International Journal of Safety
and Security in Tourism/Hospitality

Tourism and the Health Effects of Infectious Diseases: Are There Potential Risks for Tourists?

David Mc.A Baker

Facultad de Ciencias Económicas

Tourism and the Health Effects of Infectious Diseases: Are There Potential Risks for Tourists?

David Mc.A Baker[1]

Abstract

According to statistics of the WorldTourism Organization (WTO), international touristarrivals for 2014 exceeded 1138 million. In the same year the majority ofinternational tourist arrivals were for thepurposes of leisure, recreation and holiday, about 55%. However travel is a potent force in the emergenceof disease since the migration of humans has beenthe pathway for disseminating infectious diseases throughout recorded history andwill continue to shape the emergence, frequency, and spread of infections in geographicareas and populations. The current volume, speed, and reach of travel are unprecedented.The consequences of travel extend beyond the traveler to the population visitedand the ecosystem.International travel and tourism can pose various risks tohealth, depending on the characteristics ofboth the traveler and the travel. Travelersmay encounter serious health risks that may arise inareas where accommodation is of poorquality, hygiene and sanitation areinadequate.The purpose of this paper is to highlightthe details and impact of significant infectious diseases that can pose a risk to tourists and threaten public health.The paper also seeks to raiseawareness of the issues outlined and thereby increase efforts to enhance travel safety.

Keywords: tourism, risks, infectious diseases, health

1. Introduction

Recovery from the global financial crisis and an emergence of new source markets has led to considerable growth in the global tourism industry from 2009 to 2014. The volume of travel has grown exponentially too. International tourist arrivals increased from 25.3 million in 1950 to 1138 million in 2014, an astounding 45-fold increase. In recent years, the World Tourism Organization has estimated growth in travel at approximately 6% per year, and anticipates

[1] PhD. Program Coordinator of Hospitality Management, Associate Professor of Hospitality Management Tennessee, State University College of Business, Department of Business Administration, Suite J-405, Nashville, Tennessee 37203. Tel: 615-963-7143. Fax: 615-963-7139. Email: dmbaker@tnstate.edu

similar growths in upcoming decades as seen in the tourism highlight United Nation World Tourism Organization (UNWTO) 2014 report. The demand in the international markets (5.4%) expanded at a slightly faster rate than domestic travel (4.9%).Strongest overall growth (domestic and international combined) was recorded by carriers in the Middle East (11.4%) followed by Asia-Pacific (7.1%), Latin America (6.3%) and Africa (5.2%). The slowest growth was in the developed markets of North America (2.3%) and Europe (3.8%). These areas of rapid growth include many developing countries in tropical/subtropical regions, places characterized by greater species richness, (Guernier et al. 2004). Other attributes of these areas, including poor infrastructure, lack of clean water and sanitation, and poor vector control, may increase the risk that travelers will be exposed to local infections. The shift of international tourist arrivals to less-developed regions predicts increased exposure for tourists to diseases endemic in those regions.

An expansion in the overall global tourism market has contributed significantly to the spread of infectious diseases.Like trade, international travel is vast, rapid, on the rise, and a significant risk factor for infectious disease emergence.Human travelers can easily carry person-to-person transmitted infections to any part of the world as has been seen recently with the Ebola virus. In looking ahead, it is unclear to what extent the current dramatic changes in the global economy will affect numbers of travelers or favored destinations. Political instability and disease outbreaks can also influence travel destinations, sometimes abruptly.Travelers play a critical role in the movement of microbes globally. In an increasingly interconnected world with a growing, increasingly urban population in low-latitude areas, new risks exist and disease-causing microbes and resistance genes can move even more rapidly than in past decades. In some instances,disease can be prevented by vaccination, but there are someinfectious diseases,including some of the most important and most dangerous, for which no vaccinesexist, e.g. the Ebola virus.General precautions can greatly reduce the risk of exposure to infectious agentsand should always be taken for visits to any destination where there is a significantrisk of exposure. These precautions should be taken regardless of whether anyvaccinations or medication have been administered.

Global travel has evolved dramatically during the past two centuries, with ever escalatingspeed, distance, and volume. Because the geographic distribution of diseases isdynamic and influenced by ecologic, genetic, and human factors, travel allowshumans to interact with microbes and introduce pathogens into new locations andpopulations. The increased numbers of travelers and their spatial mobility havereduced geographic barriers for microbes and heightened the potential for the spreadof infectious diseases that can negatively affect the tourism industry. Between 1950 and 2013, world population grew from 2.5 to more than 6.9 billion.Thepopulation growth favored centers of commerce, usually urban or suburban areas,which brought more humans into close contact with larger groups of people. Concurrently,progress in transportation led to speedier movement of humans and goods as well asmicrobial organisms which cause the rapid spread of diseases.

