

Health tourism policy in Türkiye: Legal frameworks and Governance analysis in the international context (2015–2025)

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Abstract

Health tourism has emerged as a strategic governance priority worldwide, with Türkiye positioning itself as one of the leading global destinations for international patients. This study critically examines the legal and policy frameworks shaping Türkiye's health tourism sector between 2015 and 2025 and empirically maps the discursive structures of its governance through qualitative content analysis. A two-phase mixed qualitative methodology was applied: Phase 1 consisted of a systematic documentary review of national legislation, ministerial strategies, and international policy instruments; Phase 2 applied a structured coding scheme to sixteen selected national and international documents using MAXQDA 24 software, generating co-occurrence network maps and a code matrix browser. The findings confirm a dual narrative: while Türkiye has developed a comprehensive centralized regulatory architecture—including the establishment of USHAŞ, telemedicine regulation, and minimum price controls—persistent structural gaps remain in transparency, equity safeguards, and genuine alignment with international normative frameworks. The qualitative coding reveals that governance and regulatory enforcement dominate Türkiye's policy discourse, while patient rights, ethical dimensions, and international alignment remain peripheral. This configuration is inconsistent with the requirements for sustainable health tourism governance. The study contributes structured insights for policymakers seeking to balance economic opportunity with transparency, equity, and long-term institutional credibility.

1. Introduction

Health tourism, including medical, wellness, and thermal tourism, has emerged as a major component of the global healthcare economy, especially after 2010. This phenomenon is driven by factors such as globalization, advances in technology,

increased awareness of the benefits of personalized care, and reduced costs for certain treatments in specific destination countries, including Türkiye. Health tourism—defined as patients traveling abroad for medical care in pursuit of affordability, accessibility, and quality [1]—offers significant benefits for both patients and host countries. From a legislative perspective, medical tourism constitutes a type of tourist activity characterized by the formation and sale of a tourist product encompassing both general tourism services and medical services, requiring tailored legal frameworks beyond conventional tourism law [2].

The economic and social significance of health tourism has grown substantially in the post-pandemic period, and its sustainable development is now recognized as a multidimensional challenge requiring solutions that address not only economic growth but also social equity and institutional governance quality. A systematic literature review published in *Sustainability* identified that existing research on sustainable development in health tourism remains fragmented and that the post-pandemic period has intensified interest in governance-oriented approaches [3]. This observation aligns directly with our study's dual emphasis on documentary review and discursive analysis of policy texts.

From a sustainable development perspective, health tourism should not be assessed solely through patient mobility, market expansion, or export revenue. Its broader relevance also depends on its contribution to health protection, institutional quality, equity, and long-term social well-being, especially in relation to Sustainable Development Goal 3 (Good Health and Well-Being). In this sense, the governance of health tourism must be evaluated not only through the existence of legal instruments, but also through the quality of implementation, transparency toward patients, continuity of care, and the capacity of institutions to protect both international and domestic health interests. Recent contributions further support the need to interpret health-related sectors through a broader sustainability lens. Research on long-term health orientation and environmentally informed consumption behavior shows that health and well-being are increasingly embedded in wider social and sustainability-oriented decision-making processes (Rustagi et al., 2025). Studies on sustainable tourism and destination management emphasize the importance of governance quality, environmental integration, and service credibility in shaping destination performance and user confidence, which is equally relevant for health tourism destinations (Ates et al., 2024). The post-crisis and post-pandemic literature also shows that sustainable tourism development depends on institutional resilience, risk management, and adaptive capacity rather than on growth indicators alone (Mazilu et al., 2024). In addition, evidence from destination-based tourism research demonstrates that user satisfaction is strongly linked to infrastructure, service quality, territorial differentiation, and effective place management (Gheorghe, 2025). In health tourism, these dimensions acquire additional significance because they are directly related to patient safety, information transparency, and trust in governance.

Even when not perfectly organized legislatively, health tourism offers access to specialized treatments at lower costs and with shorter waiting times [4,5], while generating economic revenue, creating jobs, and fostering technological and professional advancements in destination countries. However, despite its economic and healthcare advantages, health tourism risks reinforcing inequities if not supported by robust, ethical, and transparent regulations. Empirical evidence shows that the 'absence of effective public regulation' in medical tourism governance shifts responsibility toward private accreditation systems, a practice that weakens state accountability and reproduces regulatory gaps common in developing and transitional health systems [6].

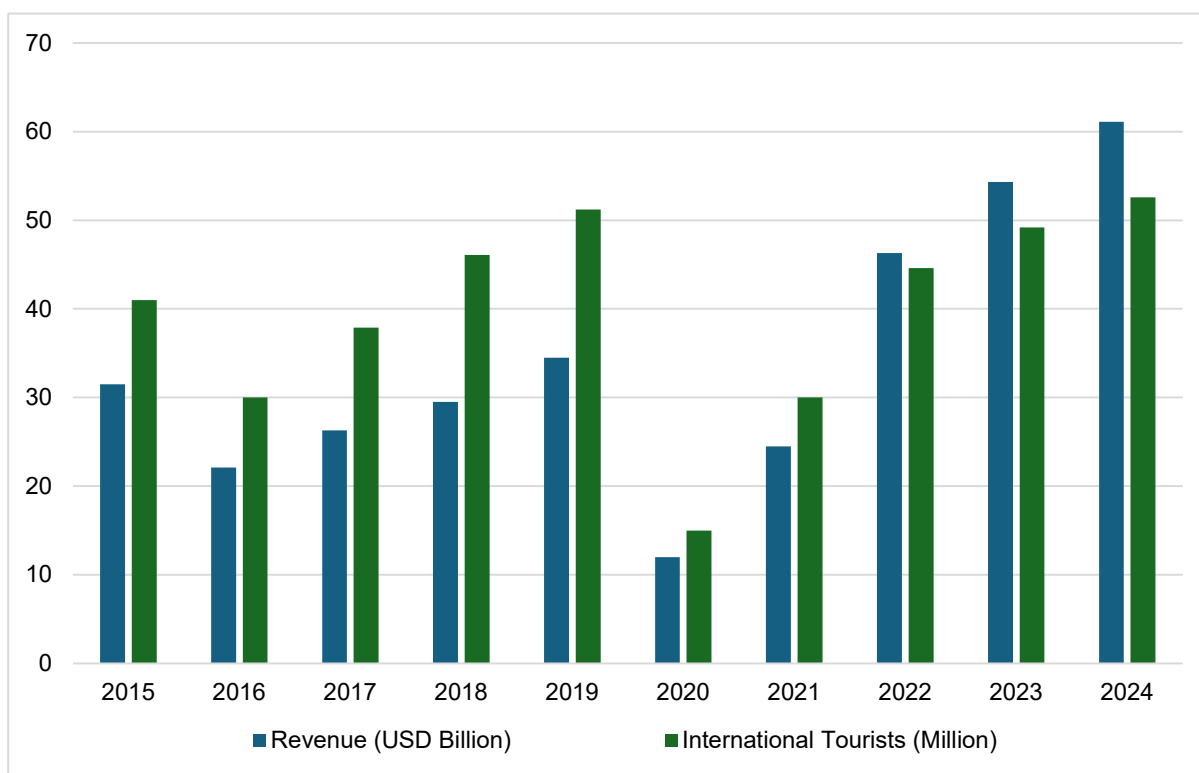
Important contributions to the study of health tourism present conceptual, critical, and country-specific analyses. Connell (2013) [1] conceptualizes health tourism as an export that merges tourism, health, and culture, warning of the 'commodification of care' when regulation lags behind market growth. Hanefeld et al. (2014) [7] argue that unregulated, market-driven models may compromise patient safety and public health. Lunt and Smith (2015) [8] explore the role of intermediaries within the 'medical travel value chain,' showing how they reshape trust and risk relationships between patients and providers. Research on post-pandemic recovery in Mediterranean health tourism destinations demonstrated that sustainable demand management, organisational adaptation, and crisis communication are central to sectoral viability [9]. Moreover, clinical trust and patient well-being have been identified as key mediating variables in medical tourists' intention to revisit destinations, underscoring the governance relevance of service quality and transparency [10].

