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# **The Evolution of Travel Medicine Research: A New Research Agenda for Tourism?**

Current Issues in Tourism Article

## **Abstract**

There has been considerable growth in interest in the field of travel medicine and the intersection with Tourism Studies since the 1990s. Yet this interest from a medical perspective is not new as a review of *The Lancet*, one of the most well-established medical journals, shows. What is new is the way in which the interest in travel medicine has developed across the science-social science divide and has now become one strand of a wider practitioner and academic interest in tourist well-being. With the exception of studies on technology and tourism and environmental science and tourism (e.g. climate change), this science-social science intersection has been comparatively absent from research in Tourism Studies. For this reason, this current issues paper seeks to broadly outline the evolution of this area of study and some of the influential studies published to date along with some of the research agendas now emerging in this new area of study.

**Keywords:** Travel Medicine; The Lancet; Tourist safety; Tourist Well-Being

## **INTRODUCTION**

Tourist health and safety have arguably become among the most high profile issues now associated with the individual tourists' concerns with travel. Likewise, tourist destinations are increasingly being assessed in terms of their record on providing safe and healthy environments for tourists, given the central premise of tourism: to enjoy one's leisure time; to partake in a holiday which will involve 'periods of escape for people, and catalysts for change in both individual's and communities' (Ryan 1997:4). It is this holiday experience which features prominently in most analyses of the tourist experience (Ryan 1997) and ensuring both the tourists' safety, health and enjoyment are key issues for the tourism industry. This is because the tourism industry sell dreams, potential experiences and seek to fulfil our diverse motivation for domestic and international travel. Aside from the growing international growth in litigation and legal action associated with tourism when things go wrong, tour operators and destinations are increasingly realising that holidays need to perform a positive function in the post modern society linked to reinvigoration of mind, body and soul, enjoyment, entertainment together with a wide range of needs associated with the imagery of holiday taking.

With the exception of adventure travel and niche forms of tourism which involve a significant degree of risk and challenge (e.g. adventure tourism), the notion of tourist well-being and safety are inherent in much of the popular culture of tour advertising in the western world. This even extends to the notion of tourists travelling in an 'environmental bubble' in countries where health and safety risks are significantly problematic, but where tour operators utilise exploitative modes of production such as resort enclaves, to ensure higher levels of profit but also to control the environment and risk factors. Through limited and managed interaction with the natural environment and local population, operators seek to provide

positive tourist experiences of both place and the wider holiday by minimising risk situations. Given these now widely used management tools to seek to manage the tourist experience and to seek to create positive notions of well-being, this current issues paper debates the issues associated with tourist holiday taking and its management by the tourism industry, namely:

- tourist well-being and how accident, injury and perceived risk may impact upon it;
- the notion of a tourist welfare continuum;
- current issues and trends affecting the tourist risk and injury;
- what steps the tourism industry are taking to minimise the risks and incidence of injury.

However, prior to discussing these issues, it is pertinent to chart the development of this area of study within tourism studies and its evolution as travel medicine, given its interdisciplinary nature and reliance upon a wide range of subject areas.

## **THE HISTORICAL DEVELOPMENT OF TRAVEL MEDICINE AND ITS ROLE IN TOURISM STUDIES**

Tourist travel is certainly not a new phenomenon and historical analyses of Scottish Missionaries between 1873 and 1929 highlighted the health risks which such travellers faced, especially to tropical areas, such as West Africa, where the most severe risks occurred (Cossar 1987). Whilst few historical studies exist of other forms of tourist travel and the health issues which faced travellers prior to the post-war era, the existing studies do largely date to the 1970s (e.g. Steele 1977), 1980s (e.g. Reid et al 1986) and 1990s (e.g. Cossar et al 1990) and all these studies have come from the field of medicine known as epidemiology (i.e. the study of disease outbreaks and their propensity to grow to epidemics). These studies were certainly influential in creating what is now acknowledged as the field of travel medicine

which some commentators consider has evolved from the area of tropical medicine. As Figure 1 shows, travel medicine has developed from a wide range of medical specialisms and contributions made from science and social science. Indeed the area of study has its own International Society of Travel Medicine with a well established scientific journal – the *Journal of Travel Medicine* and a more recent newcomer – *Travel Medicine and Infectious Diseases*. A range of textbooks on travel medicine aimed at the medical profession also exist which underpin three key principles of travel medicine:

- providing specialist medical advice to impending travellers with a view to preventing risks and morbidity associated with travel (**A Prevention Role**);
- assessment of known or likely hazards associated with a specific form of tourist travel and the prescribing of prophylactics to reduce risks (**Risk Assessment**);
- generic health advice and information to advise travellers of necessary behavioural issues associated with travel to certain areas and destinations (**Information Role**). This is epitomised in Figure 2 which is an analysis of the UK Government's Foreign and Commonwealth Office's Travel Advisories of areas which UK tourists should avoid travel to. Whilst such a geographical distribution of destinations to avoid will change through time, it does highlight the importance on informing potential tourists of areas of political instability and areas of a high propensity for kidnapping of tourists (eg. some South American destinations).

These features are broadly consistent with Leggatt et al's (2002: 3) attempt to define this evolving area of study:

Travel medicine seeks to prevent illnesses and injuries occurring to travellers going abroad and manages problems arising in travellers coming back or coming from abroad. Tourist health is also concerned about the impact of tourism on health and advocates for improved health and safety services for tourists (Leggatt et al 2002:3).

