



Past themes and future trends in medical tourism research: A co-word analysis



Andrea de la Hoz-Correa ^{a,*}, Francisco Muñoz-Leiva ^a, Márta Bakucz ^b

^a University of Granada, Spain

^b University of Pécs, Hungary

HIGHLIGHTS

- A co-word analysis was applied to elucidate the thematic evolution of medical tourism (MT) research from 1931 to 2016.
- Research on medical tourism has broadened its focus since 1987.
- Topics such as assisted reproduction and fertility tourism will be of interest for MT research in a near future.

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ABSTRACT

The purpose of this paper is to analyze the evolution of medical tourism (MT) research from a longitudinal perspective (period 1931–2016). A co-word analysis was applied to themes found in published research listed in the Web of Science (WoS) and Scopus database services.

The results reveal six clusters of themes: a) issues regarding ethical implications, trust and accreditation; b) health, wellness, spa tourism and service quality; c) health-related issues, medical treatments and tourism; d) “sensitive” practices in MT; e) medical tourism destinations and marketing; and f) globalization, policies and the effect on international patients. This study is one of the first attempts to use a bibliometric approach and co-word analysis so as to offer powerful insight into the conceptual structure of MT research from academic literature and to visualize all the underlying and interconnected subfields. It also provides a guide to researchers by improving the understanding of the current state of the art and predicting the direction of future research.

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1. Introduction

Health and medical tourism is a rising global phenomenon in the 21st century (Chew & Darmasaputra, 2015, p. 119) and since its emergence, it has attracted interest in both the academic and professional communities. It is the product of globalization in healthcare and neoliberal policies (Hopkins, Labonté, Runnels, & Packer, 2010; Meghani, 2011) resulting from factors such as continuing search for lower costs, better quality care and shorter waiting lists (Ngamvichaikit & Beise-Zee, 2014).

Medical tourism (MT) specifically involves travel across international borders with the intention of receiving medical care. This care “is typically paid for ‘out-of-pocket’ and is motivated by an

interest in cost savings and/or avoiding waiting times for care in the patient’s home country” (Snyder, Crooks, & Turner, 2011, p. 3). Despite the rapid growth and increase of interest among scholars and practitioners on this question, there is currently no precise characterization of its conceptual contours and studies on its evolution are scarce. Most existing works evaluate MT research only over a period of time limited to the last 10–15 years and offer neither a complete nor a truly objective overview of the current state of research, but rather attempt to connect the existing literature with other issues such as the magnitude of the trade, patient experience or its impact on health. Additionally, the stream of publications on MT history suggests that the lack of consensus regarding its defining concepts is a major barrier for its theoretical understanding and future development.

This paper intends to address this problem and respond to the calls for greater theoretical clarification made by numerous researchers, tourism authorities and organizations. It provides a more

* Corresponding author.

E-mail addresses: andrehoz@gmail.com (A. de la Hoz-Correa), franml@ugr.es (F. Muñoz-Leiva), bakucz@ktk.pte.hu (M. Bakucz).

objective quantitative approach which will supplement previous attempts to portrait its thematic evolution. The findings will enable researchers to better understand its current state, prevailing topics and to employ future lines of research as a guide. This will ultimately enhance theoretical development and clarify the conceptual background of this research field. The originality of the study is related to the methodology and time frame used. Methodologically, we used a co-word analysis, which, although is a technique applied in tourism in general, has so far not been so in respect of MT. It helped us detect central themes, uncover several direct and indirect links between them and reveal current research interests, knowledge gaps and the internal knowledge structure of MT field. Thus, the time-framed used helped us analyze changes, fluctuation of interest and linkages between keywords since the first published works providing a broader picture than those used in previous qualitative analysis.

In particular, the aims of this study are: a) to review a large number of publications on medical tourism ranging from 1931 to 2016 and indexed in the WoS and Scopus through co-word analysis; b) to examine the state of this domain of research through the most relevant contributions; and c) to suggest future lines of research. The paper is structured into four sections. Following the introduction, section one presents the theoretical background to medical tourism, section two describes the focus of the paper and methodology, whilst section three presents the preliminary data analyses, main outcomes, including the most prolific authors, journals and themes, as well as the relationships between the themes identified and future trends of research. Finally, section four provides the main conclusions, identifies some limitations and indicates future lines of research.

1.1. Background to medical tourism research

There is consensus among different authors to consider medical tourism (MT) as a subset of health tourism (Pocock & Phua, 2011, p. 2) (see Fig. 1) that, according to Lunt et al. (2011, p. 11) contains the

following range of treatments:

“Cosmetic surgery (breast, face, liposuction); dentistry (cosmetic and reconstruction); cardiology/cardiac surgery (by-pass, valve replacement); orthopedic surgery (hip replacement, resurfacing, knee replacement, joint surgery); bariatric surgery (gastric by-pass, gastric banding); fertility/reproductive system (IVF, gender reassignment); organ, cell and tissue transplantation (organ transplantation; stem cell); eye surgery and diagnostics and check-ups”.

The typical themes in the research agenda for the academic community related to medical tourism include the analysis of destinations, risks and opportunities in a specific country (e.g. Sharma, 2013) or group of countries (e.g. Ramírez de Arellano, 2011); the cost saving potential, quality and continuity of care (Meghani, 2011, p. 19); the behavior and experience and common motivations of medical tourists (e.g. Gan & Frederick, 2013; Ye, Qiu, & Yuen, 2011); and the decision-making models of potential medical tourists (e.g. Sung & Ozuem, 2014). Furthermore, there is also a continuous intense debate on the ethical implications and impact on the host country (Ramírez de Arellano, 2011; Snyder et al., 2011) along with an increasing interest from practitioners and governments in researching medical tourism. In recent years, the ministries of tourism in several countries and entities such as the World Health Organization (WHO), the American Medical Association (AMA), the Indian Institute of Tourism and Travel Management (IITM) and consultancy firms such as Deloitte have conducted studies indicating awareness of the economic implications for the national economies (IITM, 2011).

