deeply within the architecture of public health policy.

The first recommendation concerns the development of a coherent and comprehensive legislative framework. At present, Ukraine regulates assisted reproductive technologies through fragmented legal provisions and clinical guidelines, often leaving crucial issues to contractual arrangements between clinics, donors, and intended parents<sup>24</sup>. This creates risks of legal uncertainty and unequal protection of rights. A unified law on assisted reproductive technologies should be developed, addressing all aspects of practice, including in vitro fertilization, gamete and embryo donation, surrogacy, cryopreservation, genetic screening, and emerging techniques such as mitochondrial replacement.

Such a law must clearly define the rights and responsibilities of all parties involved, establish procedures for informed consent, and create mechanisms for monitoring compliance. Aligning these provisions with European Union directives on tissues and cells would not only strengthen legal certainty but also facilitate harmonization with EU health standards.

The second priority is the establishment of robust institutional oversight. Unlike many EU member states, Ukraine lacks national bodies dedicated specifically to regulating assisted reproductive practices. Creating a central regulatory authority, such as a National Council for Reproductive Technologies, would ensure transparency, accountability, and the consistent enforcement of ethical and medical standards. This body could be tasked with licensing clinics, monitoring outcomes, maintaining registries of procedures, and providing annual reports on the state of reproductive health services.

In addition, it could serve as a platform for ethical deliberation, involving representatives from medicine, law, sociology, psychology, and civil society. Such institutional mechanisms are necessary to build public trust and to ensure that the expansion of reproductive technologies contributes to societal well-being rather than generating ethical controversies or international criticism.

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<sup>24</sup> V.S. Blikhar. Surrogacy in Ukraine: theoretical and applied problem. December 2021 *Reproductive Endocrinology*. <https://doi.org/10.18370/2309-4117.2021.62.22-28>

A third recommendation involves the integration of reproductive technologies into the public health system and their partial financing through public insurance schemes. Currently, access to assisted reproductive services in Ukraine is limited by high costs, making them largely available only to wealthier segments of the population or to international patients seeking affordable options through medical tourism. This reinforces social inequalities and contradicts the principle of reproductive justice.

To address this, the state should develop funding mechanisms that subsidize key procedures such as *in vitro* fertilization, particularly for couples with diagnosed infertility and for populations affected by war-related health challenges. Even partial reimbursement would represent a significant step toward equity, enabling broader segments of the population to access services. Moreover, such measures would align Ukraine with European practices, where public coverage of reproductive technologies is increasingly recognized as a matter of health rights and demographic policy.

The fourth recommendation emphasizes the importance of strengthening ethical frameworks and human rights protections. Surrogacy, which is permitted in Ukraine under conditions that are among the most liberal in Europe, illustrates both the strengths and risks of the Ukrainian approach<sup>25</sup>. While this openness has made the country a global leader in reproductive services, it has also created situations of exploitation, inadequate protection for surrogate mothers, and complex legal disputes involving foreign parents and children born through surrogacy.

Ethical safeguards must be introduced to prevent the commercialization of human reproduction, to ensure that surrogate mothers are fully informed and protected, and to guarantee the rights of children born through these arrangements. The development of standardized contracts, minimum requirements for medical and psychological support, and clear procedures for citizenship and parental recognition would mitigate risks and strengthen the international credibility of Ukraine's system.

The fifth dimension of reform involves education, awareness, and public dialogue. Reproductive technologies are not merely clinical procedures but socially significant phenomena that reshape conceptions of family, parenthood, and gender roles. As such, their regulation must be accompanied by informed societal debate, supported by transparent communication from medical institutions, policymakers, and academic experts.

Educational programs for healthcare professionals should emphasize ethical principles, patient-centered care, and cultural sensitivity, while public

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<sup>25</sup> Viktoriia V. Nadon. The private-legal nature of the application of the methods of assisted reproductive technologies in Ukraine. *Wiadomości Lekarskie Medical Advances*, VOLUME LXXVII, ISSUE 7, JULY 2024. doi: 10.36740/WLek202407124

campaigns should disseminate accurate information about reproductive health options and counteract stigma associated with infertility. In the long term, such measures would foster a more informed and supportive environment, ensuring that reproductive technologies are not viewed as privileges of the elite but as legitimate tools for realizing fundamental health rights.

Finally, reform must take into account the rapidly evolving landscape of technological innovation. The global field of reproductive medicine is advancing toward techniques that challenge traditional regulatory frameworks, including gene editing, artificial gametogenesis, and the integration of artificial intelligence in embryo selection. Ukraine should adopt a proactive rather than reactive stance, establishing flexible legal provisions that can accommodate new technologies while maintaining rigorous ethical oversight.

Participation in international scientific networks, cooperation with EU regulatory bodies, and investment in research and innovation will enable Ukraine not only to adopt global standards but also to contribute to shaping them. This forward-looking approach would reinforce the country's position as a competitive and respected actor in the field of reproductive health.

In sum, the reform of reproductive technologies in Ukraine must move beyond the current model, which prioritizes openness and clinical expertise but neglects equity, oversight, and institutional accountability<sup>26</sup>. By developing comprehensive legislation, establishing regulatory bodies, integrating services into the public health system, strengthening ethical protections, promoting education, and preparing for future innovations, Ukraine can build a reproductive health system that meets the needs of its citizens, aligns with European standards, and contributes to demographic resilience.

Such reforms are not only essential for protecting individual rights and improving access to healthcare but also for ensuring the sustainability of public health as a cornerstone of national development. The challenge lies in balancing liberal access with strong safeguards, economic opportunities with ethical responsibilities, and national priorities with international obligations. The successful resolution of these dilemmas will determine the role of reproductive technologies in shaping Ukraine's demographic and public health future.