The Prevention – Risk Assessment – Information nexus highlighted above, combined with the diversity of literature that has grown in this area during the 1990s from the subjects listed in Figure 1, means any outline of key studies must necessarily be limited to landmark studies. Seeking to synthesise the diverse scientific literature is a near impossible task, with literally hundreds to thousands of relevant articles available from proprietary academic search engines (e.g. Google, Google Scholar, SCOPUS, Medline and Science Direct) which collate the scientific publications in the area. For readers, the more gentle introduction to this vast literature can be more easily accessed by charting some of the landmark books in the field since the early 1990s. Any review of the scientific literature points to the 1990s as the ‘take off’ point of literature in this area which also coincides with the launch of the *Journal of Travel Medicine*. Yet this may be a reflection of the relabelling of research activity that already existed for decades before, with a more explicit ‘travel medicine’ label. A brief review of Table 1 which documents the history of travel medicine articles in international medical journal - *The Lancet*, does show a diversity of publications grouped around many of the subjects listed in Figure 1. Interestingly, these travel medicine issues have a history dating to the 1890s. This would seem to suggest that the study of travel medicine may have expanded somewhat in the 1990s (e.g. Behrens and McAdam 1993) but it is a well defined area of scientific inquiry dating back to the nineteenth century, with much of the original impetus linked to the positive health giving qualities of ocean travel. This has gradually changed to recognise that travel may also provide a range of health risks for certain groups of travellers.

#### **LANDMARK STUDIES ON TOURIST HEALTH AND SAFETY IN THE 1990s**

Among the key scholarly books published on the interface between tourism, travel medicine and the relationship with the expansion of international tourist travel were:

- S.Clift and S.J.Page (eds) (1996) *Health and the International Tourist*, which identified some of the current interdisciplinary work on this area from a broad range of medical and social science researchers;
- S.Clift and P.Grabowski (eds) (1997) *Tourism and Health*, which followed a similar pattern to Clift and Page (1996);
- J.Wilks (2002) *Safety and Security in Tourism: Partnerships and Practical Guidelines for Destinations*, a report for UN-World Tourism Organisation, which reviewed the practical issues for destinations, governments, the tourism industry and travellers with a range of invaluable case studies and is influential among practitioners;
- J.Wilks and S.J.Page (eds) (2003) *Managing Tourist Health and Safety*, which had a wide range of contributions from the medical and social science literature, but also with a specific focus on risk and adventure tourism;
- J.Wilks, D.Pendergast and P.Leggat (eds) (2006) *Tourism in Turbulent Times: Towards Safe Experiences for Visitors*, with a series of sections on health, documenting the rise of travel medicine, insurance issues, SARS, local health impacts of tourism and issues related to safety and security.

These landmark studies in Tourism are a snapshot of current thinking in the field and review the state of the art as travel medicine relates to tourism. From these studies and other reviews (e.g. Page 2002), it is apparent that a number of concepts underpin the travel medicine field and its links to tourism and travel.

## **CONCEPTS UNDERPINNING THE TOURISM – TRAVEL MEDICINE NEXUS**

Clift and Page (1996) identified the link between tourist travel and the prevention-risk assessment-information role in travel medicine and the relationship with tourism as a



dynamic process. Figure 3 depicts some of these relationships which hinge upon three stages associated with tourist decision-making, their behaviour and issues associated with health:

- pre travel, where the potential tourist decides on the destination and makes the arrangements to travel;
- the trip (travel phase);
- the post-travel phase.

During each of these stages, tourists may have interactions with medical services, services or sources of information as shown in Figure 3. This illustrates the importance of the prevention-risk assessment-information role not only during travel preparations but also on when on holiday and when returning. The widely argued premise among social psychologists is that the need for travel medicine is predicated on the assumption that tourists' behaviour changes when on holiday, compared to that in the origin area. Debates associated with the tourist experience on hedonism, behaviour change and the cultural significance of holidays in shaping these changes remain contentious and complex to unravel (Ryan 1997). However, as many empirical studies of traveller behaviour and the propensity to experience health problems (eg. Cossar et al 1990) confirms, many travellers engage in much more risky behaviour, either consciously or sub-consciously. One outcome, as Behrens (1997) found among returning travellers to Australia from less developed countries, was that around 50% reported illness on their return. Without engaging in a detailed debate on the causes of such illness rates, it is still apparent that the core area of tropical medicine has a core role to play in travel medicine if one examines Figure 4. Figure 4 illustrates the scale and volume of international tourist travel to less developed countries using recent UN-World Tourism Organisation statistics. If one was to superimpose upon the map, a list of endemic diseases

and health concerns, particularly those affecting ‘tropical’ countries (i.e. those located between the Tropic of Cancer and Capricorn), then the following common diseases emerge:

- malaria
- arboviral diseases (e.g. yellow fever, dengue fever, dengue fever)
- hepatitis
- typhoid

although some of these can be treated by vaccines and other prophylaxis.

Despite these inherent risks, there is no sign of tourist travel to less developed countries waning (except where terrorism is a major threat). To the contrary, tourism is growing in scale as Figure 4 indicates despite the known risks and greater concern with travel advisories, and travel medicine clinics. Even so, the persistence of tropical diseases since their study in the nineteenth and twentieth century, initially due to the fatigue and problems posed during European colonisation, remain an ever present risk for many modern day travellers to these environments. Yet the existence of environmental risks in tourist travel which are climatic in nature (i.e. largely confined to tropical destinations) are only one type of risk facing travellers and one further concept of importance is the continuum of tourist health risks whilst on holiday.

### **TOURIST HEALTH AND SAFETY RISKS ON HOLIDAY**

A number of studies (e.g. Page 2002; Walker and Page 2003) have given credence to the existence of a continuum of tourist health problems. Given the growing volume and scale of the travel medicine literature, there is a need to try and provide some logical order and a rationale framework in which one can understand:

- what are the most common health and safety problems tourists might face on holiday;

- what are the significance of these issues in terms of their scale and magnitude.