As stated before, due to this growing interest, several studies that in one way or another can be seen as ‘reviews’ or ‘overviews’ have appeared in recent years (See Table 1). The common conclusions gleaned from these reviews are that despite the recent flow of publications, there remains a lack of formal literature. Most earlier studies are exploratory with a tendency to describe in general

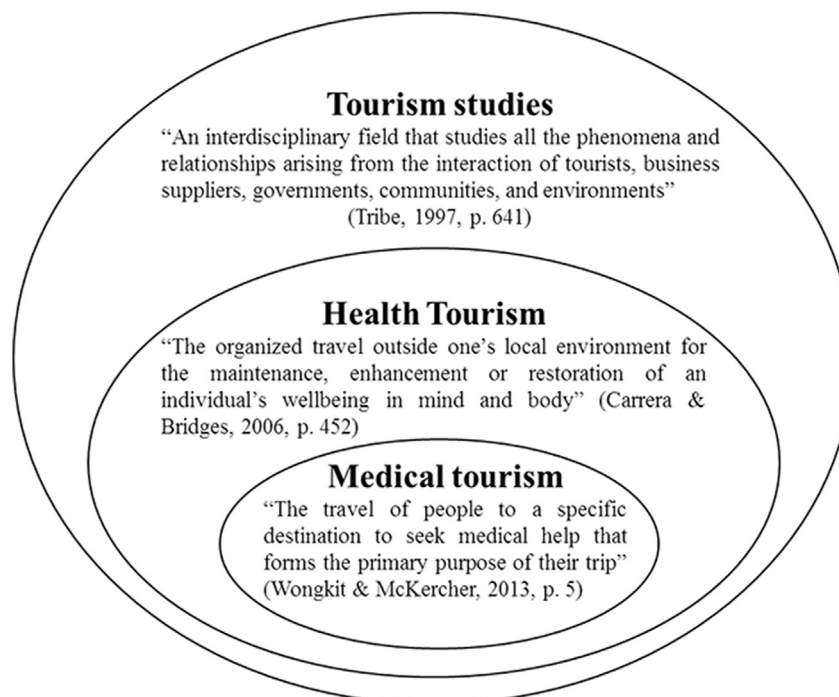


Fig. 1. Tourism studies, health tourism and medical tourism (Tribe, 1997, Wongkit and McKercher, 2013).

Table 1
Key studies with reviews of MT research.

Authors (year)	Title	Objectives
Carrera and Bridges (2006)	"Globalization and healthcare: understanding health and medical tourism"	Conceptualize health and medical tourism and estimate the size of trade in healthcare.
Page (2009)	"Current issue in tourism: The evolution of travel medicine research: A new research agenda for tourism?"	Outline the evolution of research in travel medicine.
Crooks, Kingsbury, Snyder, and Johnston (2010)	"What is known about the patient's experience of medical tourism? A scoping review"	Synthesize themes and issues related to the patient's experience of medical tourism.
Heung, Kucukusta, and Song (2010)	"A Conceptual Model of Medical Tourism: Implications for Future Research"	Undertake a comprehensive theoretical corpus of research for future research.
Johnston, Crooks, Snyder, and Kingsbury (2010)	"What is known about the effects of medical tourism in destination and departure countries?"	Synthesize current knowledge about the effects of medical tourism in destination and departure countries.
Lunt and Carrera (2010)	"Medical tourism: Assessing the evidence on treatment abroad"	Identify the existence of medical tourism literature for out-of-pocket payments.
Hopkins et al. (2010)	"Medical tourism today: what is the state of existing knowledge"	Determine the level of existing research of medical tourism focusing on cross-border flows.
Balaban and Marano (2010)	"Medical tourism research: A systematic review"	Identify and evaluate current data on medical tourism and associated health impacts.
Smith, Martínez Álvarez, & Chanda (2011)	"Medical tourism: A review of the literature and analysis of a role for bi-lateral trade"	Understand medical tourism from a bi-lateral perspective.
Hall (2011a)	"Health and medical tourism: a kill or cure for global public health?"	Outline some of main themes that exist in the academic literature of medical tourism.
Lunt et al. (2011)	"Medical Tourism: Treatments, Markets and Health System Implications: scoping review"	Identify the key emerging policy issues relating to the rise of "medical tourism."
Lunt and Carrera (2011)	"Systematic review of web sites for prospective medical tourists"	Evaluation of the availability and types of information, reliability and privacy protection from medical tourism websites.
Hanefeld, Smith, Horsfall, and Lunt (2014)	"What do we know about medical tourism? A review of the literature with discussion of its implications for the UK National Health Service as an example of a public health care system"	Outline the current level of knowledge on medical tourism in reference to the UK National Health Service (NHS).
Lunt et al. (2014)	"Implications for the NHS of inward and outward medical tourism: a policy and economic analysis using literature review and mixed-methods approaches"	Generate a comprehensive documentary review and map out medical tourism development within the UK.
Chuang, Liu, Lu, and Lee (2014)	"The main paths of medical tourism: From transplantation to beautification"	Analyze the significant development trajectories, important literature, and recent active research areas in medical tourism.
Lunt, Horsfall, and Hanefeld (2016)	"Medical tourism: A snapshot of evidence on treatment abroad"	Contextualize the state of medical tourism research (stock of coverage, emerging themes, and gaps).

terms the global development of this industry, explore the MT market (Woo & Schwartz, 2014), indicate how it should be developed (Chew & Darmasaputra, 2015), increase knowledge on the terminology and determine, in general, the size and flow of the trade (Carrera & Bridges, 2006). Hence several authors agree that there is an urgent need for more empirical studies collecting primary data and where "anecdotes, brokerage claims, and theoretical conjectures should be substitute for more deliberative study" (Hopkins et al., 2010, p. 194) and where theoretically and empirically driven approaches from a variety of disciplines should be developed (Snyder et al., 2011). Thus, the debate is ongoing, as many scholars are still calling for a theoretical clarification of this emerging industry and its subsequent domains.

2. Methodology

2.1. Co-word analysis

The existing literature in a field is the starting point for researchers to build new frameworks and test hypotheses and relationships. The relations among the building blocks of literature can also be examined in what is called the "science of science" (Goldsmith & Mackay, 1964) reverting to bibliometrics to reveal the structure of knowledge in a specific field (Samiee & Chabowski, 2012).

Bibliometrics are defined as "the quantitative study of physical published units, or of bibliographic units, or of the surrogates for either" (Broadus, 1987, p. 376). It includes any quantitative

measures or analyses applied to bibliographical units such as books, journal articles, and the like, and has become an increasingly significant issue in tourism studies due to the growth of knowledge in this field (Hall, 2011b). One of the pioneering works in this area, published in *Science* by Garfield (1955), states that citations are the foundations of scientific language and their analysis reveals the structure of scientific communications. The present paper, following the lines of Garfield, applies a co-word analysis to a very large cross-section of published materials (1931–2016) from the MT field.

Co-word analysis is a content technique that is effective in mapping the strength of association between information items in textual data (Viedma-Del-Jesús, Perakakis, Muñoz, López-Herrera, & Vila, 2011, p. 1029). The visualization of the results through bibliometric mapping based on co-word analysis is founded on the assumption that each research field can be characterized by a list of the most important keywords (Borner, Chen, & Boyack, 2003, p. 6). The idea is that the co-occurrence of keywords describes the contents of the documents in a file (Callon, Courtial, & Laville, 1991) and those keywords can be used to measure the similarity between a pair of publications.

Bibliometric maps based on co-word analyses, as in the current study, can therefore serve as a forecasting tool by researchers to visualize different subfields and their relationships and thus detect future trends (Garfield, 1994). The goal of this technique is to interconnect the most significant concepts (Muñoz-Leiva, Viedma-Del-Jesús, Sánchez-Fernández, & López-Herrera, 2012) by "reducing the distance between descriptors (or keywords) to a set

of network graphs that effectively illustrate the strongest associations between the descriptors” (Viedma-Del-Jesús et al., 2011, p. 1029). This technique has been applied before in the area of tourism with the intention of studying and assessing the developments and quality of research of this field (e.g. Hall, 2011b). However, to date, the authors of the current paper have not identified any specific study applying a bibliometrics approach to MT literature based on co-word analysis.