2. Methodology

An extensive literature review was conducted using published reports from the World Tourism Organization, World Health Organization, World Bank, U.S Center for Disease Control & Prevention and Internet sources. This investigation was conducted utilizing the secondary data analysis research method. The research method consistsof how the researcher collects, analyzes, and interprets the data in the study(Creswell, 2009). Secondary analysis is a systematic method with proceduralandevaluative steps similar to the primary research method. Secondary data analysis offers methodological benefits and can contribute to tourism research through generating new knowledge. The overall goal of this method is the same as that of others, tocontribute to scientific knowledge through offering an alternate perspective; itonly differs in its reliance on existing data. Tourism researchers should takeadvantage of the high quality data that are available and consider the potentialvalue in gaining knowledge and giving insight into a broad range of tourism issuesthrough utilizing the secondary data analysis research method.

3. Literature Review

3.1 Risk Theory

Risk is a many-layered concept, one that has yet to have a single, widely accepted definition (Clarke and Short Jr, 1993; Fischhoff, et al, 2004; Tierney, 1999). Risk can take myriad forms and is influenced by facts, perceptions, experience, social groups, culture, and personal judgments (Boholm, 1998; Cole and Withey, 1981; Rogers, 1997; Sjoberg, 2000). In addition, sensational occurrences can dramatically affect risk perception, as evidenced by the 2001 September 11th terrorist attacks that led to an increased awareness in the tourism academic and non-academic literature (Kegley, 2003) of terrorism. Tourism is an integral part of the global economy; it generates spending internationally and creates jobs (Allen et al, 2002; Dwyer, 2002; Tarlow, 2005). Socially, tourism provides a venue exposing travelers to new cultures and ideas, thereby promoting a more global community (Goeldner& Ritchie, 2003; Tarlow, 2002). In addition, visitors are highly mobile and may change their choice of destination if they perceive an increase in risk at a destination. Tourism studies have consistently found five critical tourism risk factors: (1) War and politicalinstability (Gartner & Shen, 1992; Ioannides &Apostolopoulos, 1999; Mansfeld, 1996; Seddighi et al., 2000); (2) Health concerns (Miller & Ritchie, 2003; McKercher& Chon, 2004; Cooper, 2005); (3) Crime (Brunt, Mawby&Hambly, 2000; Dimanche&Leptic, 1999; Pizam, 1999); (4) Terrorism (Sönmez, 1998; Aziz, 1995; Sönmez&Graefe, 1998a, 1998b; Sönmez, Apostolopoulos&Tarlow, 1999); and (5) Natural disaster (Faulkner, 2001; Amstrong& Ritchie, 2007; Faulkner &Vikolov, 2001; Mazzocchi&Montini, 2001; Chandler, 2004; Higgins, 2005).

Given the economic importance of the tourism industry, the effects of a crisis can potentially be devastating and can have long-term impacts on a destination and the nation's economy (Blake & Sinclair, 2003; Faulkner, 2001; Heath, 1998; Santana, 2004). Research on risk perceptions and

travel intentions has been found to exhibit an inverse relationship, in that when perceptions of risk are high, intentions to travel are lower. Many studies have examined mediating variables between risk perceptions and intentions to travel. These variables include past travel experience (Lepp& Gibson, 2008); nationality/culture (Reisinger&Mavondo, 2005); psychographics (Priest, 1990; Roehl &Fesenmaier, 1992); and knowledge seeking (Hennig-Thurau& Walsh, 2004). A recent study by Reisinger and Mavondo (2005) found that travel safety was positively associated with intentions to travel and travel safety was negatively associated with travel anxiety. Travel anxiety was impacted mostly by personality, but motivation also played a role inpeople's level of anxiety (Reisinger&Mavondo, 2005). Scholars have found that risk perceptions significantly influence the intention to travel. Sönmez and Graefe (1998b) found that perceptions of risk are pivotal to the travel-related decision-making process. For instance, when potential travelers perceive a destination as risky, these travelers may modify their intentions to travel to that destination.

Risk perceptions associated with international travel may vary depending on the geographic region (Sönmez&Graefe, 1996). Furthermore, risk perceptions seem to have a great effect on avoidance of geographic regions and destinations (Sönmez&Graefe, 1998b). Thus, if the potential tourist perceives that the risk of encountering the Ebola virus at a destination is high, then the individual may seek other destinations for their vacation. Therefore, riskier destinations may be omitted from the destination choice set(Crompton, 1992; Sönmez&Graefe 1998a, 1998b). When traveling internationally, tourists often experience a great degree of anxiety (Korstanje,2011). Risk perceptions, whether real or perceived, can potentially become the dominant factors in travel related decisions, particularly in the international context (Sönmez&Graefe, 1998a; Sönmez, 1998). The influence of risk perceptions related to international travel has been found to be related to several factors: (1) type of risk, (2) culture/nationality, (3) proximity to origin, and (4) international media coverage.