Figure 5 provides a diagrammatic representation of some of the health and safety risks which impact upon tourist well-being that illustrates the existence of:

- minor accidents, injuries and health issues (e.g. travellers diarrhoea) that are the most prevalent but not life threatening;
- medium-scale incidents such as road traffic accidents which are likely to cause more serious injury but which are not as commonplace as other minor injuries and accidents;
- major incidents leading to or resulting directly in mortality (e.g. kidnapping, terrorism, natural disasters and death from injury or natural causes whilst on holiday) which are relatively minor occurrences but which attract a high level of media interest epitomised by 9/11 and the Tsunami in 2004.

From this range of incidents and issues affecting tourist well-being whilst on holiday or during the experience of travel, attention now turns to a commentary of emergent issues which are affecting tourist health and safety, that can result in injury or enhanced risk of injury or health problems.

### **EMERGENT ISSUES IN TRAVEL MEDICINE LEADING TO ENHANCED RISK OR PERCEIVED RISK OF INJURY**

The area of travel medicine is, from time to time, picked up by the media and other forms of popular culture when articles are published in high profile journals such as *The Lancet* highlight an issue of concern. As Table 1 shows, the issues which *The Lancet* published in the 1990s and new millennium (e.g. SARS and Deep Vein Thrombosis) created a major media frenzy. Whilst these issues are noteworthy, they need to be looked at in the context of

Figure 4, to reflect upon their importance, relative significance in the wider scheme of tourist health and safety and the measures which international and national agencies need to take to address the perceived or real problem. Conversely, those issues which the media do not readily identify and publicise, are nonetheless important and worthy of discussion. Given the constraints of space, it is not possible to provide a definitive classification of the most important issues, but only to highlight some of the most pressing issues raised from some of the subjects outlined in Figure 1. To add some degree of coherence, it is also possible to view these issues in terms of their significance in global, regional and national terms although it is also possible to examine the local level within countries. At the country level, regional distributions of affected areas where diseases exist (e.g. malaria) may also act as a constraint on tourism development, as low volume, adventure-style exploration-style travel prevails as opposed to luxury tourism based in resorts and quality accommodation.

Conceptually, Table 2 raises a number of pertinent issues related to tourist behaviour and the significance of 'trigger points' (i.e. the point at which changes in tourism behaviour and travel patterns occur). At a global scale, the likelihood of a global flu pandemic will certainly modify tourist travel patterns away from affected areas. In addition, the affected areas would most likely see their tourism sector respond in much the same way that SARS (Lumsdon and Page 2004) led to the rapid loss of inbound tourism to destinations like Hong Kong where a 70% drop in the market occurred. Yet the important point to stress here, is the point at which the World Health Organisation declares a pandemic is in existence, thereby triggering a downshift in global and regional travel. The same principle also applies with reference to many of the other issues listed in Table 2. It is the point at which the media and tourist perception leads to a reaction against travel to regions affected by specific problems, triggering a behaviour change that it is critical for the tourism industry and destinations. This

is probably much clearer with reference to more tangible and easily understood human risks such as terrorism or a natural disaster as opposed to medical or health risks that are less tangible. Even so, tourist travel still has a considerable propensity to recover after the issue has subsided from media attention and travel behaviour begins to see a degree of normality return. This was evident in the case of SARS, where recovery in passenger loadings on Asian airlines six months after the event signalled recovery (Page 2005).

The range of issues associated with travel medicine and health risks is extensive and Table 2 only outlines a number of key challenges. What is more significant is that tourist behaviour and the social psychology of tourist perception of risk varies considerably according to traveller type. Yet interestingly, the trigger point for the majority of travellers is crucial in determining their aversion to a greater risk once it is associated with the media. Figure 4 is a real indicator of the willingness of international travellers to visit the tropical environment which have among the greatest background levels of disease and health risks in part, due to the attraction imagery and promotion of their idyllic and exotic qualities. Yet avoidance of such destinations only occurs after a concerted media campaign or travel advisory. This reiterates the arguments made earlier that tourists are more willing to subject themselves to a wide range of risk factors whilst on holiday compared to those they would be prepared to experience in their home environment. It is only once risk aversion behaviour is positively triggered by the media or other information sources (i.e. the unwillingness of travel insurers to provide cover) that avoidance occurs in many cases. Again, this is a somewhat simplified argument, but it should be qualified by recognising that different types of travellers do seek various experiences and the propensity to seek safe through to extremely challenging and adventurous experiences. So what do these conceptual issues and reflections on tourists' behaviour and travel mean for practical management measures the tourism sector?

## **PRACTICAL MANAGEMENT MEASURES FOR THE TOURISM INDUSTRY**

At a purely philosophical level, Walker and Page (2003) pointed to the critical question which should underpin this entire paper – whose responsibility is tourist health and safety? There are varying debates on this. These range from the perspective that each traveller is an adult and should be responsible for their own actions; to government's and other public sector agencies have a responsibility to ensure that all tourism providers develop a duty of care for their guests and visitors. This means ensuring a safe, healthy and meaningful experience that is as authentic as possible without being artificial and over-managed. In reality, the situation in different countries, sectors of the tourism industry and cultural determinants of tourist provision lead to many different attitudes to tourist safety and well-being. This determines the type of risk factors which visitors may experience in any destination or country, where the legal and regulatory environment may be a good surrogate for the operational guidelines which businesses must adhere to.