2.2. Method and data collection

Our approach draws on the studies of Borner et al. (2003) and Muñoz-Leiva, Porcu, and Del Barrio-García (2015) by focusing along the lines of (i) detection of research themes; (ii) collection of row data; (iii) calculation of similarities between items; (iv) building of thematic networks based on keywords and their interconnections; and (v) performance analysis from a longitudinal perspective.

2.2.1. Detection of research themes

The aim of this study is to analyze the thematic evolution of MT research from a longitudinal perspective, and, to accomplish the objective, the authors focused on themes dealing with what is generally accepted as MT in academic literature - the act of traveling abroad for medical care. This study therefore excludes the subject of vacationers or expatriates taken ill while abroad. Previous reviews of literature on MT differ on whether to include (e.g. Chuang et al., 2014) or exclude (e.g. Crooks et al., 2010; Hanefeld et al., 2014) papers relating to stem cell tourism, transplant tourism or assisted reproduction because of the distinct ethical issues or because their focus was on the patient's experience. After discussion, the authors came to the decision to retain these types of articles in order to offer a broader picture of the development of research in medical tourism throughout the years and because, according to Lunt et al. (2011, pp. 1–55), these modalities are embedded in the definition of medical tourism. Hence research regarding international trade in health services, political and ethical implications and “modalities” of medical tourism (such as “reproductive tourism” or “surrogate tourism”) were also included to broaden the focus.

2.2.2. Collection of row data

The row data was extracted on April 1, 2017, from the journals included in two of the most important bibliographic databases and search engines: Web of Science (WoS) and Scopus. These assessment platforms were selected because they are considered by the academic community as the major citation databases. Using the data extracted from these databases, the authors designed a new database including all the publications on the topic between 1931 and 2016. The data were identified using a specific query:

Query: TS = “medical tourism” OR “health tourism” OR “medical tourist” OR “health tourist” OR “medical tourists” OR “health tourists” where the TS field is a search based on the “Topic” (title, abstract and keywords).

The terms medical tourism/medical tourist and health tourism/health tourist served to obtain a higher number of results and to ultimately enhance the focus and relevance of the findings. The resulting database initially contained 2548 articles. The authors then eliminated the duplicated records, read the titles and abstracts and revise the content of the articles to verify the relevance and relation of those articles to the query. This led to the elimination of all papers with an exclusive focus on the medical intervention or its consequences, or those pertaining to other disciplines such as engineering, anthropology, medicine (e.g. gynecology, surgery, disease control) with no explicit or causal reference to MT. The remaining corpus was subject to the

following steps: a) the plural and singular forms of the keywords were combined (e.g. spa and spas); b) the American and British spelling of words were combined; and c) the acronyms (e.g. GATT, General Agreement on Tariffs and Trade) were harmonized using the findings of the article by Muñoz-Leiva et al. (2015) as a guide. The final database comprised 1119 articles and 1498 keywords.

2.2.3. Calculation of the similarities and construction of the thematic network

The keywords were then reduced to a set of network graphs that illustrate their strongest associations, in particular from the chronological standpoint (1931–2016), with the intention to locate closely linked sub-groups corresponding to centers of interest or to research problems (Callon et al., 1991). The software used to extract the network graphs was NodeXL version 1.0.1, using the Fruchterman-Reingold force-directed layout algorithm and the Clauset-Neuman-Moore agglomeration algorithm. The keywords and their interconnections can be seen graphically through a “thematic network.” The group of networks is identified by a label derived from the most significant keywords. Furthermore, “... the volume of the spheres depends on the number of documents which contain each keyword and the thickness of the link between two spheres *i* and *j* is in proportion to the co-occurrence of both” (Muñoz-Leiva et al., 2015, p. 683).

2.2.4. Performance analysis from a longitudinal perspective

The evolution of the MT research was inferred by analyzing the frequency and indicators of the number of papers and journals consulted per year, the names of the authors who published a significant number of papers in the field, the average citations for each author, the citation indices, and the 20 papers with the highest annual average citations. The IBM SPSS v.22 software served to plot the indicators according to year, number of documents, number of times cited and their combination. The results of this analysis allow quantification of the thematic evolution of medical tourism scientific literature in order to assist researchers fathom the current state-of-art of this research and potential future lines of study.

3. Results

3.1. Evolution of the documents and journals

Fig. 2 illustrates the evolution of the documents published on the topic per year from 1931 to the year prior to our study (2016). The slight increase of publications on medical tourism from 2004 reflects an increasing trend (except for 2012) suggesting that this subject is progressively gaining popularity in academia. It also clearly shows that the interest among editors in medical and health tourism has steadily grown since 2004, as the number of journals publishing articles on both topics has doubled or tripled since that time.

The tremendous increase in the numbers of papers published in 2010 and 2011 was also highlighted in the paper by Hanefeld et al. (2014). This escalation is explained by the appearance of a number of special issues in several academic journals. In November 2010, the *Medical Anthropology Journal* published a special issue entitled “Medical Travel.” Secondly, in May 2011, *Anthropology and Medicine* published the special issue “Healing holidays? Itinerant patients, therapeutic locales and the quest for health”. Likewise, in 2011, *Tourism Review* published the special issue “Health and medical tourism” and other journals such as *Global Social Policy*, *Body and Society* and *Signs* also devoted special editions to medical tourism in both of those years (Lunt et al., 2014). In short, MT research during