3.2Implication of Travel Pattern on Disease Outbreaks

Travel pattern influences disease outbreaks. Frequent travelers accelerateinternational spread if they are infected early and the outbreak does not otherwiseexpand rapidly, (Hollingsworth, 2007). The travel routes, aviation network, number of flights departingfrom and arriving at airport, number of passengers carried, and size of aircraft areimportant considerations inestimating the spread of modern epidemics (Hufnagel et al., 2004). For sometypes of infections, simulations illustrate that travel restrictions, particularly isolationof largest cities, will be a necessary component in epidemic control strategies, (Hufnagel et al., 2004).The present pattern of air travel could expedite the spread of an influenza pandemiccompared with past pandemics. In 1968 to 1969, 160 million persons traveled internationallyon commercial flights, (Rvachev&Longini, 1985), this number increased to 2.9 billion in 2012 (International Civil Aviation Organization, 2012). The Hong Kong influenza strain of 1968 to 1969spread globally through the network of cities by air travel: first to northern latitudes,then southern latitudes.(Rvachev&Longini,

1985).Modeling of the epidemic with air transportation data in2000 for 52 cities showed that influenza would spread concurrently to cities in bothhemispheres, resulting in minimal seasonal swing and little time for public health intervention, (Grais et al., 2003). Disease would reach nearby cities first, but also distant cities with high airtravel volumes; a pandemic initiating in Hong Kong can now spread speedily to northernhemisphere cities 111 days earlier than in 1968, (Grais et al., 2003). Understanding the local ecologyand linkages through travel can provide projection of disease spread.

3.3Interactions of Travelers, Microbes, and Locations

Travelers have dynamic interactions with microbes and places. Travelers can carrythese microbes and their genetic material, and can play many roles with respect tomicrobes. Travelers can be victims, sentinels, couriers, processors, and transmittersof microbial pathogens, (Wilson, 2003). Conversely, arrival of travelers can affect host populationsthrough contact with diverse groups of people and microbes throughout their trip and sharing environments sequentially. Travel should be considered a loop and notjust an origin and destination, (Wilson, 2003). Travel can be associated with behavior that leads to transmission of pathogensthrough blood and body fluid exposure. Travelers may engage in sexual activities, pursue extreme sports, and hike in the mountains or jungle or other injury-prone activities that they would not risk athome. A survey assessing possible exposures to hepatitis B among more than 9000European travelers found that most had potential risk (60.8%–75.8%), including holidayromance (12.5% of all travelers), with 6.6%– 11.2% at high risk (Zuckerman & Steffen, 2000). A Canadianstudy found that 15% of travelers had potential exposure to blood and body fluidsthrough vehicles such as new sexual partner (9%); sharing instruments, such as razoror toothbrush (5%); receiving injection for medical treatment (3.2%); having acupunctureor other percutaneous nontraditional treatment (1%); tattooing or body piercing(0.5%); and abrasive injury (0.5%), (Correia et al. 2001).Other investigators found that 5.6% of tourists departing from Cuzco engaged insexual activity with a new partner during their stay, (Cabada, 2003). Although most reported havingsex with other travelers (54.3%), some had sex with local partners (40.7%) or commercialsex workers (2.15%), (Cabada, 2003). Sexually transmitted infections (including hepatitis B, HIV,and HTLV-1) acquired during travel can further spread during the journey and after travelers returnhome.

4. Specific Infectious Diseases Involving Potential Health Risks for Travelers

4.1 Severe Acute Respiratory Syndrome (SARS)

The outbreak of SARS in 2003 exemplifies the impact of spatial mobility and thedynamic role of travelers. In 2002, a previously unrecognized coronavirus caused anoutbreak of respiratory infections in the Guangdong Province of China. The virusapparently jumped species from civet cats to humans, although subsequent researchsuggests that the reservoir host is the fruit bat, (Li et al., 2005). The outbreak became visible to theworld community when an infected physician

from Guangdong, who stayed for a dayin Hotel Metropole in Hong Kong, was the source of infection for multiple hotel guests,who then disseminated the virus inmany other countries upon their return home. By May2002,more than8000 SARS infections had been reported by the World Health Organization, (WHO, 2002). By July 2002, 29 countries and territories acrossfive continents reported outbreaks and attributed 774 fatalities to SARS (WHO, 2002). Transmissionof SARS on aircraft occurred at rates of 0% to 18.3%, and occurred as far asseven rows from the source passenger, (Olsen et al., 2003).