At a government level, many examples of Best Practice exist in this area, ranging from Voluntary Codes of Conduct in ensuring visitor safety through to more extreme measures to protect visitors where problems exist. Among the most proactive measures now in place following the DVT debate associated with long-haul travel, are the issuing of guidelines to passengers to encourage in-flight exercise to reduce immobility. Yet these are only paid lip service by many airlines to reduce possible grounds for litigation. At an international scale, the IATA minimum space for aircraft seat pitch still remains at 26 inches although some international carriers have expanded pitch size to 32 inches. This is still pitifully inadequate and reflects the commercial pressure on airlines to increase passenger yields by reducing legroom. However, until more conclusive research is published on the link between cramped

airline travel conditions, DVT and poor passenger health/well-being, this commercial model seems set to remain in place. The examples of Best Practice examined by Wilks (2002) provides a good overview of how measures to improve tourist well-being have been developed across the tourism sector. A cynic might argue that much of this activity has resulted from the growing concerns in travel and tourism law (Grant et al 2005) that tourists will pursue litigation as one option to seek redress when unnecessary risk of injury occurs. Equally, there is growing evidence of tourists also using litigation to seek redress for non-health or medical issues, such as emotional stress caused by a disappointing holiday through to trivial issues like lost luggage. It is this litigation and the rising costs of tourism insurance which have force some sectors of the tourism industry to reduce the necessity of claims.

Yet when tourists are injured or require hospitalisation (e.g. for a road traffic accident or due to adventure tourism injuries, Walker and Page 2004; Bentley et al 2001), then the public sector often bears the economic cost. This places undue pressure on inadequately funded public health systems, where cost recovery for accident and emergency treatment is not a common occurrence. Whilst Bentley et al (2001) observed that many injuries are minor, largely in the slips, trips and falls category, they do pose problems for health systems. The interaction between the public sector tourism and health systems is weakly developed, and it offers considerable scope for developing Best Practice models to reduce tourist injuries, accidents and morbidity. Here, the role of travel medicine has a role to play in risk assessment and prevention at the pre-travel phase but also a greater reinforcement in the destination area. Where voluntary cooperation and safety management is not practical or feasible, then legislation by government agencies is required, in areas such as food hygiene and handling where international standards exist.

Yet we cannot manage risk out of tourism. If we do, as Page et al (2005) noted, then tourist experiences will cease to be fun, exciting, different and could become artificial and too stage managed. That is certainly not in the interest of the tourism industry, which is in the business of fulfilling dreams, desires and ambitions. The challenge is to balance the need for the provision of an exciting or meaningful experience with a realistic assessment of the risks involved to tourist health, so that visitor well-being is safeguarded where practicable but not to the point of wrapping participants in cotton wool. Much of what the international tourism industry provides is of a standard where risk factors are known to the operators, but only slowly is that being made more transparent to visitors. To provide a full outline of all known risks and likely injuries would detract from the experience of a holiday. Therefore, balancing what the tourist needs to be told versus what is actually disclosed is now a contentious but burgeoning issue. Operators are increasingly being required to disclose risks to travellers in brochures and on web sites so insurance risks can be calculated and cover provided. The tourism sector does not operate as a seamless business, despite the role of large multinational integrated operators, and travel medicine issues highlight many of the inherent flaws in their *modus operandi*. Whilst the most advanced operators do track risk and injury issues via customer surveys and complaints, their approach in the main is still reactive because responsibility for tourist well-being is largely an outcome of what happens in the destination. As a result, much of this is outside of the immediate control of the tour operator, and within the remit of the destinations public and private sector tourism industry. The differing approaches of destinations to such issues also gives rise to a lack of consistency in the management of tourist health and safety, since human behaviour changes on holiday and the public sector have varying approaches and attitudes to how such behaviour should be managed.



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**Table 1 : The History of Travel Medicine Research published in The Lancet 1823-June 2007**

The Lancet was first published in 1823 and among the scientific articles it has published on the area of Travel Medicine, the following are of note (correspondence / discussion / short communications / news / editorial are excluded which would increase the number of published items to 115).

	<b>Title of Article</b>	<b>Authors</b>	<b>Volume</b>	<b>Issue</b>	<b>Date</b>	<b>Pages</b>
2007	Have microbes, will travel	Kelley Lee	369	9568	7 April	1159-1160
	Jet lag: trends and coping strategies	Jim Waterhouse, Thomas Reilly, Greg Atkinson and Ben Edwards	369	9567	31 March	1117-1129
	Health risks at the Hajj	Qanta A Ahmed, Yaseen M Arabi and Ziad A Memish	367	9515	25 March	1008-1015
	Transmission of infectious diseases during commercial air travel	Alexandra Mangili and Mark A Gendreau	365	9463	12.3.2005 – 18.3.2005	989-996
	Frequency of venous thromboembolism in low to moderate risk long distance air travellers: the New Zealand Air Traveller's Thrombosis (NZATT) study	RJ Hughes, RJ Hopkins, S Hill, M Weatherall, N Van de Water, M Nowitz, D Milne, J Ayling, M Wilsher and R Beasley	362	9401	20.12.2003 – 27.12.2003	2039-2044
	<i>Rickettsia sibirica</i> infection in members of scientific expeditions to northern asia	Matthew R Lewin, Donald H Bouyer, David H Walker and Daniel M Musher	362	9391	Oct 2003	1201-1202
	Epidemiological determinants of spread agent of severe acute respiratory syndrome in Hong Kong	Christl A Donnelly, Azra C Ghani, Gabriel M Leung, Anthony J Hedley, Christophe Fraser, Steven Riley, Laith J Abu-Raddad, Lai-Ming Ho, Thuan-Quoc Thach, Patsy Chau et al	361	9371	24.5.2003	1761-1766
	A multicentre collaboration to investigate the cause of severe acute respiratory syndrome	K Stöhr	361	9370	17.5.2003	1730-1733
	Assessment of travellers who return home ill	Alan M Spira	361	9367	26.4.2003	1459-1469
	Preparing the traveller	Alan M Spira	361	9366	19.4.2003	1368-1381
	Frequency and prevention of symptomless deep-vein thrombosis in long-haul flights: a randomised trial	John H Scurr, Samuel J Machin, Sarah Bailey-King, Ian J Mackie, Sally McDonald and Philip D Coleridge Smith	357	9267	12.5.2001	1485-1489