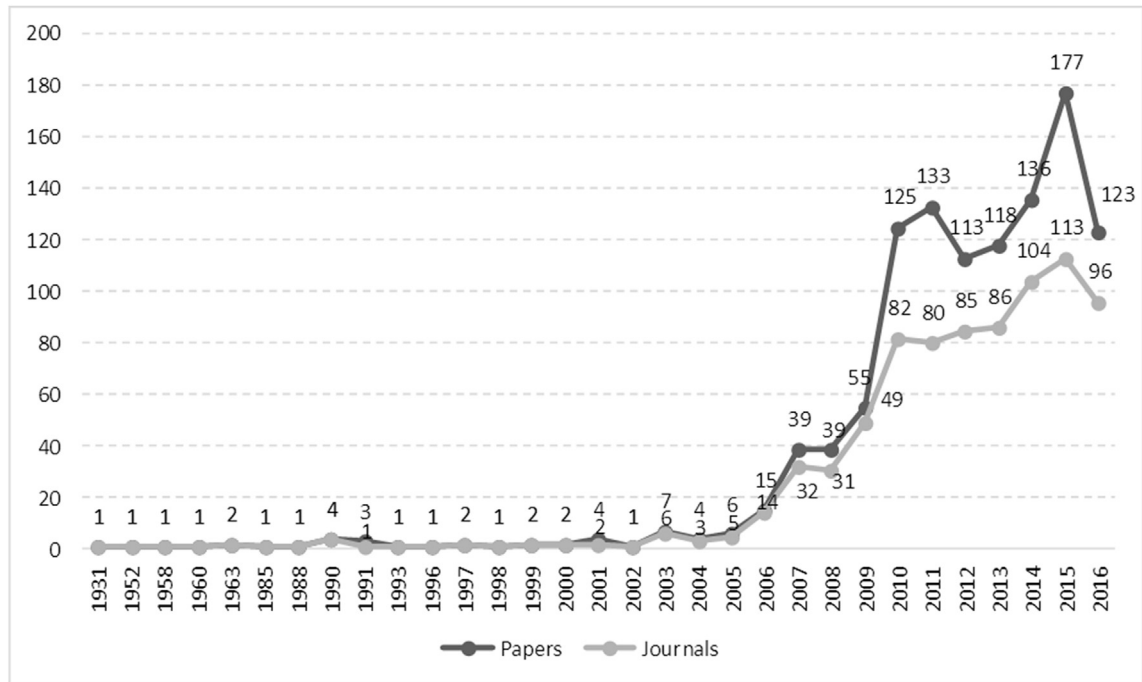


Fig. 2. Quantification of papers and journals on the topic in the sources consulted from 1931 to 2016.

the period under analysis followed an upward trend in both papers and journals thus contributing to the dissemination and development of knowledge and the assemblage of a more solid scientific corpus for future research.

Table 2 illustrates the journals with seven or more papers published on the topic. *Tourism Management*, *Reproductive Biomedicine Online*, *American Journal of Bioethics*, *BMJ*, *Journal of Travel & Tourism Marketing*, *Globalization and Health* and *Current issues in Tourism*, with over 10 papers published during the analyzed period, are highlighted. They reflect the special interest for this topic among the scientific journals mostly from health, bioethics or tourism.

Table 2
Journals with seven or more papers on medical tourism from 1931 until 2016.

Journals	# papers	%
Tourism Management	23	2.2%
Reproductive Biomedicine Online	18	1.7%
American Journal of Bioethics	17	1.6%
BMJ	14	1.3%
Journal of Travel & Tourism Marketing	13	1.2%
Globalization and Health	12	1.1%
Current issues in Tourism	11	1.0%
BMC Health Services Research	9	0.8%
Canadian Family Physician	9	0.8%
Iranian Journal of Public Health	9	0.8%
Asia Pacific Journal of Tourism Research	8	0.8%
Developing World Bioethics	8	0.8%
European Journal of Health Law	8	0.8%
Health Policy	8	0.8%
Medical Anthropology	8	0.8%
Anthropology and Medicine	7	0.7%
Canadian Medical Association Journal	7	0.7%
International Journal of Health Services	7	0.7%
International Journal of Healthcare Management	7	0.7%
Signs	7	0.7%
Tourism	7	0.7%
...
TOTAL	1119	100.0%

3.2. Publication activity on MT: authorship

Table 3 lists the ten authors with a highest production of MT articles. Crooks is the most prolific with 47 articles devoted mostly to qualitative research in Canada focusing on medical tourism, decision making or global health care mobilities. The second and third positions are filled by Snyder (45) and Johnston (27) that together with Adam (11) are often co-authors with Crooks. Lunt accounts for 16 articles at times in collaboration with Smith (13), Hanefeld (12), Carrera (9) with research centered on the effects of this practice in the UK National Health Service (NHS) and in Europe. Finally, Ormond (10) mainly focuses on transnational healthcare practices and the economic impact of MT in Malaysia.

Table A1 in Appendix 1, in turn, lists the 20 most frequently cited papers. Connell's article "Medical tourism: Sea, sun, sand and... surgery" (2006), published in *Tourism Management* leads with 174 citations. It is followed by the article by Shenfield et al. (2010) "Cross border reproductive care in six European countries" in *Human Reproduction* with 132 citations. From each of the lists we can conclude that there are authors with fewer publications that are often cited. This is due in part because they are published in top ranking journals in the WoS or Scopus lists. Therefore, literature on MT is also influenced by researchers with high or low production

Table 3
Top ten authors according to the number of articles.

#	Author	No. of articles
1	Crooks, V.A.	47
2	Snyder, J.	45
3	Johnston, R.	27
4	Turner, L.	21
5	Lunt, N.	16
6	Smith, R.	13
7	Hanefeld, J.	12
8	Adams, K.	11
9	Ormond, M.	10
10	Carrera, P.	9

Table 4

Keywords covered in the 1119 papers of the review (with more than 10 occurrences).

Keyword	Occurrences	%	Keyword	Occurrences	%
Medical tourism	338	11.20%	Service quality	14	0.50%
Health tourism	114	3.80%	Health	13	0.40%
Health care	35	1.20%	Medical treatment	13	0.40%
Tourism	35	1.20%	Assisted reproductive technology	11	0.40%
Globalization	34	1.10%	Spa	11	0.40%
Medical travel	32	1.10%	Accreditation	10	0.30%
Cross border reproductive care	25	0.80%	Behavioral intention	10	0.30%
Cross border health care	22	0.70%	China	10	0.30%
Reproductive tourism	20	0.70%	International medical travel	10	0.30%
India	19	0.60%	International patient	10	0.30%
Ethics	15	0.50%	Public health	10	0.30%
Thailand	15	0.50%	Stem cell tourism	10	0.30%
Canada	14	0.50%	Transplant tourism	10	0.30%
Health policy	14	0.50%
Malaysia	14	0.50%	Total	1498	100%

rates whose papers were published in high-impact journals, indicating that only a small group of authors has played a role in the development of MT knowledge, while authors with extensive research experience have relatively little influence on the evolution of the topic because their research was published in journals of lower impact.

3.3. Structure of the conceptual MT sub-domains

As expected, this paper's findings reveal that "Medical tourism" (338) and "Health tourism" (114) are the most common keywords (see Table 4). These are followed by terms linked to travel for access to medical services such as "Health care" (35), "Medical travel" (32), "Cross border health care" (22), "Health" (13), "Medical Treatment" (13) and "International Medical Travel" (10). Secondly, keywords referring to countries attracting medical tourists such as "India" (19), "Thailand" (15), "Malaysia" (14), "China" (10), and countries exporting medical tourists such as "Canada" (14), appeared in several entries. Furthermore, relevant keywords such as "Tourism" (35), "Globalization" (34), "Cross border reproductive care" (25), "Reproductive Tourism" (20), "Ethics" (15), "Health policy" (14), "Service quality" (14), Spa (11), "Assisted reproductive technology" (11), appeared between 11 and 35 times. These were followed by

identification of other related terms such as Accreditation (10), "Behavioral intention" (10), "International patient" (10), "Public health" (10), "Stem cell tourism" (10) and "Transplant tourism" (10).