The case of Türkiye is distinctive because the state plays an active role in regulation, development, and promotion. Türkiye, with its unique geographical position between Europe, Asia, and the Middle East, has positioned itself as a rising global hub for health tourism [35,43]. Despite global disruptions such as the COVID-19 pandemic, the sector demonstrated notable recovery capacity, recording over 50 million international arrivals in 2023 and maintaining its position among the world's ten most visited destinations [26]. A longitudinal analysis of Turkish tourism sustainability performance over the period 2000–2024 confirmed sustained growth in tourist arrivals and overnight stays, while highlighting the need to integrate qualitative governance indicators alongside quantitative growth metrics [11]. Türkiye's competitive position in global tourism exports has been confirmed through Revealed Comparative Advantage analysis, situating the country among the top performers in international service trade [12].

The necessity of analyzing the legal framework in health tourism is dictated by the rapid evolution of the Medical Travel Value Chain, which now involves a sophisticated network of intermediaries, healthcare providers, and digital platforms that often operate beyond the reach of traditional national laws. Prior research has rarely examined *how* Turkish policy documents articulate their governance priorities beyond a straightforward listing of legislative instruments. The present study fills this gap by introducing a second analytical layer—a systematic qualitative content analysis of sixteen documents using MAXQDA 24—that reveals not just what policies exist, but how governance, patient rights, and international alignment are discursively structured and weighted.

The present study therefore contributes not only to the legal and policy analysis of health tourism in Türkiye, but also to a broader discussion in health geography and sustainable development about how cross-border healthcare systems are territorially organized, institutionally justified, and socially legitimized.

Graphic 1. General Tourism in Türkiye: Revenue (USD Billion) and Number of International Tourists (2015–2024)



Source: Anadolu Agency (2025).

When viewed from a tourism perspective, COVID-19 led to unprecedented disruption in tourist numbers and revenue. The industry experienced a significant downturn in 2020 but recovered rapidly, achieving record revenues and tourist numbers by 2024. This strong rebound may be attributed to pent-up travel demand and effective recovery strategies. From a medical perspective, the pandemic underscored a global shift in demand towards high-quality, resilient healthcare systems, reinforcing the strategic importance of countries—like Türkiye—whose health systems demonstrated robustness during the crisis [13]. Bibliometric analysis of health tourism research confirms that post-pandemic scholarship is increasingly focused on governance, policy, and sustainability dimensions, reflecting the sector's maturation as a subject of scientific inquiry [14].

2. Materials and Methods

In Türkiye, the decade between 2015 and 2025 has been especially important, as the government has introduced new strategies, legal reforms, and international collaborations to strengthen its global position in health tourism. While research on health tourism has expanded in recent years, there is still a lack of detailed analysis of both the legal and policy frameworks that have guided Türkiye's development and the discursive structures through which governance is articulated in those documents. This paper responds to that gap through a two-phase methodology. The analytical framework was also informed by the assumption that health tourism governance should be examined in relation to sustainable development concerns, particularly institutional accountability, equity, and the broader contribution of the sector to health and well-being.

2.1. Phase 1 – Documentary Review

Document identification followed a systematic search strategy across multiple official, academic, and institutional sources. Three categories of sources were used. **National legal and policy sources:** Official Gazette (Resmi Gazete), Ministry of Health (MoH), Ministry of Culture and Tourism, Presidency of Strategy and Budget, USHAŞ. Search terms: health tourism, international patients, medical tourism regulation, price tariff, telemedicine, USHAŞ. **International and regional policy sources:** WHO, OECD[39], UNWTO, WTO (GATS), World Bank, ISO/TC 228, European Commission (Directive 2011/24/EU) [31,32], ASEAN Secretariat, GCC documents. **Peer-reviewed literature:** Scopus, Web of Science, PubMed, and Google Scholar, with search terms including medical tourism governance, patient mobility, policy frameworks, regulation, Türkiye, equity.

Inclusion criteria were guided by the most important international institutions linked to health tourism policy and categorized by document type (laws, regulations, official strategies, bilateral agreements, policy briefs, organizational reports, and high-quality academic literature), relevance, time frame (primarily 2015–2025, with foundational documents included), geographical focus (Türkiye + international frameworks), and language (English and Turkish). Analytical interpretation followed Bowen's documentary analysis method [24], informed by a classic policy-analysis framework for interpreting the stages and structure of policy texts [33], which offers a systematic and rigorous approach for interpreting policy and legal texts, enabling the study to critically extract themes, identify gaps, and synthesize national and international regulations into a coherent analytical framework.

2.2. Phase 2 – Qualitative Content Analysis with MAXQDA 24

To deepen and empirically substantiate the findings from the documentary review, a structured qualitative content analysis was conducted on a corpus of sixteen strategic and legislative documents—eight from Türkiye's national regulatory framework (TR 1–8) and eight from international governance bodies (INT 1–8)—using MAXQDA 24 software. The coding scheme was developed from an initial critical reading of the corpus and covers eight dimensions: international alignment; regulatory architecture; market and economic governance; patient-centeredness and patient rights; critical governance gaps; economic and ethical contradictions; governance discourse; and health tourism as an overall framing.

The coding was conducted selectively at the paragraph level, focusing only on passages that display a causal relationship directly related to the medical field or medical tourism. This approach was chosen to capture explanatory mechanisms rather than purely illustrative or informational examples. Similar methodological approaches have been applied in studies analysing barriers to the development of medical tourism [15,16] and in qualitative content analysis of international policy documents [17]. After the coding process, 360 individual paragraphs from sixteen documents were coded (codes assigned 1,299 times in total), across approximately 878 pages of policy material. A minimum coding threshold of two codes per paragraph was applied.

Two types of visualizations were employed. A co-occurrence network (code map) was generated to display intersections among coded fragments, with a minimum threshold of 15 co-occurrences set to reflect causal patterns representing approximately 4.2% of total coded fragments. A code matrix browser was also produced, showing the distribution of assigned codes across all sixteen analysed documents. The full list of documents used for coding is presented in Appendix 1.

Table 1. Coding framework applied in MAXQDA 24

Code	Subcode	Applied when
International alignment	References to international standards	Text explicitly mentions WHO, EU, WTO, or other international bodies; cross-country comparisons made
	Harmonization claims	Document claims Türkiye's framework is aligned with international standards; positive declarative alignment language
	Misalignment / symbolic compliance	Gap between claimed alignment and reality; alignment appears formal, partial, or superficial
Regulatory architecture	Legal framework	Laws, regulations, or legal provisions described
	Institutions and governance	Ministries, agencies, or governance bodies mentioned; roles described
	Implementation and enforcement	Monitoring, inspections, audits, or enforcement actions described
Market and economic governance	Market development	Growth, expansion, or economic importance of health tourism discussed
	Public-private dynamics	Interaction between public institutions and private providers described
	State promotion	Government actively promotes health tourism; strategies to attract international patients
Patient-centeredness	Patient rights and protection	Legal or ethical rights of patients mentioned; protection mechanisms described
	Transparency toward patients	Patients' access to information (costs, procedures, risks) discussed
	Quality and safety	Standards of care, clinical quality, or patient safety discussed
	Ethical / unethical procedures	Paragraph addresses an ethical standard or an unethical event/action
Critical gaps	Transparency and accountability gaps	Lack of transparency; weak accountability mechanisms identified
	Implementation gaps	Laws exist but are not properly applied; gap between regulation and practice
	Inequality or access issues	Unequal access; disparities between groups (domestic vs. international patients)
Economic & ethical contradictions	Commercialization vs. care	Healthcare framed as commercial product; market logic influences care delivery
	Revenue vs. patient rights	Economic goals conflict with patient protection or ethics

Source: Authors' own coding scheme, developed in MAXQDA 24.