<b>Title of Article</b>	<b>Authors</b>	<b>Volume</b>	<b>Issue</b>	<b>Date</b>	<b>Pages</b>
Atovaquone-proguanil versus chloroquine-proguanil for malaria prophylaxis in non-immune travellers: a randomised, double-blind study	Birthe Høgh, Paul D Clarke, Daniel Camus, Hans Dieter Nothdurft, David Overbosch, Matthias Günther, Izak Joubert, Kevin C Kain, Dea Shaw, Neil S Roskell et al	356	9245	2.12.2000	1888-1894
Travel and risk of venous thrombosis	Roderick A Kraaijenhagen, Daniël Haverkamp, Maria MW Koopman, Paolo Prandoni, Franco Piovella and Harry R Büller	356	9240	28.10.2000	1492-1493
Risk of infection with <i>Mycobacterium tuberculosis</i> in travellers to areas of high tuberculosis endemicity	Frank G J Cobelens, Henk van Deutekom, Inez WE Draayer-Jansen, Ank CHM Schepp-Beelen, Paul JHJ van Gerven, Rob PM van Kessel and Marlies EA Mensen	356	9228	5.8.2000	461-465
Differences in sexual risk behaviour between young men and women travelling abroad from the UK	Michael Bloor, Michelle Thomas, Kerenza Hood, Damiano Abeni, Catherine Goujon, Dominique Hausser, Michel Hubert, Dieter Kleiber and Jose Antonio Nieto	352	9141	21.11.1998	1664-1668
Airline travel in sickle-cell disease	Mark Ware, Debbie Tyghter, Sean Staniforth and Graham Serjeant	352	9128	22.8.1998	652
Malaria in Maremma, Italy	Marco Baldari, Angelo Tamburro, Guido Sabatinelli, Roberto Romi, Carlo Severini, Giampiero Cuccagna, Gabriella Fiorilli, Maria Pia Allegri, Cristina Buriani and Mario Toti	351	9111	25.4.1998	1246-1247
Epidemics of syphilis in the Russian Federation: trends, origins and priorities for control	L Tichonova, K Borisenko, H Ward, A Meheus, A Gromyko and A Renton	350	9072	19.7.1997	210-213

<b>Title of Article</b>	<b>Authors</b>	<b>Volume</b>	<b>Issue</b>	<b>Date</b>	<b>Pages</b>
Outbreak of Legionnaires' disease among cruise ship passengers exposed to a contaminated whirlpool spa	DB Jernigan, J Hofmann, MS Cetron, JP Nuorti, BS Fields, RF Benson, RF Breiman, HB Lipman, RJ Carter, CA Genese et al	347	9000	24.2.1996	494-499
Mosquito-transmitted malaria in New York City, 1993	M Layton, R Advani, ME Parise, ME Parise, CC Campbell, JR Zucker and EM Bosler	346	8977	16.9.1995	729-731
Shigella Dysenteriae Type 1 infections in US travellers to Mexico, 1988	Julie Parsonnet, A Russell Gerber, Katherine D Greene, Robert V Tauxe, Octavio J Vallejo Aguilar and Paul A Blake	334	8662	2.9.1989	543-545
Air travel and thrombotic episodes: the economy class syndrome	John M Cruickshank, Richard Gorlin and Bryan Jennett	332	8609	27.8.1988	497-498
Acquired immunodeficiency syndrome after travelling in Africa: an epidemiological study in seventeen Caucasian patients	D Vittecoq, RT Roue, C Mayaud, F Borsas, M Armengaud, B Autran, T May, M Stern, P Chavanet, P Jeantils et al	329	8533	14.3.1987	612-615
Prospective study of acquisition of cryptosporidium, giardia lamblia, and gastrointestinal illness	Anssi M M Jokipii, Maria Hemilä and Liisa Jokipii	326	8453	31.8.1985	487-489
Clinical aspects of outbreak of staphylococcal food poisoning during air travel	Poul Effersøe and Kaj Kjerulf	306	7935	27.9.1975	599-600
Epidemiology of cholera in Italy in 1973	William B Baine, Mierlla Mazzotti, Donato Greco, Egidio Izzo, Alfredo Zampieri, Guiseppe Angioni, Mario Di Gioia, Eugene J Gangarosa and Francesco Pocchiari	304	7893	7.12.1974	1370-1374
Giardiasis an unusual case of epidemic diarrhoea	RG Thompson, DS Karandikar and J Leek	303	7858	6.4.1974	615-616
Vibrio parahæmolyticus gastroenteritis and international air travel	ASR Peffers, J Bailey, GI Barrow and Betty C Hobbs	301	7795	20.1.1973	143-145
Reflections on medical travel	LJ Witts	269	6983	29.6.1957	1343-1345
Reflections on medical travel	LJ Witts	269	6982	22.6.1957	1291-1292
Education by travel	Raymond Whitehead	260	6731	30.8.1952	396-400
Prevention and treatment of travel sickness with promethazine chlorotheorphyllinate	John Harper	257	6665	26.5.1951	1141-1144
Invalid railway travel	EM Corner	157	4061	29.6.1901	1850-1853