An important observation so far is that research into MT has focused on both the understanding the phenomenon itself and on the ethical, political and economic repercussions in different countries with a special interest in reproductive care. From the total of 1498 keywords, there are multiple items referring to the same concept applying different terms. For example, in lieu of "Medical tourism," authors reverted to "Medical Health Tourism" (1) or "Medical Mobility" (1). This leads to the conclusion, as noted by Connell (2013) and Chuang et al. (2014), that several terms are interchangeable when describing health services provisions from country to country leading to confusion. Thus, conceptual ambiguity in the academic literature remains despite past efforts for clear definitions of terminology.

This analysis also reveals an interconnection between research on medical tourism and other marketing-specific aspects such as consumer behavior or service quality, as well as other study fields of ethical, political or legal issues deriving from these practices. It also allows to conclude that there is a huge potential for researchers to include factors such as image, motivations or cross-cultural analysis in their works.

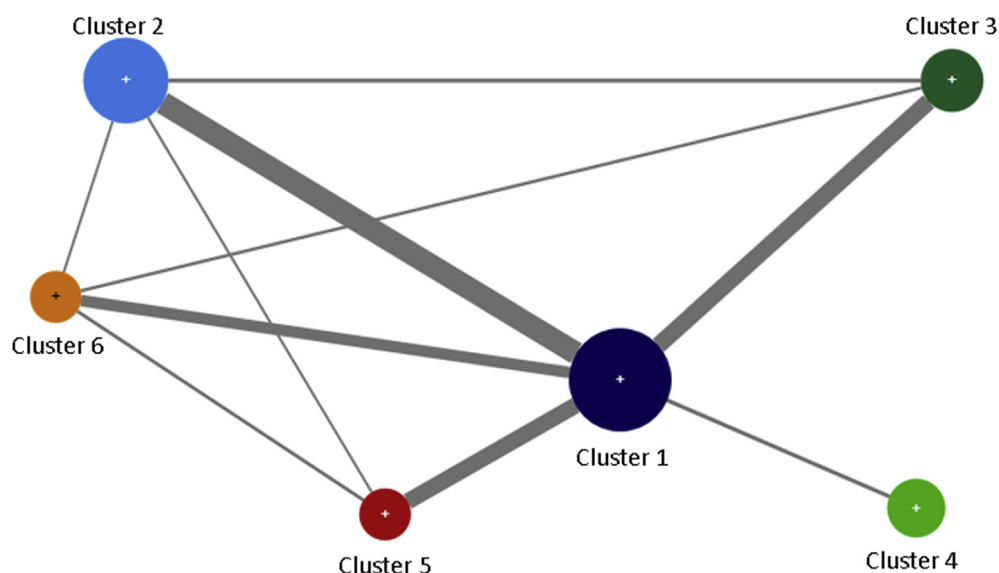


Fig. 3. Clusters of keywords identified in the MT Research and their level of interaction (Clusset-Newman-Moore clustering algorithm).

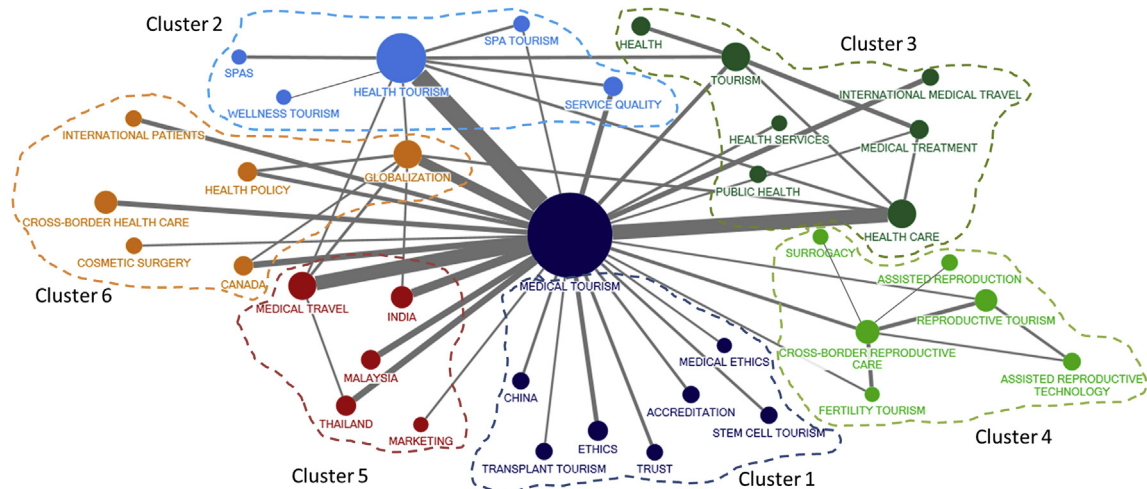


Fig. 4. Global thematic network in MT Research (Clusset-Newman-Moore clustering algorithm).

Note: the numbers refer to the six thematic groups or clusters identified in the analysis (Cluster 1: “Studies regarding ethical implications, unethical practices, trust and accreditation;” Cluster 2: “Studies on health, wellness, spa tourism and service quality;” Cluster 3: “Studies on health-related issues (health care, health services, public health), medical treatments, and tourism;” Cluster 4: “Studies on “sensitive” practices in medical tourism;” Cluster 5: “Studies on medical tourism destinations and marketing;” Cluster 6: “Studies on globalization, policies and the effect on international patients”).

Therefore, based on the criteria of the keywords and article titles, this study undertook a quantitative content analysis calculating the co-occurrence or number of joint recurrence of two words (Callon et al., 1991; Muñoz-Leiva, Sánchez-Fernández, Liébana-Cabanillas, & López-Herrera, 2012; Muñoz-Leiva et al., 2012b). The co-occurrence analysis of keywords was conducted with NodeXL software initially applying the Fruchterman-Reingold’s layout algorithm. In order to design a visual representation of the keywords, the minimum frequency of appearance for each was set at five and in this case, a keyword then became a thematic area. Additionally, for a better understanding of the structure of the conceptual sub-domains of medical tourism, the analyses extracted six clusters of themes by means of the Clusset-Newman-Moore agglomeration algorithm.¹ Fig. 3 illustrates the thematic networks extracted and their level of interaction or cohesion showing a higher centrality between clusters 1, 2 and 3, which in turn evidence greater co-occurrences between those groups. Additionally, the volume of the globes depends on the number of published documents.

Fig. 4, shows that researchers tend to link medical tourism and health tourism. Also, research in medical tourism is very much linked to Health Care in general, Medical Travel and Globalization. Moreover, there is a remarkable number of studies evaluating the effects of globalization and travel on the evolution of medical tourism. There is also a strong relationship between Globalization, Medical travel, Health Policy, Health Tourism and Tourism in general, as well as between Cross-border Reproductive care and Reproductive Tourism. In sum, the issues with the strongest internal connections appear as follows:

• **Cluster 1. Studies regarding ethical implications, “unethical” practices, trust and accreditation**

This cluster comprises papers regarding medical ethics (e.g.