## CONCLUSIONS

The analysis of reproductive technologies within the framework of public health demonstrates their profound significance not only as medical interventions aimed at overcoming infertility but also as strategic instruments for addressing demographic challenges, strengthening social equity, and realizing fundamental human rights.

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<sup>26</sup> A.O. Akhmedova. Peculiarities of legal regulation of surrogacy in Ukraine and abroad. Article. January 2020. <https://doi.org/10.32782/2524-0390/2020.1.31>

Reproductive technologies, while originally confined to the domain of biomedical science, have evolved into complex socio-political phenomena that require comprehensive regulation, ethical oversight, and integration into healthcare systems. Their role in promoting demographic resilience, reducing inequalities in access to parenthood, and supporting the principle of reproductive justice underscores their importance as an essential component of contemporary public health policy.

The study revealed that the theoretical and methodological foundations of reproductive technologies must extend beyond narrow clinical indicators to embrace interdisciplinary perspectives, including epidemiology, sociology, bioethics, law, and public administration. Such an approach ensures that these technologies are not treated as isolated medical procedures but as part of a broader societal framework that addresses population health in a holistic manner.

The public health paradigm, emphasizing prevention, equity, and sustainability, provides a solid basis for integrating reproductive technologies into national and international healthcare strategies.

The comparative analysis of Ukraine and the European Union highlighted both convergences and divergences in their approaches to reproductive health. While the EU demonstrates diversity in its regulatory models, it nevertheless ensures strong institutional oversight, ethical accountability, and growing tendencies toward public funding of reproductive services. Ukraine, by contrast, maintains one of the most liberal environments in Europe, permitting a wide range of procedures including surrogacy, but suffers from fragmented legislation, insufficient oversight, and a reliance on private financing.

This contrast underscores both the opportunities and risks inherent in Ukraine's system: on the one hand, openness and medical expertise foster global competitiveness, while on the other, the absence of comprehensive safeguards raises concerns regarding equity, ethics, and long-term sustainability.

On the basis of this analysis, several recommendations were formulated for reforming Ukraine's reproductive health system. These include the adoption of unified and comprehensive legislation harmonized with EU directives, the creation of a national regulatory authority to ensure oversight and accountability, the integration of reproductive services into public health financing mechanisms to promote equity, the strengthening of ethical safeguards to protect all stakeholders, and the promotion of education and public dialogue to foster societal acceptance and informed choice. In addition, Ukraine must anticipate future technological innovations and adopt flexible legal frameworks capable of adapting to emerging practices while maintaining adherence to ethical standards.

The broader conclusion of this study is that reproductive technologies must be understood as a structural element of public health policy, capable of addressing individual aspirations for parenthood and collective demographic imperatives simultaneously. Their proper regulation and integration into healthcare systems not only improve the quality of medical care but also contribute to social justice, gender equality, and national development.

For Ukraine, successful reform of reproductive technologies will depend on the ability to balance liberal access with strong institutional safeguards, economic opportunities with ethical responsibilities, and national interests with alignment to European standards.

Ultimately, reproductive technologies embody the dynamic intersection of medicine, ethics, law, and public health. Their effective governance requires continuous dialogue between science, society, and the state. By advancing reforms in this domain, Ukraine has the opportunity not only to improve the well-being of its citizens but also to position itself as a leader in shaping innovative and ethically responsible models of reproductive health for the broader international community.

## **SUMMARY**

The study explores reproductive technologies as an integral component of modern public health, emphasizing their role in addressing both individual medical needs and broader societal challenges. Traditionally confined to the biomedical field, assisted reproductive technologies (ART) such as in vitro fertilization, gamete donation, cryopreservation, genetic testing, and surrogacy have expanded to become multidimensional phenomena with demographic, ethical, legal, and social implications.

Their significance extends beyond infertility treatment, as they contribute to demographic resilience, the promotion of equity in access to healthcare, and the realization of reproductive justice as a fundamental human right.

The research highlights that the theoretical and methodological analysis of reproductive technologies must be interdisciplinary, combining perspectives from epidemiology, sociology, bioethics, law, and public administration. Within the public health paradigm, reproductive technologies are situated as instruments that promote prevention, sustainability, and equity, aligning with international goals such as the Sustainable Development Agenda. This framework ensures that ART are considered not only for their clinical outcomes but also for their contribution to population health and social cohesion.

A comparative analysis of Ukraine and the European Union demonstrates both similarities and divergences in their approaches. EU member states display regulatory diversity but emphasize strong institutional oversight, ethical

accountability, and increasing public financing of reproductive services. Ukraine, by contrast, permits a wide range of reproductive practices and has developed notable expertise, particularly in surrogacy, yet suffers from fragmented legislation, insufficient institutional oversight, and reliance on private financing.

This divergence positions Ukraine simultaneously as a competitive global destination for reproductive services and as a system facing significant challenges in ensuring equity and ethical compliance.

Based on these findings, the study formulates recommendations for reforming Ukraine's reproductive health system. These include the adoption of unified legislation harmonized with EU standards, the creation of a national regulatory authority, integration of reproductive services into public health insurance, the establishment of robust ethical safeguards, and the promotion of public awareness and dialogue.

Furthermore, the study stresses the need for proactive adaptation to technological innovations such as gene editing, artificial gametogenesis, and AI-driven embryo selection, which will shape the future of reproductive medicine.

The conclusions underline that reproductive technologies must be recognized as a structural element of public health strategies rather than isolated clinical interventions. Their proper regulation and integration into healthcare systems strengthen demographic resilience, promote equity, and ensure the protection of fundamental rights.

For Ukraine, aligning with European standards while maintaining flexibility and openness offers an opportunity to build a sustainable and ethically robust model of reproductive health, capable of responding to national challenges and contributing to global best practices.

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