Table 2. Summary of official health tourism documents, Türkiye (1998–2025)

Official Document	Date & Publisher	Main Ideas	Strategic Directions	New Concepts
Patient Rights Regulation	1998, MoH (amended)	Establishes fundamental rights of patients (informed consent, confidentiality, access to care)	Align Türkiye with universal patient rights standards	First legal foundation for protecting international patients
Health Tourism Unit	2010, MoH	Creation of a unit dedicated to managing and promoting health tourism	Formal recognition as national priority; coordination between public/private hospitals	Governance capacity for international patient management
Personal Data Protection Law No. 6698 (KVKK)	2016, Republic of Türkiye	Protects personal and health data, aligned with GDPR principles	Builds trust for international patients; strengthens data privacy	Legal safety in handling foreign patients' sensitive information
Int'l Health Tourism Regulation	2017, Official Gazette, MoH	First comprehensive regulation on international health tourism; defines standards for intermediaries	Centralize authorization; define quality and safety requirements	Moves from general health law to sector-specific regulation
USHAŞ Establishment Law	2018, MoH	Establishment of International Health Services Inc. as single coordinating body	Professionalize and centralize promotion under one national body	USHAŞ as Türkiye's international health brand and market regulator
11th Development Plan	2019–2023, SBB	Health tourism included in national development strategy as economic growth driver	Increase competitiveness; expand infrastructure; attract high-income patients	Strategic shift—health tourism as knowledge-economy component
Remote Health Services Regulation	2022, MoH	Legal framework for telemedicine; mandatory documentation requirements	Expand services beyond physical borders; improve pre/post-treatment continuity	Integration of digital health and telehealth into health tourism
Promotion and	2023, MoH	Regulates advertising and	Prevent	Commercial

Official Document	Date & Publisher	Main Ideas	Strategic Directions	New Concepts
Information Regulation		promotional activities; ethical marketing standards	misleading health advertisements; balance promotion with patient protection	promotion constrained by patient protection obligations
12th Development Plan	2024–2028, SBB	Long-term vision for health tourism as part of a knowledge-based economy	Digitalization, sustainability, international cooperation	Health tourism as innovation-driven export sector
Updated Int'l Health Tourism Regulation	2025, MoH	Updated version of 2017 regulation; adapts rules to digital health and pricing	Tighten standards; modernize framework for global competitiveness	Adaptive regulation for post-pandemic international market
Minimum Price Tariff	2025, MoH	Sets a floor price for medical services for international patients	Prevent unfair competition; protect brand value; deter predatory pricing	Market regulation tool—quality over low-cost competition
Int'l Health Tourism Cooperation Protocol	May 2025, MoH & MoCT	Collaboration between health and cultural tourism sectors; integrated packages	Promote health, wellness, and cultural tourism combinations	Broadens scope—combining medical, wellness, and cultural tourism

Documents verified last on 2 September 2025.

3. Results

The results are presented in two complementary parts corresponding to the two analytical phases. Section 3.1 presents the findings from the documentary review of national and international legal frameworks. Section 3.2 presents the results of the MAXQDA 24 qualitative content analysis.

3.1. Evolution of National Governance (2015–2025): From Patient Rights to Export of Health Services

Over the past decade, Türkiye has consolidated its position as a leading global health tourism destination; however, this rapid expansion has unfolded within a legislative framework that remains uneven in terms of standardization and long-term regulatory coherence. An examination of national policies—with the 1998 Patient Rights Regulation included as the foundational legal bedrock upon which the 2015–2025 framework was constructed—reveals a dual and at times contradictory trajectory:

while regulatory instruments have multiplied and institutional capacity has expanded, persistent structural gaps remain in outcome transparency, equity, and alignment with international governance frameworks. Sustainable approaches to medical tourism require not only competitive strengths but active governance mechanisms that address transparency, accreditation, and equity simultaneously—a lesson directly applicable to Türkiye's current governance stage [18].

The foundations of Türkiye's health tourism governance are rooted in a rights-based approach to healthcare delivery, consistent with the broader equity-oriented reforms documented in Türkiye's universal health coverage trajectory [23]. Early instruments such as the Patient Rights Regulation (1998) and the Personal Data Protection Law (KVKK, 2016) established formal guarantees concerning informed consent, privacy, and patient dignity, aligning national practice with international human-rights-oriented health norms. From 2015 onward, regulatory priorities gradually shifted toward the formalization and organization of health tourism as an export-oriented sector. The 2017 International Health Tourism Regulation marked a turning point by centralizing authorization procedures, defining standards for intermediaries, and strengthening Ministry of Health oversight [38]. Subsequent legal commentary on the professional responsibility framework for health personnel further clarified the liability and oversight structures underpinning these regulatory changes [36].

This transformation became more explicit with the establishment of USHAŞ [34,41] and the introduction of subsequent regulatory instruments aimed at promotion, coordination, and commercialization. Türkiye's development strategy exemplifies a distinct institutional governance model, where the state functions not merely as regulator but as proactive promoter and coordinator through hybrid public institutions—a configuration that distinguishes it from the predominantly market-oriented models observed in India, Malaysia, and South Korea [21,25,27,37]. The introduction of the Minimum Price Tariff in 2025 reinforced the commercial governance logic by standardizing prices and curbing predatory market practices. Nevertheless, the literature consistently cautions that when economic incentives dominate regulatory design without robust safeguards, patient protection risks being reduced to a formal rather than substantive commitment [1,7].

3.2. Post-Pandemic Response: Digitalization and Market Correction

The COVID-19 pandemic (2020–2021) constituted a critical stress test for Türkiye's health tourism system, abruptly interrupting international patient mobility and exposing underlying governance vulnerabilities. The 2022 Remote Health Services Regulation formally authorized teleconsultations, introduced mandatory documentation requirements, and expanded the regulatory scope of healthcare provision beyond physical clinical settings. Empirical evidence from comparable medical tourism destinations indicates that telehealth and telemedicine services positively shape patient satisfaction and willingness to undertake medical travel, underscoring the strategic relevance of Türkiye's 2022 telemedicine regulation for sustaining international patient flows [28]. More broadly, the technological and regulatory evolution of telemedicine over the past two decades shows that the effectiveness of such services depends on parallel progress in legal clarity, data security, and professional training, dimensions that remain only partially addressed in Türkiye's framework [29]. The post-pandemic recovery period (2022–2025) was marked by renewed patient inflows and heightened concerns regarding market distortions. The 2023 Promotion and Information Regulation tightened advertising controls, while the 2025 Minimum Price Tariff was explicitly designed to deter predatory pricing and stabilize market conditions. Despite these advances, important governance challenges remain unresolved, particularly

around the concentration of promotional and regulatory functions within USHAŞ and the absence of standardized clinical outcome indicators.