One particular SARS case showed the potential for rapid international dispersion ofa pathogen that is spread from person to person, (Breugelmans et al., 2004). A businessman flew from HongKong to Frankfurt, Germany, on March 30, 2003. He traveled on seven flights throughoutEurope during a 5-day period, including stops in Barcelona, London, Munich, andHong Kong. He was hospitalized in Hong Kong on April 8 for suspected SARS, subsequentlyconfirmed on April 10, (Breugelmans et al., 2004). Responding to SARS outbreak, the Center for Disease Control (CDC) issuedadvisories to avoid travel to the SARS-affected countries, thus negatively affecting tourism. Most countries in Asiainstituted strict quarantine measures and restricted travel to reduce cross-borderspread and as inter-country spread. The CDC temporarily suspended internationaladoption from China because of concern for dissemination.SARS and the associated travel advisories led to significant decline in international tourist arrivalsin 2003; the World Tourism Organization (WTO) reported that arrivals to some affectedcountries in Asia plummeted to less than 50% of their usual levels, (WTO, 2004). Although theregion rebounded quickly, SARS was responsible for a 9% overall loss in travel volumefor Asia in 2003 and had substantial economic impact, (WTO, 2004).

4.2 Chikungunya

Chikungunya virus, an alpha virus first isolated in Africa in 1952, is a mosquito-transmittedvirus that was recently carried by travelers to geographically disparate regionson different continents. Recent outbreaks of chikungunya virus infection originated inKenya in 2004, and major outbreaks followed in the Indian Ocean Island countries like Reunion,Mauritius, Comoros, Seychelles and Madagascar in 2005 to 2006 (Charrel et al., 2007). Outbreaks ensuedin India and Indonesia, and the virus was carried by travelers to Europe, (Panning et al., 2007; Beltrame et al., 2007; Parola et al., 2006; Simon et al., 2007; Hochedez et al., 2006); theUnited States, (Lanciotte et al., 2007; CDC, 2007); Australia, (Bruce et al., 2007) and Hong Kong, (Lee et al., 2006). A viremic traveler from India visitingthe Ravenna province of Italy became the index case of an outbreak that infected 205local residents, which was transmitted through local Aedesalbopictus, a mosquitospecies introduced into Italy by ship in 1990, (Rezza et al., 2007). The overall results are the same, negatively affecting travel and tourism.

4.3 Dengue

Dengue virus, a flavivirus, is endemic in Southeast Asia, South Asia, the Pacific, Caribbean,and Central and South America, and its history illustrates the intricate interactionsof travel, movement of goods, and translocation of infectious disease, (Gubler, 2002). Mostcases of dengue virus infection diagnosed in the United States have been importedin travelers, although limited local transmission in Texas has also occurred recently.Less well-known is the fact that a competent vector, Aalbopictus, or Asian tiger mosquito,was introduced into the United States in 1980s by ships that carried used tires.Since then, the mosquito has established itself in many states, and could potentiateautochthonous dengue outbreaks.In 2001 Hawaii experienced dengue outbreaks, the likely source being viremic travelersreturning from French Polynesia. Dengue had been present in Hawaii until the1940s (after World War II), when autochthonous transmission ceased. However, Aalbopictusbecame established in Hawaii, and in 2001was the primary vector in a localoutbreak involving more than 100 cases, (Effler at el., 2005).

4.4 Influenza: Seasonal and Pandemic

Influenza remains an ongoing global challenge, given the large pool of influenza virusesin avian and other species and the capacity of the virus to recombine, re-assort,and mutate. Spread through aerosol or direct contact, the aircraft provides an idealenclosed space for transmission of the influenza virus. In one well-characterized outbreak,a passenger who had influenza on an airplane with a nonfunctioning ventilation systemfor 3 hours probably transmitted the infection to 72% of 54 passengers onboard, (Moser et al., 1979). Movementof troops during World War I contributed to the spread of influenza in 1918 to 1919. Nowadays the expandedrange and speed of travel can rapidly disseminate a pandemic strain ofinfluenza.Influenza has caused multiple outbreaks on cruise ships. A large outbreak of influenzacases during the summer of 1998 in Alaska and the YukonTerritory-Canada affected primarily tourists and workers in the tourism industry, (Uyeki et al., 2003).Outbreaks also occurred on two cruise ships, affecting passengers between NewYork, Montreal, Tahiti and Hawaii, (CDC, 97-98).