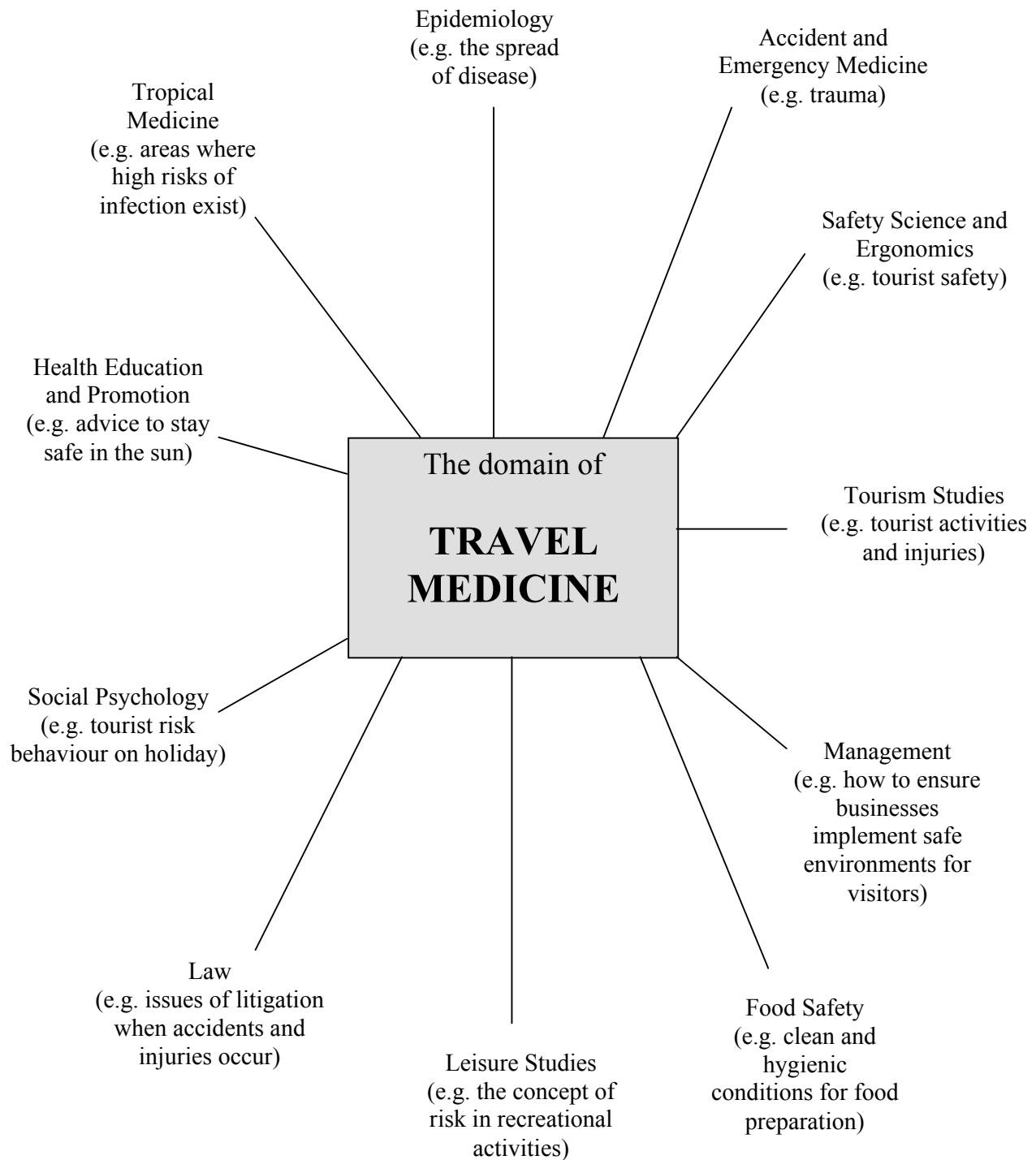
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<b>Title of Article</b>	<b>Authors</b>	<b>Volume</b>	<b>Issue</b>	<b>Date</b>	<b>Pages</b>
Notes on ocean travel for health and disease	John V Shoemaker	140	3596	23.7.1892	192-194
Notes on ocean travel for health and disease	John V Shoemaker	140	3595	23.7.1892	194-194