3.3. Qualitative Content Analysis: Governance Discourse in National and International Documents

3.3.1. Co-Occurrence Network: International Documents

Figure 1 illustrates the co-occurrence network of documents analysed at the international level. The analysis generated three thematic clusters. The first cluster (purple) refers to the sector's governance and institutional organization, which exhibits the highest internal density and contains the node with the greatest centrality in the entire system. The centrality of governance suggests that the strategic discourse on medical tourism at the international level is built predominantly around governance concerns—a finding consistent with the broader literature on medical tourism policy, which highlights the integrative role of governance in sustainable sectoral development [19,20]. The dominance of governance discourse in international policy documents also echoes findings from bibliometric analyses of health tourism research, which identify governance as the most rapidly developing thematic cluster in the field [14].

The second cluster (blue) centres on patient accountability and protection, placing patient rights and quality and safety at the centre. Connections between this cluster and the governance node are substantial but asymmetrical: the legal framework code serves as the main link with the rest of the system, while patient rights and quality and safety remain predominantly connected to one another. This configuration suggests that patient protection is mentioned primarily through formal legal instruments, rather than through operational mechanisms integrated into the general logic of policies. The third cluster (magenta) concerns alignment with international standards and harmonization claims. It is the least represented in the corpus and occupies a peripheral position in the co-occurrence network, suggesting that international alignment is treated as an external reference rather than a cross-cutting governance logic.

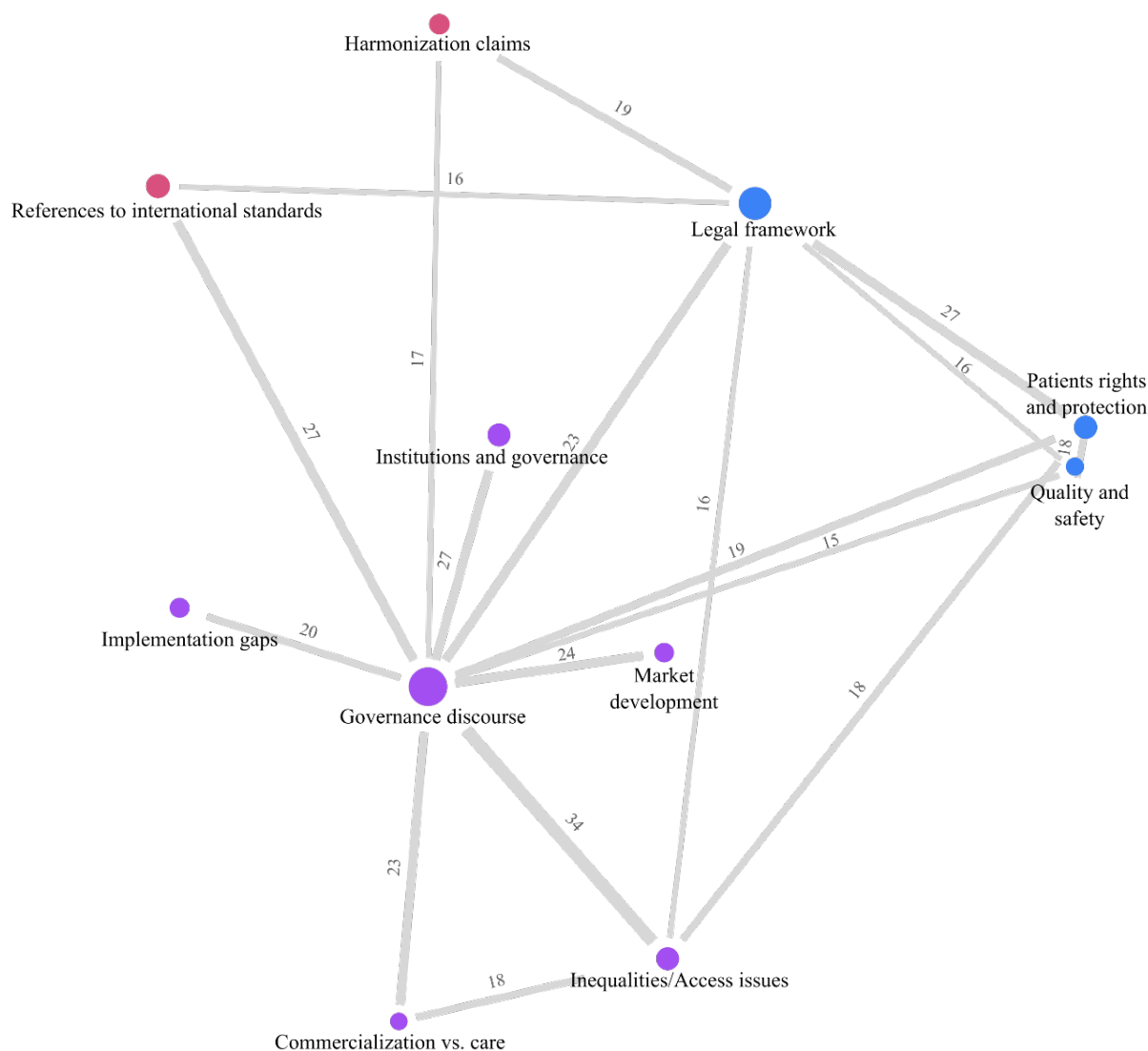


Figure 1. The co-occurrence network of the strategies issued at international level (min. 15 intersections)

3.3.2. Co-Occurrence Network: Turkish National Documents

Figure 2 illustrates the co-occurrence network of documents regulating medical tourism in Türkiye. In contrast to the international corpus, the Turkish corpus reveals a strongly asymmetrical structure dominated almost exclusively by a single regulatory cluster. This configuration is consistent with observations in the literature on medical tourism policies in emerging economies, which highlight the trend toward accelerated institutionalization and administrative centralization [19,21]. The first cluster (magenta) centres on the national regulatory framework, the legal framework, and institutions. The presence of health tourism primarily in this cluster suggests that medical tourism is treated foremost as an economic and regulatory objective rather than as an issue of quality, safety, or patient rights. This finding resonates with analyses of Turkish tourism sustainability performance, which have noted the prevalence of quantitative growth metrics in national strategic discourse relative to qualitative governance indicators [11].

The strongest co-occurrence link in the entire Turkish corpus is established between the legal framework and implementation and enforcement codes. This pairing

reflects a discursive orientation toward the operationalisation of the regulatory framework, but also a possible overemphasis on administrative control at the expense of substantive dimensions essential for sectoral sustainability. The second cluster (purple) contains declarative patient rights, linked primarily to ethical procedures and the legal framework. A third cluster (blue) encompasses transparency for patients, mentioned most frequently in connection with ethical procedures and patient rights, and less frequently in connection with the national regulatory framework. Most strikingly, alignment with international standards appears only marginally (approximately ten co-occurrences), and does not constitute a structural element of Türkiye's governance discourse.