A major outbreak on a cruise ship can affectthousands of individuals and passengers can carry infection from one destination to the next. In a study of Swiss travelers that included a questionnaire and paired serologic testingbefore and after travel (N =1450), 2.8% of travelers tested positive for influenzaand 1.2% had more than a fourfold increase in antibody titers. Investigators estimatedthe incidence for influenza-associated events to be 1.0 per 100 person-monthsabroad, (Mutsch et al., 2005).These results indicate that influenza has become the most common vaccine-preventable disease in Swiss travelers to the tropics, and highlight the risk forspread through travel.An analysis of the CDC’s influenza and pneumonia mortality data from 1996 to 2005found that international air travel influences the timing of influenza introduction, andthat domestic airline travel volume in November correlates with the rate of spread inthe United States, (Brownstein et al., 2006). A study of the hemagglutinin of 13,000 human influenza A(H3N2) viruses during 2002 through 2007 indicated that most new strains emerge inEast and Southeast Asia, (Russell et al., 2008).The new strains circulate continuously in this

region andcause epidemics, leading to epidemics in temperate regions. The new strains initiallyspread to Oceania, North America, and Europe, later reaching South America, (Russell et al., 2008). It is widely accepted that thenew influenza strains most likely reach other parts of the world through travelers.

4.5 Animal and Vector Movement and Travel

Human and livestock populationscontinue to grow rapidly, increasing the number of hosts potentially susceptible tonovel infections. Mass transportation of people, products, livestock, and vectors ofdisease brings each of these closer to one another, and more quickly (Kimball et al.

2005;Wilson 2003). Over half of all human infections are zoonotic (nonhuman animal) in origin

(Cleaveland et al. 2001; Woolhouse and Gaunt 2007), and the majority of allemerging pathogens in humans are zoonotic in origin (Jones et al. 2008; Tayloret al. 2001). Population, ecological, and behavioral changes that increase contactwith wildlife exacerbate emergence of these pathogens (Daszak et al. 2000). Human encroachment into previously undisturbed areas increases remote area accessibilityand introduces more vectors and reservoirs of infection to new hosts. Encroachment,extensification of agricultural land, and urban sprawl all alter population densitiesand distributions of wildlife, which change disease dynamics (Patz et al. 2004).Bush-meat is an important source of protein and income for millions of people, andthe illegal bush-meat trade has been facilitated by the use of modern weapons andcommunication, logging operations that provide access to forests and transportationof products, lack of economic alternatives, and minimal capacity to enforce laws(Karesh and Noble 2009). Bush-meat hunting, preparation, and consumption are linked with several pandemicsand epidemics, most notably human immunodeficiency virus (HIV), Ebola,and severe acute respiratory syndrome (SARS). Travelers have been affected by these and have helped with the spread to countries internationally.

4.6 Ebola Virus

In contrast to HIV, the Ebola virus is an RNA filovirus that has wiped out several nonhuman primate populations over the past 20 years (Bermejo et al. 2006; Leroy et al. 2004; Walsh et al. 2003). The virus appears to be restricted to the rainforests of central and western Africa and Southeast Asia (Monath 1999; Peterson et al. 2004). Marburg, a related virus, appears to be restricted to dry, open areas of central and eastern Africa, and the distributions of Ebola and Marburg likely reflect natural host distribution (ibid.). Nearly all cases of Ebola in humans can be traced back to the handling or consumption of infected wildlife carcasses, particularly that of apes (Leroy et al. 2004; Pourrut et al. 2005). Although not definitively known at this time, several fruit bat species are suspected to be the natural reservoir host for Ebola (subtype Zaire) and possibly other subtypes (Biek et al. 2006; Leroy et al. 2005). An outbreak of Ebola virus disease in West Africa, with onset in early February 2014, has evolved in Guinea, Liberia,

Nigeria and Sierra Leone. This is the first such outbreak in the area. The first cases were reported from the forested region of south-eastern Guinea. As of 7 April 2014, the Ministry of Health in Guinea reported 151 clinically compatible cases of Ebola, 54 of which were laboratory-confirmed. Ninety-five of these patients died, and the death toll is expected to go much higher in the months to come. Liberia has reported 21 cases clinically compatible with Ebola, including 10 deaths. In Mali, the Ministry of Health has reported six suspected cases as of 7 April 2014, two of which have tested negative for Ebola virus infection. Samples from the four remaining suspected cases have been sent to CDC and the Institute Pasteur in Dakar for testing. According to the UN and WHO, the first reported case in the Ebola outbreak that has ravaged west Africa dates back to December 2013, in Guéckédou, a forested area of Guinea near the border with Liberia and Sierra Leone and travelers took it across the border. By the end of June 759 people had been infected and 467 people had died from the disease, making this the worst ever Ebola outbreak. As of July 5th 2015, 27,609 cases and 11,261 deaths had been reported worldwide, the vast majority of them in these same three countries; Guinea 2499 deaths, Sierra Leone 3940 deaths and Liberia 4807 deaths. Travelers carried the Ebola virus to North America but less than 5 persons have died.