Turner, 2007), accreditation and trust of clinics and doctors (e.g. York, 2008). This may be explained by the concern of many hospitals and destinations to be the “first” in medicine and to look for accreditation, particularly by the Joint Commission International as a guarantee of the quality of care (Manaf, Hussin, Kassim, Alavi, & Dahari, 2015). This cluster also includes themes relating to topics considered “unethical” such as the practice of transplant tourism or stem cell tourism (e.g. Murdoch & Scott, 2010) and China as a medical tourism destination.

• **Cluster 2. Studies on health, wellness, spa tourism and service quality**

This cluster comprises a group of papers linking medical tourism with other segments of health tourism such as wellness and spa tourism that are more oriented toward prevention rather than cure (e.g. Mueller & Kaufmann, 2001). Papers on service quality are also included as they reveal that superior service quality is an important factor of customer satisfaction, loyalty and contributes to a competitive advantage among the healthcare providers (e.g. Prajitmutita, Perényi, & Prentice, 2016).

• **Cluster 3. Studies on health-related issues (health care, health services, public health), medical treatments and tourism**

Papers included in this cluster mostly relate to the impact of medical tourism services on national health systems in host countries, for example the EU Directive on cross-border health care (Hanefeld et al., 2014) and its implications in medical treatments, medical travel and tourism (e.g. Connell, 2006). These papers not only highlight the potential of medical tourism to attract doctors and generate direct investments, but the need for regulation, the lack of quality control among foreign providers, and the real or even potential cost of possible complications (Lunt et al., 2014).

• **Cluster 4. Studies on “sensitive” practices in medical tourism**

Papers included in this cluster address different treatments and practices found in medical and health tourism destinations such as assisted reproduction, surrogacy or reproductive tourism (e.g.

¹ Clusset-Newman-Moore’s clustering algorithm, in the NodeXL software detects the community structure in network topologies and works by optimizing the modularity metric (division of network into communities). The authors assume that the keywords in the network are linked if they are frequently used in the same document. The Clusset-Newman-Moore algorithm divides the network into sub-groups by the means the keywords are connected to one another more than to other groups.

Shenfield et al., 2010; Whittaker & Speier, 2010). Most of these papers are qualitative studies focusing on equity and ethical concerns including the rights of women in recipient countries and how to regulate them. This group of themes were also highlighted in the study by Chuang et al. (2014) and linked to the ethics and risks of organ transplants.

- **Cluster 5. Studies on medical tourism destinations and marketing**

Works included in this cluster explore Asian medical tourism destinations and countries such as India, Malaysia and Thailand. Other papers evaluate marketing features of medical travel (e.g. Crooks, Turner, Snyder, Johnston, & Kingsbury, 2011; Yeoh, Othman, & Ahmad, 2013) and how to effectively market these countries in global terms. These papers explicitly explore the use of a variety of messages and images in their attempt to attract international patients.

- **Cluster 6. Studies on globalization, policies and the effect on international patients**

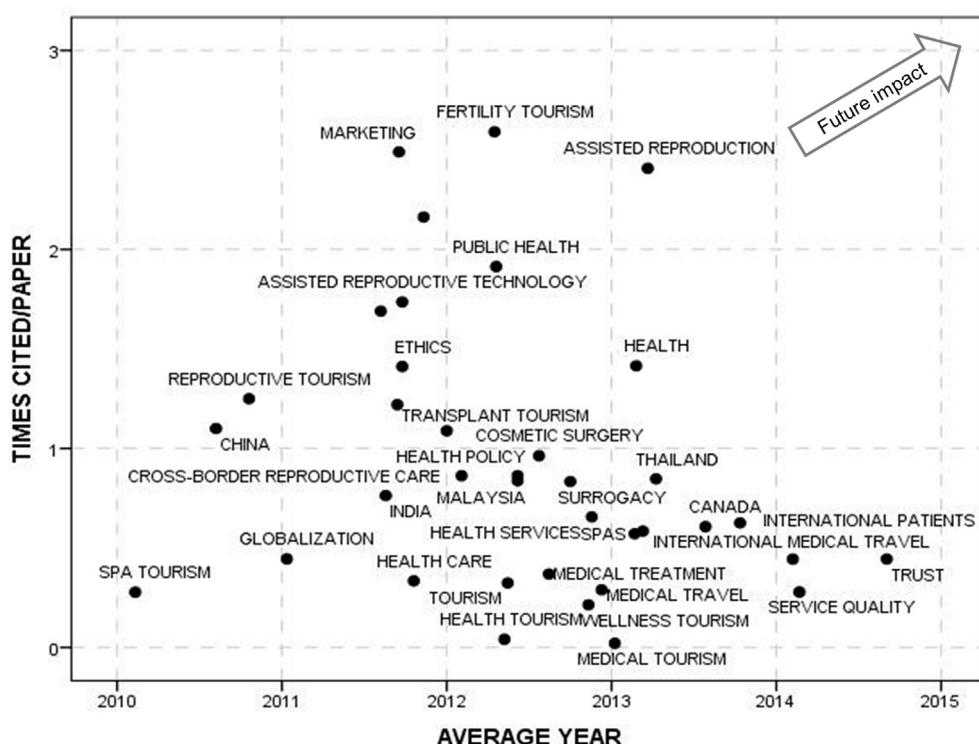
This cluster comprises a number of heterogeneous papers dealing with the effects of globalization and health policy. Examples include papers attempting to estimate the entire global medical industry and revenue gains in destination countries. Also, two out of the nine papers on cosmetic surgery included Canada as one of the main countries exporting medical tourists (e.g. Carrera & Bridges, 2006; Horowitz & Rosensweig, 2007). This cluster includes seven other papers on dental care and/or dental tourism (e.g. Barrowman, Grubor, & Chandu, 2010) that deal with the subject of lack of accountability and regulation, as well as the research of Dhama et al. (2016) presenting a review of the subject's opportunities, feasibility, treatment costs and popularity.

3.4. Streams of MT research and their future contribution

Muñoz-Leiva et al. (2015) also identified an area which they labelled “frontier of relevance” derived from the co-word analysis containing the most cited themes. The themes can in fact be considered a “research stream” depending on their position on the map. In fact, the closer they are to the upper right corner, the more likely they are to become a “research stream” (see Fig. 5). Moreover, when taking into account the year of publication, this area circumscribes the “future impact” of the topic.

The analysis of the stream for the data from the WoS and Scopus databases reveals that Assisted Reproduction and Fertility Tourism are among the topics with a future impact on MT research according to their relative relevance (assessed by calculating the citations/papers ratio). Similar findings were advanced in the work of Hanefeld et al. (2014) and Chuang et al. (2014) where assisted reproduction and fertility tourism were found to be comparatively better documented than other forms of MT where researchers were interested primarily in ethical and equity concerns. However, these authors also point to a consistent gap in the empirical research on this topic because most examples are reviews, analyses or overviews, and only a few correspond to true empirical investigations.