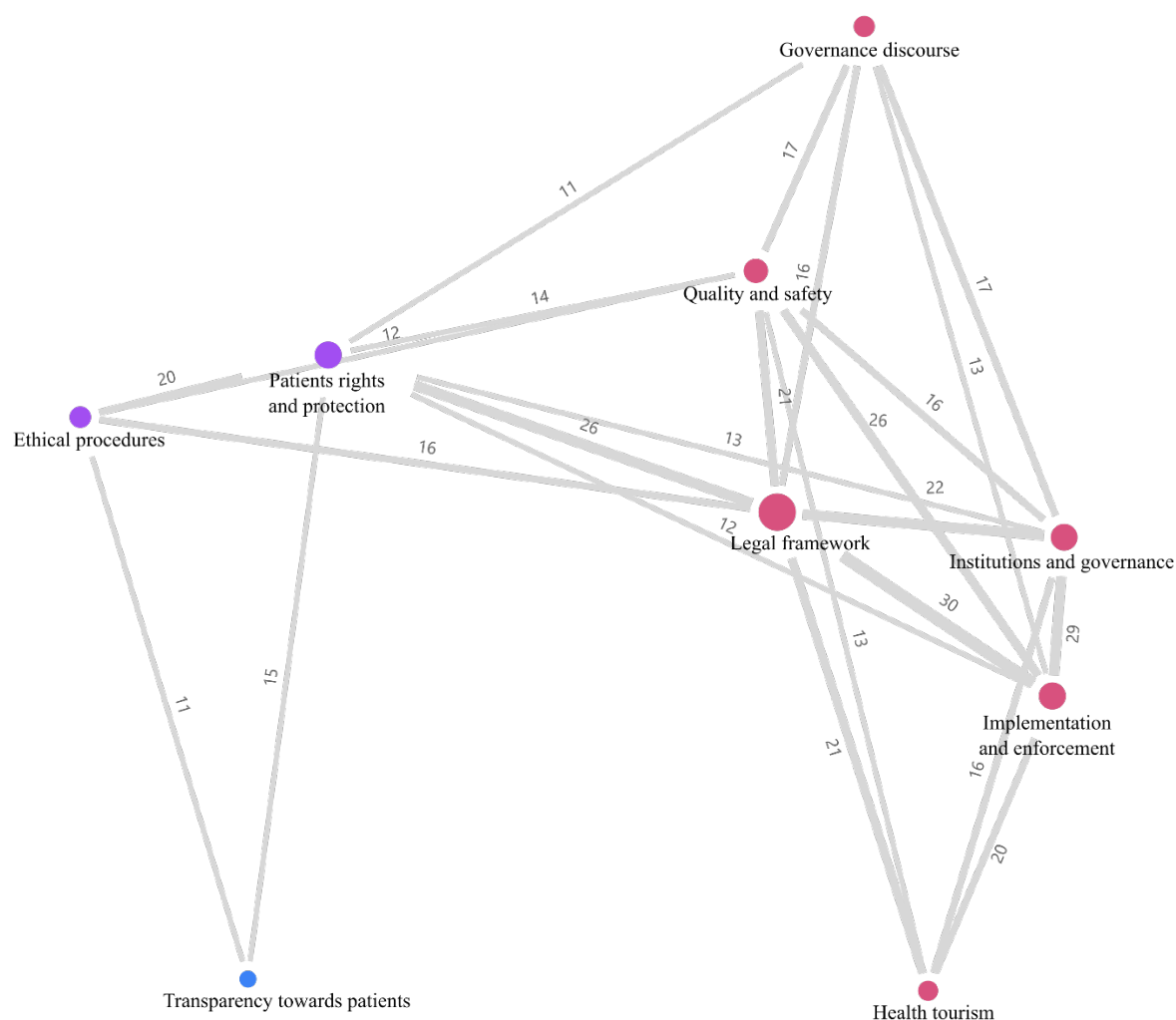


Figure 2. The co-occurrence network of the strategies issued at Türkiye's level (min. 15 intersections)

3.3.3. Code Matrix Browser: Distribution across Documents

Table 4 presents the distribution matrix of codes across the sixteen analysed documents. Türkiye's national documents engage in active normative discourse regarding the legal framework, governance, and implementation. However, the frequency with which these themes are mentioned does not guarantee the quality of governance. At the international level, disparities and accessibility issues in medical tourism are more frequently mentioned, whereas in the documents analysed for Türkiye, gaps in transparency and accountability are more frequently flagged—a distributional asymmetry with direct policy implications.

**Table 3. Code relationships browser between codes and analysed documents
(percentage of total codes per document)**

Code	TR1	TR2	TR3	TR4	TR5	TR6	TR7	TR8	IN1	IN2	IN3	IN4	IN5	IN6	IN7	IN8
Health tourism	3%	18%	2%	0%	0%	0%	0%	20%	4%	0%	3%	0%	2%	0%	0%	6%
Governance discourse	9%	14%	22%	0%	2%	4%	4%	1%	12%	24%	22%	3%	2%	6%	19%	8%
Revenue vs. Patient rights	3%	3%	1%	3%	0%	6%	0%	2%	6%	6%	0%	2%	3%	0%	1%	2%
Commercialization vs. care	0%	0%	2%	0%	0%	4%	0%	4%	4%	7%	3%	5%	4%	0%	11%	2%
Inequalities / Access issues	0%	0%	0%	4%	2%	7%	0%	4%	6%	6%	3%	6%	3%	1%	16%	8%
Implementation gaps	0%	0%	2%	1%	6%	4%	2%	1%	0%	15%	7%	5%	8%	3%	7%	1%
Transparency & Accountability	9%	5%	9%	3%	5%	2%	0%	0%	0%	2%	4%	3%	3%	0%	0%	0%
Unethical procedures	0%	0%	2%	4%	3%	0%	0%	2%	10%	0%	0%	0%	1%	1%	0%	0%
Ethical procedures	0%	0%	0%	17%	20%	0%	7%	6%	6%	0%	0%	2%	6%	3%	2%	1%
Quality and safety	15%	11%	13%	9%	8%	4%	4%	6%	6%	0%	1%	3%	2%	9%	4%	12%
Transparency toward patients	3%	2%	4%	7%	8%	0%	5%	6%	6%	0%	0%	2%	5%	1%	1%	7%
Patients rights & protection	6%	3%	10%	19%	9%	0%	20%	8%	6%	6%	3%	3%	9%	4%	3%	17%
State promotion	0%	0%	0%	0%	0%	2%	0%	2%	0%	0%	9%	3%	0%	9%	0%	0%
Public-private dynamics	0%	2%	2%	0%	0%	6%	0%	1%	2%	6%	3%	5%	0%	6%	2%	1%
Market development	0%	0%	0%	0%	0%	7%	0%	2%	0%	0%	7%	6%	0%	12%	6%	8%
Implementation & enforcement	18%	12%	9%	8%	3%	9%	13%	12%	6%	4%	5%	12%	9%	7%	2%	5%
Institutions and governance	15%	17%	9%	8%	6%	9%	11%	8%	6%	2%	10%	6%	9%	9%	5%	3%
Legal framework	15%	12%	9%	17%	14%	19%	27%	14%	8%	4%	5%	22%	15%	16%	5%	14%
Misalignment / Symbolic comp.	0%	0%	0%	0%	5%	2%	0%	0%	0%	4%	1%	0%	4%	0%	7%	0%
Harmonization claims	3%	2%	2%	0%	5%	7%	5%	1%	4%	6%	4%	5%	12%	6%	5%	5%
Ref. to int'l standards	0%	2%	1%	1%	8%	9%	4%	0%	6%	13%	12%	9%	5%	7%	5%	2%

Source: Authors' MAXQDA 24 analysis.

3.4. Comparative Analysis: Türkiye's Alignment with International Frameworks

When situated within the broader landscape of international governance, Türkiye's health tourism framework exhibits both areas of convergence and significant divergence. Global and regional instruments—including the International Health

Regulations (WHO, 2005/2016), EU Directive 2011/24/EU, and the WHO Global Code of Practice on the International Recruitment of Health Personnel (2010)—place strong emphasis on cross-border coordination, patient rights, workforce sustainability, and equity. While Türkiye has developed robust domestic licensing and authorization mechanisms, it has adopted fewer formal tools to address transparency in international collaboration, workforce impacts, and regional standardization. Research on sustainable governance in emerging health tourism destinations confirms that framework alignment, accreditation transparency, and equity mechanisms must be treated as interdependent rather than sequential governance requirements [18].