For tourists, visitors or residents in affected areas, the risk of infection is considered very low if some elementary precautions are followed, e.g. avoiding contact with symptomatic patients and/or their bodily fluids or with corpses and/or bodily fluids from deceased patients. In addition, generic precautions for travelling in West African countries also apply for preventing infection with Ebola virus, e.g. avoiding close contacts with alive or dead wild animals and consumption of ‘bushmeat’, washing and peeling fruits and vegetables before consumption, and following hand-washing routines. Those who are providing medical care in the outbreak area are advised to wear protective clothing, including masks, gloves, gowns, and eye protection and practice proper infection prevention and control measures. The risk related to seeking medical care in affected countries depends on the implementation of precautionary measures in those settings. The outbreak of the Ebola virus in West Africa is hitting many African economies where they hurt most: the tourism industry, as jittery travelers reconsider trips to places as far away as Kenya and South Africa. Fear of the virus is having some effects on would-be tourists to the continent and underlines the exaggerated risks some associate with travel to Africa, Paris (2015). Travelers are putting trips on hold to countries unaffected by Ebola, such as South Africa and Kenya. Africa’s tourism industry is feeling the effects of concerns about Ebola, the virus generates so much fear in people that it's almost impossible to reassure them with logic that the virus is not affecting the entire continent of Africa. Yet, in the mind of many visitors, all of Africa is a single country. Fear of the virus is rattling would-be tourists to the continent and is underlining the risks some associate with travel to Africa. The Ebola epidemic will continue to cripple the economies of Guinea, Liberia, and Sierra Leone even as transmission rates in the three countries show significant signs of slowing, according to a World Bank Group analysis on the economic impact of Ebola in Africa. The Bank Group estimates that these three countries will lose at least US$1.6 billion in forgone economic growth in 2015 as a result of the epidemic.

5. Conclusion

The impact of air travel on the spread of infectious diseases has led to considerable concern but limited study ((Mangili&Gendreau, 2005; Leder& Newman, 2005). More than 1 billion people travel by air each year. There are several important ways in which air travel can influence the global spread of emerging and established infectious disease. Infections may be spread on the aircraft through close contact and large droplets (Mangili&Gendreau, 2005); airborne spread through small-particle aerosols, as in the case of severe acute respiratory syndrome (SARS) (Olsen et al., 2003); or even through contaminated food, (Eberhart-Phillips et al., 1996; Widdowson et al.,2005). Aircraft can transport infected disease vectors, such as rats or malaria-infected mosquitoes, as nonpaying passengers. Perhaps the greatest concern for global health, however, is the ability of a person with a contagious illness to travel to virtually any part of the world within 24 hours as has been seen with the Ebola virus. The importance of air travel for the spread of seasonal influenza was recently demonstrated by empirical data showing that the spread of influenza was delayed by the decrease in air travel after the attacks of 11 September 2001, (Brownstein et al., 2006). With the current heightened awareness of Ebola, it is timely to reconsider the strategies to prevent more casualties.

Travelers should be considered an integral part of the global surveillance network for emerging infections. Research and the knowledge gained can be used to alert the globalcommunity to the presence or susceptibility patterns of pathogens in different regions;inform strategies that can be used to control infections in developing countries; andprepare travelers to those areas and guide the care of those returning. One major lesson from the Ebola outbreakwas for the world to respond much more quickly than before to epidemics.The containment and preparedness efforts dramatically limited the potential impact of Ebola on the African economy, compared to earlier worst-case scenarios. This demonstrates why all countries, developing and developed, should make investing in pandemic preparedness a top priority. It points to the need for a global pandemic emergency financing facility that will enable the world to respond much more quickly and effectively to any future deadly outbreaks, and avoid the tragic and unnecessary human and economic costs that have resulted from the Ebola epidemic.

References

Allen, J., O'Toole, W., McDonnell, I., & Harris, R. (2002).Festival and special event management, 2nd edition. Australia: John Wiley & Sons Australia, Ltd.

Armstrong, E.K., & Ritchie, B.W. (2007). The heart recovery marketing campaign: Destination recovery after a major bushfire in Australia's national capital. *Journal of Travel & TourismMarketing*, 23(2/3/4), 175-190.

Aziz, H. (1995). Understanding attacks on tourists in Egypt. *Tourism Management*, 16, 91-95.

Beltrame, A., Angheben, A., &Bisoffi, Z. (2007). Imported chikungunya infection, Italy. *Emerging Infectious Diseases*, 13(8):1264–6.

Bermejo, M., Rodr´ıguez-Teijeiro, J. D., Illera, G., Barroso, A., Vil`a, C., & Walsh, P. D. (2006). Ebola outbreak killed 5000 gorillas. Science, 314, 1564.

Biek, R.,Walsh, P. R., Leroy, E.M., & Real, L. A. (2006). Recent common ancestry of Ebola Zaire virus found in a bat reservoir.PLoS Pathogens, 2(10), e90. doi:10.1371/journal.ppat.0020090.