Marketing and Public Health are other topics relatively close to Fertility Tourism and Assisted Reproduction with a high number of citations. This group of topics represents a clear stream of research on medical tourism for future years as can be seen on Fig. 6 which depicts the most recent literature grouped in clusters and the relative relevance of the research themes by average year. Only the themes in cluster 4 and 5 in the upper right corner seem to have a higher impact on the scientific community. Curiously, in the case of this analysis, the year of publication is not as relevant in determining future streams of research since almost all items appeared between 2011 and 2013. The findings also suggest that studies on “sensitive practices of medical tourism” and “medical tourism destinations” will continue to be the most relevant themes in future



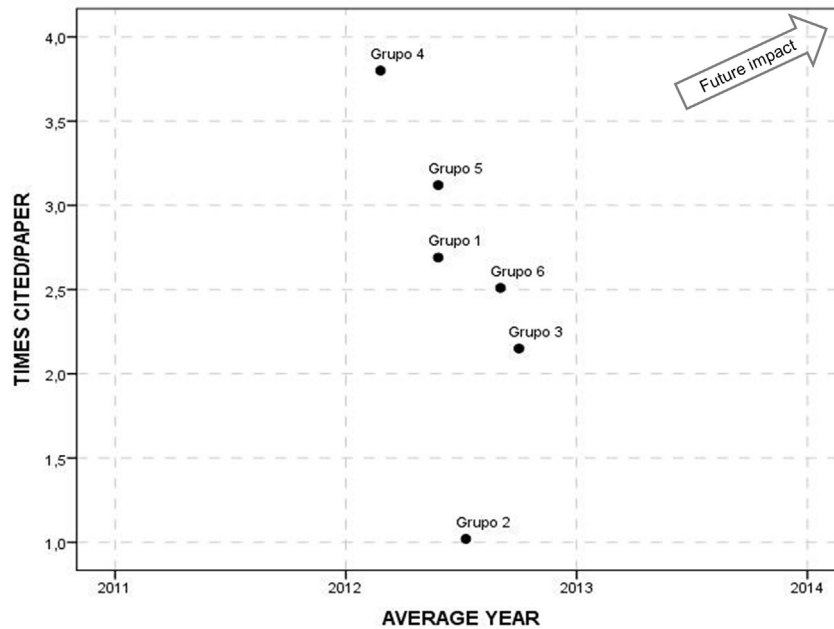


Fig. 6. Longitudinal analysis of the most significant clusters (Number of citations/paper vs. average year).

years for the MT community, including assisted reproduction, commercial surrogacy and medical destinations (such as India or Malaysia). Additionally, that medical tourism is still in an evolving

and developmental stage, and is somewhat fragmented in nature. Finally, future lines of research for the major keywords identified in current literature are summarized in Table 5.

Table 5

Future lines of research on the major themes on Medical tourism.

Major keywords and themes	Potential future lines of research
Cluster 1 Medical ethics and ethics Accreditation Transplant tourism, stem cell tourism Trust	Consequences of the “commodification” in healthcare and pressures for privatization of health in departure and host countries. Negative impacts of MT on public health and equality of access to care remain unexplored. There is also an on-going need for more normative analysis of ethical concerns, patient information consents, insurance responsibility, issues related to quality, and patient safety and follow up (after treatment). How accreditation affects destination choice? More study is also needed on how to create brand equity and brand positioning of destinations and on examination of the differences between medical facilities (with/without accreditation) for potential medical tourists. Explore organ procurement policies and the potential ethical concerns and policies. This also includes the underlying social and medical factors that encourage transplant and stem cell tourism. Role of trust in customer retention and clarification of medical tourist post-purchase behavior, the role of the sources of information and intermediaries in developing trust, and the role of trust in the medical tourism supply chain.
Cluster 2 Health, wellness and spa tourism Service quality	How trends in wellness affect the medical tourism market? Also, the integration of wellness hotels, spa resorts and medical tourism destinations offering a complete package to potential tourists. More study is needed on the question of assessing which characteristics of medical service quality influence international patient-traveler decision-making processes.
Cluster 3 Tourism Health services and health care Public health Medical treatment International medical travel	The hospitality linkages of MT and their effect in other modalities of tourism such as event or cultural tourism. More is needed on understanding the health sector in destination and origin countries and their impact on medical travelers. Explore the clinical outcomes and their costs to health systems and the particularities of health care systems. The importance of medical tourist's characteristics when deciding medical treatments and destinations. The impact of displacement distance in the decision to travel. Furthermore, complete and accurate data on medical tourism volume, destinations, services, and procedures are unavailable.
Cluster 4 Surrogacy Assisted reproduction Reproductive and fertility tourism	More discussion is needed on the social, ethical and political issues derived from these practices with different point of views of the actors involved (patients, policy makers or intermediaries). Comparative analyses between different subdomains of MT regarding the medical, socio-ethical and distinct policy challenges.
Cluster 5 Marketing India, Malaysia and Thailand	Word of mouth as a potential marketing tool, marketing strategies in different countries, technological advances and the effect of pricing in the demand of medical services. More different destinations and cross-cultural studies and more precise applications related to destination behavior are necessary, especially concerning satisfaction and destination loyalty. In addition, research on the congruence between customer beliefs and location characteristics in the decision to travel.
Cluster 6 Globalization Health Policy International patients	Digitalization of communication, liberalization of medical tourism finances and the effects of globalization forces on the medical tourism supply chain. How restrictions on foreign health service providers, foreign direct investments and regulation in insurance affect the demand of medical tourism. More studies on patient characteristics, numbers of patients traveling abroad for new treatments on cosmetic surgery and dental care and comprehensive medical tourist decision models including sources of information and perceptions.

4. Conclusions, limitations and future research

On the basis of the papers included in the WoS and Scopus database services, we can assert that research on MT has broadened its focus since 1987 with the seminal publication by Goodrich and Goodrich. During this period, MT research saw an upward trend by the appearance of numerous papers and journals contributing to the dissemination and development of knowledge on this topic and forming a sound scientific corpus for future research. This increase of publications on MT since 2010 reflects a fairly constant trend with the greatest number of documents published in 2015, which suggest that MT is gaining increasing recognition in the academic world. The findings of this study also reveal the great variety of keywords used in MT research that reflect the current lack of consensus regarding an “appropriate” definition of MT and the need to provide a consistent terminology to the field. Another finding is that the most prominent authors usually collaborate, enhancing the potential impact of their publications among the scientific community. Likewise, authors with few articles are more often cited than those with a greater number due to publication in high-impact journals.

Most of the papers identified in the study are not usually related either to other marketing-specific features such as consumer behavior, image, sources of information, or to other aspects such as cross-cultural or psychological fields. This implies a challenge to the scientific community and highlights the necessity of more advanced analyses of features such as decision-making, the role of intermediaries (MT companies) and the place of MT within both tourism (linkages with hotels, airlines and travel agents) and global health (Connell, 2013).