The MAXQDA analysis reinforces this observation empirically: in the Turkish corpus, references to international standards appear only marginally and lack discursive integration into governance logic, closely mirroring what the qualitative coding identifies as 'symbolic compliance'—formal adoption of international terminology without substantive normative integration. Comparative regional arrangements further illustrate these gaps: frameworks developed within ASEAN and the Gulf Cooperation Council institutionalize visa facilitation, mutual recognition of accreditation, and structured patient mobility pathways—features largely absent from Türkiye's bilateral agreements.

Table 4. Key international policy instruments in health tourism governance

Title	Issuer, Date	Type	Core Relevance
WTO/GATS – Mode 2: Consumption abroad	WTO, 1995	Treaty	Legal basis for cross-border healthcare service consumption
ASEAN Tourism Agreement	ASEAN Secretariat, 2002	Agreement	Regional health and wellness tourism cooperation framework
International Health Regulations (IHR, 2005)	WHO, 2005	Regulation	Legally binding cross-border health risk management
WHO Global Code – International Recruitment of Health Personnel	WHO, 2010	Code of Practice	Prevents brain drain; ethical workforce recruitment standards
EU Directive 2011/24/EU on Patients' Rights in Cross-Border Healthcare	European Union, 2011	Directive	Creates EU-wide patient mobility rights; mandates transparency and quality safeguards
ISO/TC 228 – Health tourism standards	ISO, 2018	Standard	Cross-border quality and safety benchmarks for health services
OECD – Tourism Trends and Policies 2020 / 2024	OECD, 2020 / 2024	Policy Report	Benchmarks on diversification, resilience, and health/wellness tourism
WHO/Europe – Health at the heart of tourism development	WHO Europe, 2022	Policy Guidance	Integrating health into tourism planning; governance and Health in All Policies

Documents verified last on 20 August 2025.

4. Discussion

The combined findings from the documentary review and MAXQDA 24 analysis allow for a nuanced and empirically grounded assessment of Türkiye's health tourism governance. Several recurring patterns and tensions emerge from the data. These patterns align with the broader sustainability literature, which argues that sustainable health tourism requires the integration of economic, institutional, social, and environmental dimensions rather than merely the accumulation of regulatory instruments [3].

Read through the lens of sustainable development, these findings suggest that the expansion of health tourism cannot be treated as a sufficient indicator of success in itself. A sector may perform strongly in economic terms while remaining institutionally fragile in relation to transparency, accountability, equity, and the protection of patient welfare. This distinction is essential for SDG 3, which is concerned not only with access to services, but also with the conditions under which health and well-being are produced, protected, and distributed.

First, the dominance of the regulatory and institutional cluster in the Turkish corpus—with the strongest co-occurrence link established between 'legal framework' and 'implementation and enforcement'—confirms that Türkiye's governance discourse is constructed primarily around administrative operationalisation. While this reflects genuine institutional capacity building, it also indicates an overemphasis on procedural control at the expense of substantive outcomes: patient safety metrics, clinical transparency, and equity safeguards receive comparatively less discursive weight. This mirrors patterns in emerging medical tourism economies undergoing accelerated institutionalisation, where the proliferation of regulations can create an illusion of governance maturity without ensuring its substance.

Second, the peripheral position of international alignment in Türkiye's national corpus is among the most significant findings of this study. Türkiye has adopted international terminology and produced harmonisation claims, but these do not appear to drive the internal logic of its regulatory documents—contrasting sharply with the international corpus, where governance is directly linked to alignment concerns. This risk of symbolic compliance has also been identified in comparative analyses of emerging European health tourism markets, where formal transposition of EU directives occurs without the development of coherent national governance strategies [22]. This asymmetry mirrors the broader north–south divide documented in transnational healthcare policy research, where destination countries adopt the language of international frameworks while source-country and international-body documents more readily operationalise alignment within their governance logic [42]. Research on medical tourists' revisit intentions confirms that clinical trust and perceived quality—dimensions directly dependent on transparent governance—are stronger predictors of sustained patient flows than cost advantages alone, reinforcing the governance argument [10].

Third, the code matrix browser reveals that transparency and accountability gaps are more frequently coded in Turkish national documents than in international ones, while inequality and access issues receive greater attention at the international level. This divergence reflects what Connell (2013) [1] identified as the 'commodification of care' risk: in the absence of standardized outcome indicators, medical services risk being reduced to market-driven commodities, thereby undermining clinical integrity in favour of revenue maximization [40]. Bibliometric analysis of health tourism research confirms that governance, equity, and patient outcomes are the thematic dimensions most underrepresented in destination-country policy literature relative to market-oriented concerns [14].

The results also speak to concerns commonly raised in health geography, namely that health-related mobility is unevenly structured by territory, infrastructure, regulation, and institutional trust. In this sense, Türkiye's case is relevant not only as a national policy model, but also as an example of how geography, governance, and international patient flows interact in ways that can either reinforce or reduce inequalities in access, quality, and protection.

Fourth, with respect to patient rights and protection, the analysis shows that these dimensions are present in both corpora but with a critical structural difference. In international documents, patient rights are linked both to the legal framework and to governance mechanisms, suggesting operational integration. In Türkiye's corpus, however, patient rights appear as a declarative legal commitment, disconnected from enforcement mechanisms or outcome monitoring. Transparency toward patients—covering access to cost information, procedure risks, and clinical outcomes—emerges as the most underdeveloped dimension in both corpora, but particularly in Türkiye's national documents.

Fifth, the post-pandemic regulatory adaptations—particularly the 2022 telemedicine regulation and the 2025 minimum price tariff—represent genuine policy learning and market correction. However, as the qualitative analysis reveals, these instruments remain embedded within the same regulatory-centric discourse that prioritises administrative control over substantive patient outcomes. Without accompanying mechanisms for outcome measurement, independent evaluation, and public reporting, these instruments risk remaining procedural innovations rather than governance transformations.

The findings taken together suggest that Türkiye's health tourism governance exhibits a 'high-density regulatory shell with a low-density accountability core': a sophisticated outer architecture of laws, institutions, and strategies, but limited mechanisms for systematic outcome evaluation, equity monitoring, and genuine international normative integration. This configuration is consistent with sustainability analyses of Turkish tourism that highlight the structural gap between impressive growth metrics and the quality of governance frameworks needed to sustain them in the long term [11]. Translating this architecture into a truly sustainable governance framework requires a discursive shift—moving from the administrative operationalisation of rules toward a logic of accountability, transparency, and patient-centered sustainability aligned with SDG 3 (Good Health and Well-Being) and SDG 16 (Strong Institutions).

At the international level, alignment with EU Directive 2011/24/EU principles of transparency and complaint-handling, and with the WHO Global Code of Practice on the International Recruitment of Health Personnel, would position Türkiye not only as a competitive provider but also as a norm entrepreneur in ethical health tourism governance. If Türkiye effectively overcomes structural shortcomings related to transparency, accountability, standardized performance reporting, and patient protection, its state-coordinated institutional framework has the capacity to function as an exportable policy model for other emerging countries pursuing regulated and sustainable health tourism development. This pattern of cross-jurisdictional regulatory fragmentation is not unique to health tourism: comparative analyses of regulatory frameworks for emerging health technologies similarly identify persistent gaps in data governance, accountability, and equitable access across jurisdictions, reinforcing the case for harmonized international standards as a precondition for sustainable sectoral growth [30].