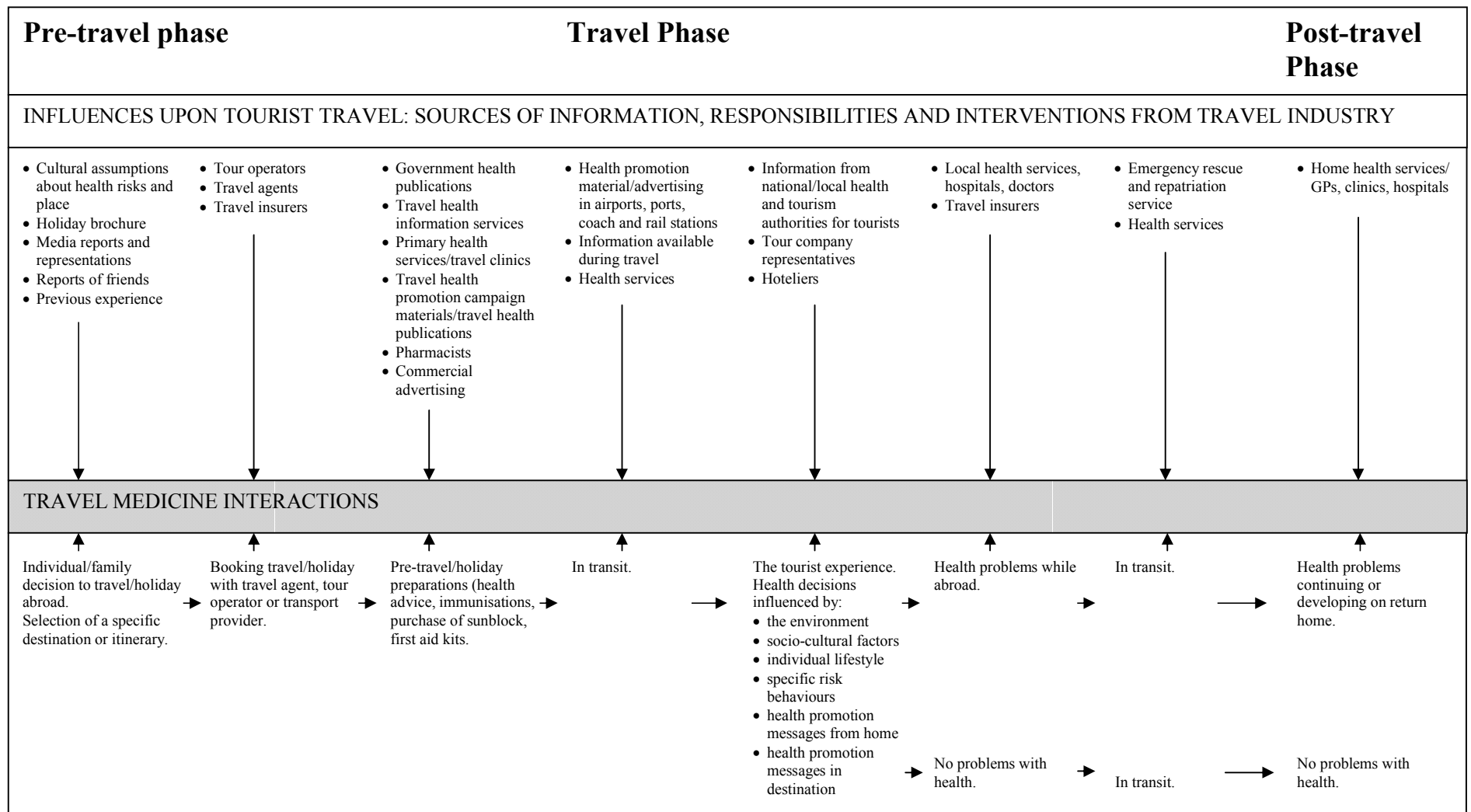
**Table 2 : Emergent trends of significance to tourist health, risk and injury and the subject areas which are driving the research agenda**

<b>Geographical Scale</b>	<b>Nature of the issue</b>	<b>Subject Area</b>	<b>Relevant Studies</b>
Global	Avian Flu and a Global Flu Pandemic	Health Education / Research – Tourism – Scenario planning	World Health Organisation (2005) Department of Health (2005) Page, Walker and Connell (2005)
	HIV-AIDS and transmission by travellers	Epidemiologists / Demographers / Social Psychologists / Health Education	Ford et al (1996) Clift and Carter (2000)
	Food Poisoning	Food Technology	Pendergast (2005)
	Deep Vein Thrombosis	Accident and Emergency Medicine / Health Education	The following debate the potential link between air travel and DVT Ansari et al (2005)
	Accidents and Injuries	Tourism / Safety Science	Page and Meyer (1996); Page et al (2006)
	Biosecurity Risks	Tourism	Hall (2005)
Regional	Malaria (300 million cases of infection in affected areas)	Epidemiology	World Health Organisation (2004); Malaria Fact Sheet 1994;
	Travellers Diarrhoea	Epidemiology	Cartwright (1996); Steffen et al (2003)
	Skin Cancer	Health Education	Weston (1996)





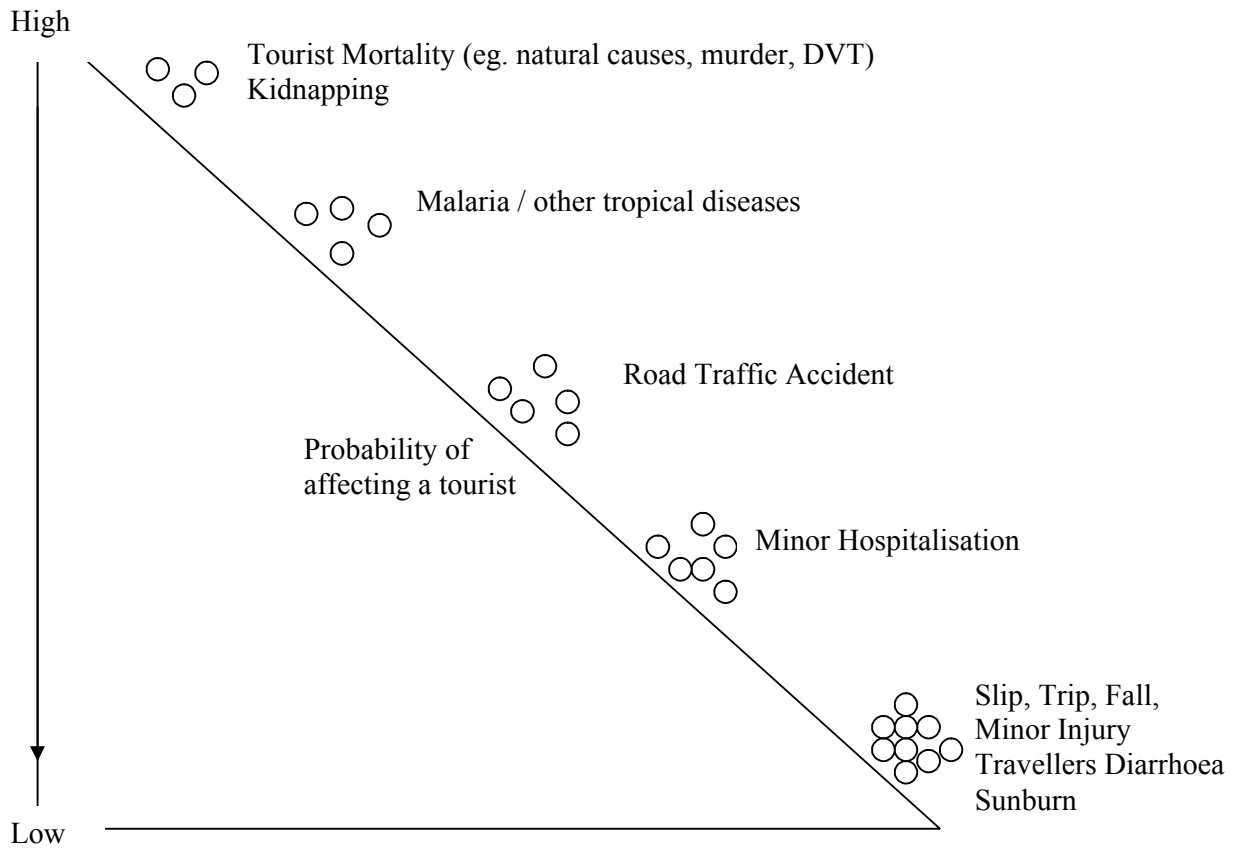
**Figure 1 : Some of the subjects contributing to the development of travel medicine with examples of the themes they research**