The central area of the global thematic network reveals that research on MT from the academic viewpoint is very much linked to Health Care, Health Tourism, Medical Travel, Globalization, Ethics, sensitive procedures (e.g. Surrogacy Tourism, Reproductive Tourism, Fertility Tourism) and specific destinations (e.g. India, Malaysia, Thailand, Canada). This implies that there is a slight

difference in the main themes in articles found in academic literature, as opposed to practitioner sources, with the second more interested in more practical issues like push and pull factors, motivations or risks (Crooks et al., 2010). Additionally, from the six clusters of thematic networks extracted, clusters 4 and 5 will see an important development on the next years due to their recent discussion and interest in the scientific literature. The analysis also reveals, as noted by Hanefeld et al. (2014), that topics such as Assisted Reproduction and Fertility Tourism will have a future impact on medical tourism research.

However, there are some limitations due to the biases involved in an analysis of this type. A first specific limitation is that the result of the applied methods depends on the restrictions imposed by the researchers at the first stage of the process. In order to clarify the interpretation of the findings, the themes and journals with marginal contributions were excluded from the study. Hence the final findings are dependent on the initial decisions. Future research would also achieve more exhaustive results by expanding its analyses to other sources such as conference proceedings, professional journals, media and other bibliographic databases improving examination and extracting more information of MT sub-domains. To conclude, the authors of this study aspire that the themes identified and the proposals of future lines of research will contribute to the understanding of this rapidly developing field.

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Appendix

Table A1
The 20 most-cited articles.

Paper	Times cited
Connell, J (2006), “Medical tourism: Sea, sun, sand and... surgery,” <i>Tourism Management</i> , 27 (6), pp. 1093–1100	174
Shenfield, F; De Mouzon, J; Pennings, G; Ferraretti, AP; Nyboe-Andersen, A; De Wert, G; Goossens, V (2010), “Cross border reproductive care in six European countries,” <i>Human Reproduction</i> , 25 (6), pp. 1361 - 1368	132
Ramirez De Arellano, AB (2007), “Patients without borders: The emergence of medical tourism,” <i>International Journal of Health Services</i> , 37 (1), pp. 193 - 198	117
Mueller, H; Kaufmann, EL (2001), “Wellness tourism: Market analysis of a special health tourism segment and implications for the hotel industry,” <i>Journal of Vacation Marketing</i> , 7 (1), pp. 5 - 17	113
Horowitz, MD; Rosensweig, JA; Jones, CA (2007), “Medical tourism: Globalization of the healthcare marketplace,” <i>MedGenMed Medscape General Medicine</i> , 9 (4), p. 33	110
Bookman, MZ; Bookman, KR (2007), “Medical Tourism in Developing Countries,” <i>Medical Tourism in Developing Countries</i> , (BOOK), pp. 1 - 245	105
Carrera, PM; Bridges, JF (2006), “Globalization and healthcare: Understanding health and medical tourism,” <i>Expert Review of Pharmacoeconomics and Outcomes Research</i> , 6 (4), pp. 447 - 454	100
Inhorn, MC; Patrizio, P (2009), “Rethinking reproductive ‘tourism’ as reproductive ‘exile,’” <i>Fertility and Sterility</i> , 92 (3), pp. 904 - 906	98
Hopkins, L; Labonté, R; Runnels, V; Packer, C (2010), “Medical tourism today: What is the state of existing knowledge,” <i>Journal of Public Health Policy</i> , 31 (2), pp. 86 - 185 - 198	86
Crooks, VA; Kingsbury, P; Snyder, J; Johnston, R (2010), “What is known about the patient’s experience of medical tourism? A scoping review,” <i>BMC Health Services Research</i> , 10, p. 266	83
Lunt, N; Carrera, P (2010), “Medical tourism: Assessing the evidence on treatment abroad,” <i>Maturitas</i> , 66 (1), pp. 27 - 32	74
Johnston, R; Crooks, VA; Snyder, J; Kingsbury, P (2010), “What is known about the effects of medical tourism in destination and departure countries? A scoping review,” <i>International Journal for Equity in Health</i> , 9 (1), pp. 1-24	71
MacReady, N (2007), “Developing countries court medical tourists,” <i>Lancet</i> , 369 (9576), pp. 1849–1850	66
Chinai, R; Goswami, R (2007), “Medical visas mark growth of Indian medical tourism,” <i>Bulletin of the World Health Organization</i> , 85 (3), pp. 164 - 165	63
Murdoch, CE; Scott, CT (2010), “Stem cell tourism and the power of hope,” <i>American Journal of Bioethics</i> , 10 (5), pp. 16 - 23	62
Horowitz, MD; Rosensweig, JA (2007), “Medical tourism–health care in the global economy,” <i>Physician executive</i> , 33 (6), pp. 24 - 30	61
Ryan, KA; Sanders, AN; Wang, DD; Levine, AD (2010), “Tracking the rise of stem cell tourism,” <i>Regenerative Medicine</i> , 5 (1), pp. 27 - 33	56
Connell, J (2013), “Contemporary medical tourism: Conceptualisation, culture and commodification,” <i>Tourism Management</i> , 34 (), pp. 1 - 13	54
Whittaker, A; Speier, A (2010), “‘Cycling overseas’: Care, commodification, and stratification in cross-border reproductive travel,” <i>Journal of Medical Anthropology: Cross Cultural Studies in Health and Illness</i> , 29 (4), pp. 363 - 383	48
Turner, L (2007), “Medical tourism: Family medicine and international health-related travel” [Tourisme médical: La médecine familiale et les voyages internationaux reliés à la santé], <i>Canadian Family Physician</i> , 53 (10), pp. 1639–1641, 1646-1648	48

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Full name: Andrea de la Hoz-Correa **Affiliation:** Department of Marketing and Market Research at University of Granada **Brief professional biography:** Ms. Andrea de la Hoz is an International Negotiator with a Master degree in Marketing and Consumer Behavior from the University of Granada (Spain). She is a professor and researcher in topics such as tourism, medical tourism, consumer behavior and online environments and currently a PhD candidate in Economics and Business at the University of Granada.



Full name: Francisco Muñoz-Leiva **Affiliation:** He is an associate professor at the department of Marketing and Market Research at University of Granada **Brief professional biography:** Dr. Muñoz-Leiva holds a PhD in Business Sciences from the University of Granada (Spain). His main fields of research are Internet consumer behavior and neuromarketing. His recent works have been published in journals such as *Current Issues in Tourism*, *Online Information Review*, *International Journal of Advertising*, *The Service Industries Journal*, *Quality & Quantity* among others, as well as in national and international conferences (EMAC, AEMARK, Hispanic-Lusitanian Congress in Scientific Management, AEDEM, IADIS, Global Management, etc.).



Full name: Márta Bakucz **Affiliation:** She is an associate professor at the Faculty of Business & Economics at the University of Pécs **Brief professional biography:** Dr. Márta Bakucz is an acknowledged expert in Hungarian tourism research, the author of several related publications and the leader or participant of numerous tourism research projects such as the “Analysis of the Competitiveness Factors of Spas and Health Resorts in Hungary and Central European Regions” (2012–2016).