Blake, A., & Sinclair, T. (2003). Tourism crisis management: US response to September 11. *Annals of Tourism Research*, 30(4), 813-832.

Boholm, A. (1998). Comparative studies of risk perception: a review of twenty years of research. *Journal of Risk Research*, 1(2), 135-163.

Breugelmans, J.G., Zucs, P., &Porten, K. (2004). SARS transmission and commercial aircraft. *Journal of the American Medical Association*, 10(8):1502–3.

Brownstein, J.S., Wolfe, C.J., &Mandl, K.D. (2006) Empirical evidence for the effect of airline travel oninter-regional influenza spread in the United States. PLoS Med 2006;3:3401.

Bruce, J.D., Johnson, D.F., & Tran, T. (2007).Chikungunya virus infection in traveler to Australia. Emerging Infectious Disease, 13(3):509–10.

Brunt, P., Mawby, R., &Hambly, Z. (2000). Tourist victimization and the fear of crime on holiday. *Tourism Management*, 21, 417-424.

Cole, G.A.,&Withey, S.B. (1981). Perspectives on risk perceptions.*Risk Analysis* 1(2), 143-163.

Cabada, M.M., Montoya, M., &Echevarria, J.I.(2003). Sexual behavior in travelers visiting Cuzco. *Journal of Travel Medicine*, 10(4):214–8. Center of Disease Control & Prevention, CDC

Chandler, J.A. (2004). An analysis of the economic impacts of Hurricanes Dennis, Floyd, and Irene on North Carolina's lodging industry. *Journal of Hospitality & Tourism Research*, 28(3), 313-326.

Charrel, R.N., de Lamballerie, X., &Raoult, D.(2007). Chikungunya outbreaks–the globalization ofvectorborne diseases. *New England Journal ofMedicine*, 356:769–71.

Clarke, L., & Short Jr., &James F. (1993). Social organization and risk: some controversies. *Annual Review of Sociology*, 19, 375-399.

Cleaveland, S., Laurenson, M. K., & Taylor, L. H. (2001). Diseases of humans and their domestic mammals: Pathogen characteristics, host range and the risk of emergence. Philosophical Transactions of the Royal Society of London Series B, 356, 991–999.

Correia, JD, Shafer RT, Patel V. (2001). Blood and body fluid exposure as a healthrisk for international travel. *Journal of Travel Medicine*, 8:263–6.

Cooper, M. (2005). Japanese tourism and the SARS epidemic of 2003.*Journal of Travel & Tourism Marketing*, 19(2/3), 117-131.

Creswell, J. W. (2009). Research design: Qualitative, quantitative, and mixedmethods approaches (3rd ed.). Thousand Oaks, CA: Sage.

Crompton, J.L. (1992). Structure of vacation destination choice sets.*Annals of Tourism Research*, 19, 420-434.

Daszak, P., Cunningham, A. A., & Hyatt, A. D. (2000). Emerging infectious diseases of wildlife – Threats to biodiversity and human health. Science, 287, 443–449.

Dimanche, F., &Leptic, A. (1999). New Orleans tourism and crime: A case study. *Journal of Travel Research*, 38, 19-23.

Dwyer, L. (2002). Economic contribution of convention tourism: Conceptual and empirical issues. In Karin Weber and Kye-Sung Chon (eds), Convention tourism. International research and industry perspectives (pp. 21-35). New York: Haworth Hospitality Press

Eberhart-Phillips J., Besser R.E., &Tormey M.P. (1996). An outbreak of cholera from food served on an international aircraft. Epidemiology & Infection, 116:9-13.

Effler, P.V., Pang, L., Kitsutani, P.(2005). Dengue fever, Hawaii, 2001–2002. *Emerging Infectious Diseases*, 11(5):742–9.

Faulkner, B. (2001). Towards a framework for tourism disaster management.*Tourism Management*,22(2):135-147.

Faulkner, B., &Vikulov, S. (2001). Katherine, washed out one, back on track the next: A post mortem of a tourism disaster. *Tourism Management*, 22(4):331-344.

Fischhoff, B.,Wandi, B. P., &Downs, W.J. (2004). "Travel Risks in a Time of Terror: Judgments and Choices", in Risk Analysis, Vol 24, No. 5.1301-1309.

Gartner, W.C., & Shen, J. (1992).The impact of Tiananmen Square on China's tourism image. *Journal of Travel Research*, 30, 47-52.

Goeldner, C.R., Ritchie, J., &Brent, R. (2003). Tourism, principles, practices, philosophies, 9th edition. New Jersey: John Wiley & Sons.

Grais, R.F., Ellis, J.H., &Glass, G.E. (2003). Assessing the impact of airline travel on the geographicspread of pandemic influenza. European Journal of Epidemiology, 18:1065–72.