5. Conclusions

While Türkiye has successfully engineered a centralized and highly competitive health tourism sector, its trajectory reveals a critical tension between rapid economic scaling and the maturity of its regulatory architecture. This study has contributed to the existing literature in two interconnected ways. The documentary review mapped the evolution of Türkiye's national legal and policy framework alongside relevant international instruments, revealing a pattern of rapid institutionalisation and centralisation that is both a strength and a source of systemic risk. The MAXQDA 24 qualitative content analysis provided an empirical basis for assessing not merely what policies exist, but how governance, patient rights, and international alignment are discursively structured and prioritised. The combination of documentary analysis and systematic qualitative coding offers a replicable mixed-qualitative framework applicable to other emerging health tourism destinations at comparable stages of regulatory development [3,14].

The resulting picture is consistent and analytically significant: governance and regulatory operationalisation dominate Türkiye's policy discourse, while patient-centered outcomes, equity safeguards, and international normative alignment remain peripheral. The absence from the Turkish corpus of a sustained causal discourse linking governance to international alignment—as opposed to scattered harmonisation claims—reveals not a capacity gap but a discursive and institutional gap: the absence of a body or process tasked with systematically assessing, acknowledging, and addressing alignment shortcomings.

Three essential policy pivots emerge from this analysis. First, there is an urgent need to mandate comprehensive outcome transparency, shifting from marketing-led data to independently verified clinical metrics—including infection rates, readmission rates, and patient-reported outcome measures (PROMs). Second, explicit equity safeguards must be integrated to prevent the erosion of the domestic healthcare workforce and ensure that health tourism revenues reinvest in public health infrastructure. Third, the structural separation of promotional functions from regulatory oversight is vital to align with WHO guidelines and EU Directive 2011/24/EU, ensuring cross-border accountability and ethical patient mobility.

From a sustainable development perspective, the relevance of this study extends beyond the Turkish case itself. It contributes to the wider debate on whether health tourism can support good health and well-being in a substantive sense, or whether it risks becoming a market-efficient but weakly accountable form of cross-border healthcare organization. The answer depends less on promotional success than on measurable transparency, patient protection, institutional coordination, and the equitable integration of health tourism into broader public health objectives.

Future research could profitably extend this approach to other countries with centralised health tourism governance models or could incorporate interview-based data from policymakers and practitioners to triangulate the discursive patterns identified in the textual corpus. Comparative applications to Mediterranean and Eastern European health tourism markets—where governance institutions are at comparable developmental stages—would be particularly valuable for identifying transferable governance innovations [18]. Türkiye stands at a strategic crossroads: its geographical and clinical advantages must be reinforced by a resilient, enforceable, and ethically grounded legal framework. The transition from a promising industry to a global benchmark hinges on the ability to harmonize economic ambition with a steadfast commitment to patient-centered, sustainable governance consistent with the United Nations Sustainable Development Goals.

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References

1. Ates, A.; Sunar, H.; Kurt, A. (2024) *Bibliometric analysis on sustainable tourism and the environment in the literature related to destination management. Present Environment and Sustainable Development*, 18(2). DOI: <https://doi.org/10.47743/pesd2024182003>
2. Connell, J. *Medical Tourism*; CABI: Wallingford, UK, 2013.
3. Gnediks, J. Legal regulation of the medical tourism as a type of economical activity. *Administrative and Criminal Justice Journal* 2023, 4(81). <https://doi.org/10.17770/acj.v4i81.2840>
4. Figueiredo, N.; Abrantes, J.L.; Costa, S. Mapping the sustainable development in health tourism: A systematic literature review. *Sustainability* 2024, 16, 1901. <https://doi.org/10.3390/su16051901>
5. Gheorghe, R.-L. (2025) *Quantitative analysis of tourist satisfaction on the Romanian Black Sea coastline: perceptions and expectations. Present Environment and Sustainable Development*, 19(1). DOI: <https://doi.org/10.47743/pesd2025191009>
6. Gholipour, H.F.; Esfandiar, K. Does medical tourism promote growth in healthcare sector? *European Journal of Health Economics* 2024, 26, 233–241. <https://doi.org/10.1007/s10198-024-01700-3>
7. Tang, Y. Quality differentials in international healthcare services. *International Journal of Health Policy and Management* 2025. [Volume and page numbers to be completed upon publication]
8. Labonté, R.; Crooks, V.A.; Cerón Valdés, A.; Runnels, V.; Snyder, J. Government roles in regulating medical tourism: Evidence from Guatemala. *International Journal for Equity in Health* 2018, 17, 150. <https://doi.org/10.1186/s12939-018-0868-0>
9. Hanefeld, J.; Smith, R.; Horsfall, D.; Lunt, N. What do we know about medical tourism? *Journal of Travel Medicine* 2014, 21, 410–417.
10. Lunt, N.; Smith, R.D. The role of intermediaries in medical travel. *Health Policy and Planning* 2015, 30, 1032–1043.

11. Mazilu, M.; Nita, A.; Babat, A.; Dragu, I.-A. (2024) *Risk and Sustainable tourism resilience in the Post Economic Crisis and COVID-19 pandemic period. Present Environment and Sustainable Development*, 18(1). DOI: <https://doi.org/10.47743/pesd2024181017>
12. Stefanidaki, E.; Lekakou, M.; Vaggelas, G.K. Sustainable recovery in health tourism: Managerial insights from a Mediterranean destination during the COVID-19 pandemic. *Sustainability* 2024, 16, 8171. <https://doi.org/10.3390/su16188171>
13. Petasis, A.; Terzidou, M.; Konstantopoulos, I. Responding to tourists' intentions to revisit medical destinations in the post-COVID-19 era through the promotion of their clinical trust and well-being. *Sustainability* 2023, 15, 2399. <https://doi.org/10.3390/su15032399>
14. Arslan, M.; Yilmaz, S. Sustainability trends in Turkish tourism: A longitudinal analysis of tourist arrivals, overnights and occupancy rates (2000–2024). *Sustainability* 2025, 17, 8333. <https://doi.org/10.3390/su17188333>
15. Coşkun, A.; Yıldız, H. The competitiveness of Turkish tourism in the global market. *Sustainability* 2024, 16, 11232. <https://doi.org/10.3390/su162411232>
16. Bağcı, H.; Uzun, O.; Bostan, S. The Turkish health system during the coronavirus pandemic. *Journal of Health Sciences Research* 2020. [Volume and page numbers to be completed by authors]
17. Liu, Y.; Guo, J.; Xu, H. Health tourism evolution: A review based on bibliometric analysis and the China National Knowledge Infrastructure database. *Sustainability* 2022, 14, 10435. <https://doi.org/10.3390/su141610435>
18. Khazaee-Pool, M.; Pashaei, T.; Rastegar, H.; Ponnet, K. A comprehensive perspective on local drivers in community-based health tourism industry development. *BMC Health Services Research* 2024, 24, 910. <https://doi.org/10.1186/s12913-024-11375-4>
19. Momeni, K.; Janati, A.; Imani, A.; Khodayari-Zarnaq, R. Barriers to the development of medical tourism in East Azerbaijan Province, Iran. *Tourism Management* 2018, 69, 307–316. <https://doi.org/10.1016/j.tourman.2018.05.007>
20. Hecker, S.; Wicke, N.; Haklay, M.; Bonn, A. How does policy conceptualise citizen science? A qualitative content analysis of international policy documents. *Citizen Science: Theory and Practice* 2019, 4, 32. <https://doi.org/10.5334/cstp.230>
21. Antoniadou, M.; Notta, O.; Vlachvei, A. Sustainable approaches to medical tourism: Strategies for Central Macedonia/Greece. *Sustainability* 2024, 16, 121. <https://doi.org/10.3390/su16010121>
22. Hopkins, L.; Labonté, R.; Runnels, V.; Packer, C. Medical tourism today: What is the state of existing knowledge? *Journal of Public Health Policy* 2010, 31, 185–198. <https://doi.org/10.1057/jphp.2010.10>
23. Lunt, N.; Horsfall, D.; Hanefeld, J. Medical tourism: A snapshot of evidence on treatment abroad. *Maturitas* 2016, 88, 37–44. <https://doi.org/10.1016/j.maturitas.2016.03.001>
24. Pocock, N.S.; Phua, K.H. Medical tourism and policy implications for health systems. *Global Health* 2011, 7, 12. <https://doi.org/10.1186/1744-8603-7-12>
25. Hoxha, E.; Hobdari, V. Legislative perspectives and sociomedical implications of medical tourism in Europe: A comprehensive review. *International Comparative Jurisprudence* 2023, 9, 226–236. <https://doi.org/10.13165/j.icj.2023.12.006>