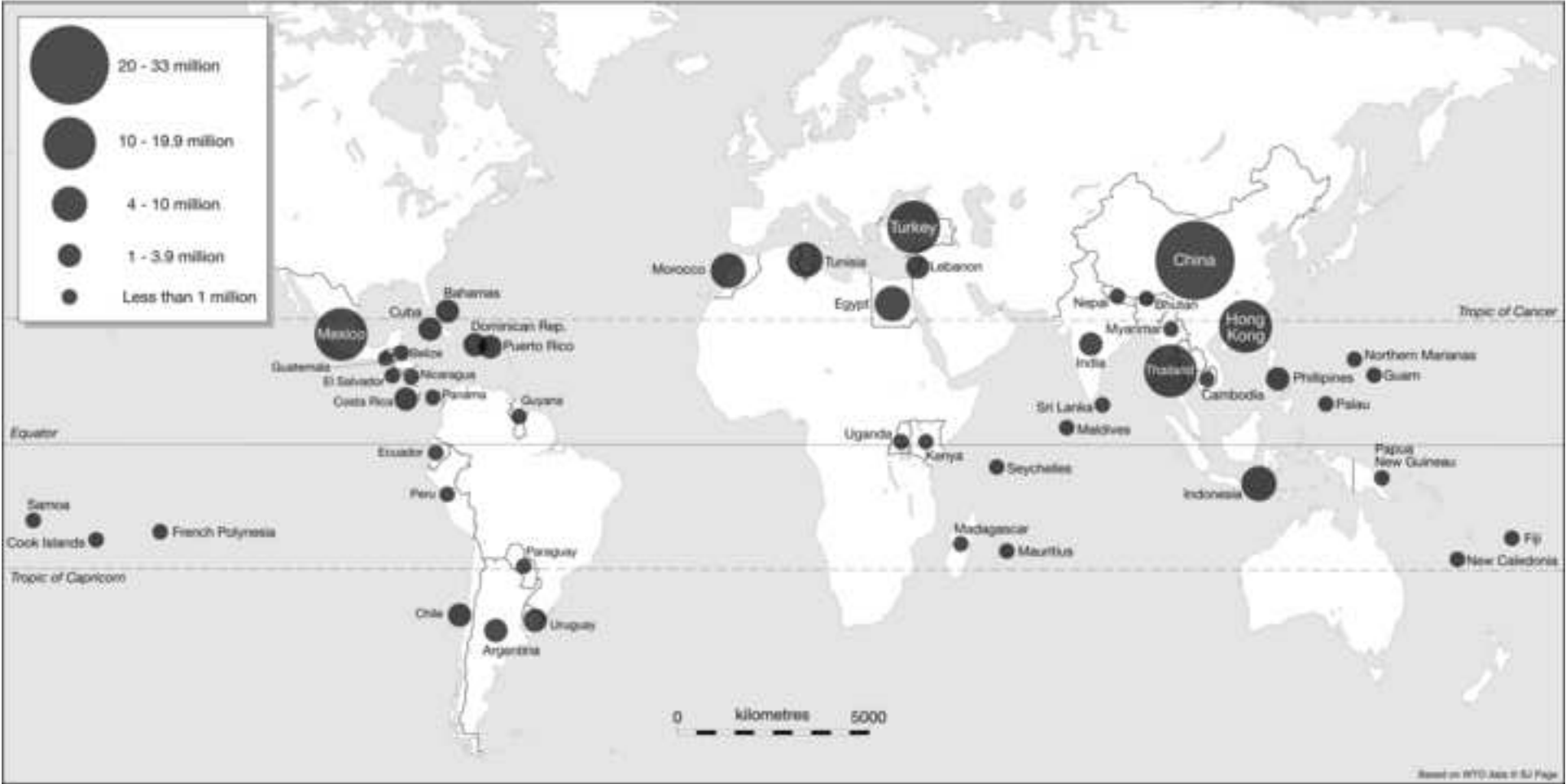
**Figure 3 : Managing the tourist health risks: a travel medicine perspective**

Source: Redrawn from Clift and Page (1996) with modifications.

Significance and  
Impact



**Figure 5 : Tourist Health and Safety Problems : Scale and Incidence**



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