26. Atun, R.; Aydın, S.; Chakraborty, S.; Savaş, Ş.; Aran, M. Universal health coverage in Türkiye: Enhancement of equity. *Lancet* 2013, 382, 65–99. [https://doi.org/10.1016/S0140-6736\(13\)61051-X](https://doi.org/10.1016/S0140-6736(13)61051-X)
27. Bowen, G.A. Document analysis as a qualitative research method. *Qualitative Research Journal* 2009, 9, 27–40. <https://doi.org/10.3316/QRJ0901027>
28. Mishra, V.; Sharma, M.G. Framework for promotion of medical tourism: A case of India. *International Journal of Business and Globalisation* 2021, 16, 103–111. <https://doi.org/10.1007/s42943-021-00027-7>
29. UNWTO. International Tourism Highlights 2024 Edition; UNWTO: Madrid, Spain, 2024. Available online: <https://www.e-unwto.org/doi/book/10.18111/9789284422203> (accessed on 1 March 2025).
30. Xu, Q.; Purushothaman, V.; Cuomo, R.E.; Mackey, T.K. A bilingual systematic review of South Korean medical tourism. *BMC Public Health* 2021, 21, 658. <https://doi.org/10.1186/s12889-021-10697-4>
31. Gu, D.; Humbatova, G.; Xie, Y.; Yang, X.; Zolotarev, O.; Zhang, G. Different roles of telehealth and telemedicine on medical tourism: An empirical study from Azerbaijan. *Healthcare* 2021, 9, 1073. <https://doi.org/10.3390/healthcare9081073>
32. Ricci, G.; Caraffa, A.M.; Gibelli, F. Telemedicine as a strategic tool to enhance the effectiveness of care processes: Technological and regulatory evolution over the past two decades. *Healthcare* 2023, 11, 734. <https://doi.org/10.3390/healthcare11050734>
33. Palaniappan, K.; Lin, E.Y.T.; Vogel, S.; Lim, J.C.W. Gaps in the global regulatory frameworks for the use of Artificial Intelligence (AI) in the healthcare services sector and key recommendations. *Healthcare* 2024, 12, 1730. <https://doi.org/10.3390/healthcare12171730>
34. European Parliament; Council of the European Union. Directive 2011/24/EU on the application of patients' rights in cross-border healthcare. Off. J. Eur. Union 2011, L 88.
35. Frischhut, M.; Levaggi, R. Patient mobility in the context of austerity and an enlarged EU. *Health Policy* 2015, 119, 1293–1297.
36. Jenkins, W.I. Policy Analysis: A Political and Organisational Perspective; Robertson: London, UK, 1978.
37. Karaman, B.; Eren, E. Public–private hybridization in Turkish health tourism governance: The role of USHAŞ. *Journal of Comparative Policy Analysis* 2022, 24, 265–282.
38. Kayali, N. Medical tourism and public health care in Turkey. *Crown Center for Middle East Studies* 2026. Available online: <https://www.brandeis.edu/crown/publications/middle-east-briefs/meb168.html> (accessed on 2 September 2025).
39. Koc, E. Health Law Updates in Türkiye: Professional Responsibility Board for Health Personnel; Legal Commentary: Ankara, Turkey, 2024.
40. Malaysia Healthcare Travel Council. Profile and Role in Medical Tourism; MHTC: Kuala Lumpur, Malaysia, 2005.
41. Ministry of Health, Republic of Türkiye. Regulation on International Health Tourism and Tourist Health; Official Gazette: Ankara, Turkey, 2017. Ministry of Health, Republic of Türkiye. Regulation on the Provision of Remote Health Services; Official Gazette:

- Ankara, Turkey, 2022. Ministry of Health, Republic of Türkiye. Regulation on Promotion and Information Activities in Health Services; Official Gazette: Ankara, Turkey, 2023.
42. OECD. Tourism Trends and Policies; OECD Publishing: Paris, France, 2020, 2024.
 43. SSM–Health Systems. Ethical dilemmas in international medical health tourism: A critical commentary. *SSM - Health Systems* 2025, 5, 100111. <https://doi.org/10.1016/j.ssmhs.2025.100111>
 44. USHAŞ. Uluslararası Sağlık Hizmetleri Anonim Şirketi; MoH: Ankara, Turkey, 2019. Available online: <https://www.ushas.com.tr> (accessed on 2 September 2025).
 45. Virani, A.; Wellstead, A.M.; Howlett, M. The north–south policy divide in transnational healthcare. *Global Health* 2020, 16, 37. <https://doi.org/10.1186/s12992-020-00566-3>

Appendix 1. Documents Used for MAXQDA 24 Qualitative Coding

Code	Name of Document	Level
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TR 1	Resmi Gazete Sayı 31746 YÖNETMELİK (Updated International Health Tourism Regulation, 2025)	National (TR)
TR 2	Resmi Gazete Sayı 30123 YÖNETMELİK (International Health Tourism Regulation, 2017)	National (TR)
TR 3	Uzaktan Sağlık Hizmetleri Yönetmeliği (Remote Health Services Regulation, 2022)	National (TR)
TR 4	Hasta Hakları Yönetmeliği, Resmi Gazete Tarih: 01.08.1998, Sayı: 23420	National (TR)
TR 5	Law and Justice Review (Professional Responsibility Board for Health Personnel)	National (TR)
TR 6	Medium-Term Program (2024–2026)	National (TR)
TR 7	Personal Data Protection Law No. 6698 (KVKK)	National (TR)
TR 8	Regulation Concerning International Health Tourism and Tourist Health	National (TR)
INT 1	Declaration of Istanbul on Organ Trafficking and Transplant Tourism	International
INT 2	WHO Global Code of Practice on the International Recruitment of Health Personnel (2010)	International
INT 3	OECD Tourism Trends and Policies 2020	International
INT 4	General Agreement on Trade in Services (GATS), WTO, 1995	International
INT 5	International Health Regulations (2005), Third Edition, WHO	International
INT 6	ASEAN Tourism Agreement	International
INT 7	WHO Global Code of Practice on the International Recruitment of Health Personnel (2023 update)	International
INT 8	Directive 2011/24/EU of the European Parliament and of the Council of 9 March 2011	International



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