Guernier, V., Hockberg M.E, &Guegan, J.E. (2004). Ecology drives the worldwide distribution of human diseases. PLoSBiol 2004;2(6):740–6.

Gubler, D.J. (2002). Epidemic dengue/dengue hemorrhagic fever as a public health,social and economic problem in the 21st century. *Trends in Microbiology* 2002;10(2):100–2.

Heath, R. (1998). Crisis management for managers and executives. London: Pitman Publishing.

Hennig-Thurau, T., & Walsh, G. (2004). Electronic word-of-mouth: motives for and consequences of reading consumer articulations on the Internet. *International Journal of Electronic Commerce*, 8(2), 51-74.

Higgins, B.A. (2005). The storm of summer: lessons learned in the aftermath of the hurricanes of '04. *Cornell Hotel and Restaurant Administration Quarterly*, 46(1), 40-46.

Hochedez, P., Jaureguiberry, S., &Debruyne, M. (2006).Chikungunya infection in travelers. *Emerging Infectious Disease*, 12:1565–7.

Hollingsworth, T.D., Ferguson, N.M., &Anderson, R.M. (2007). Frequent travelers and rate of spread of epidemics. *Emerging Infectious Disease*, 13(9):1288–94.

Hufnagel, L., Brockmann, D., &Geisel, T. (2004).Forecast and control of epidemics in a globalizedworld. Proceedings: National Academy of Sciences USA 2004;101(42):15124–9.

International Civil Aviation Organization (ICAO), (2012).

Ioannides, D., &Apostolopoulos, Y. (1999). Political instability, war and tourism in Cyprus: Effects, management and prospects for recovery.*Journal of Travel Research*, 38, 51-56.

Jones, K. E., Patel, N. G., Levy, M. A., Storeygard, A., Balk, D., &Gittleman, J. L. (2008). Global trends in emerging infectious diseases. Nature, 451, 990–994.

Karesh, W. B., & Noble, E. (2009). The bushmeat trade: Increased opportunities for transmission of zoonotic disease. *The Mount Sinai Journal of Medicine*, 76, 429–434.

Kegley, Charles W. (ed). (2003). The new global terrorism. Characteristics, causes, controls. New Jersey: Prentice Hall.

Kimball, A.M., Arima, Y., & Hodges, J. R. (2005). Trade related infections: Farther, faster, quieter. *Globalization and Health*, 1, 3.

Korstanje, M.E. (2011). The fear of traveling: a new perspective for tourism and hospitality. *Anatolia– An International Journal of Tourism and Hospitality Research*, 22(2), 222-233.

Lanciotti, R.S., Kosoy, O.L., &Laven, J.J. (2007).Chikungunya virus in US travelers returning from India, 2006. *Emerging Infectious Disease*, 13(5):764–7.

Leder, K., &Newman, D. (2005). Respiratory infections during air travel. *Internal Medicine Journal*, 35:50-5.

Lee, N., Wong, C.K., Lam, W.Y. (2006). Chikungunya fever, Hong Kong.*Emerging Infectious Diseases*, 12(11):1790–2.

Leroy, E.M., Rouquet, P., Formenty, P., Souqui`ere, S., Kilbourne, A., &Froment, J.M.(2004). Multiple ebola virus transmission events and rapid decline of central African wildlife. *Science*,303, 387–390.

Leroy, E. M., Kumulungui, B., Pourrut, X., Rouquet, P., Hassanin, A., &Yaba, P. (2005). Fruit bats as reservoirs of Ebola virus. *Nature*, 438, 575–576.

Lepp, A., & Gibson, H. (2008). Sensation seeking and tourism: Tourist role, perception of risk and destination choice. *Tourism Management*, 29(4), 740-750.

Li, W., Shi, Z., &Yu, M. (2005). Bats are natural reservoirs of SARS-like coronaviruses. *Science* 2005;310:676–9.

Mangili.A., &Gendreau, M.A. (2005). Transmission of infectious diseases during commercial air travel. Lancet 2005;365:989-96.

Mansfeld, Y. (1996). Wars, tourism and the “Middle East” factor. In A. Pizam& Y. Mansfeld (Eds.), Tourism, crime and international security issues (pp. 265-278). New York: Wiley.

Mazzocchi, M., &Montini, A. (2001).Earthquake effects on tourism in central Italy.*Annals of Tourism Research*, 28, 1031-1046.

McKercher, B., & Chon, K. (2004). The over-reaction to SARS and the collapse of Asian tourism. *Annals of Tourism Research*, 31(3), 716-719.

Miller, G.A., & Ritchie, B.W. (2003).A farming crisis or a tourism disaster? An analysis of the foot and Mouth disease in the UK. *Current Issues in Tourism*, 6(2), 150-171.

Mutsch, M., Tavernini, M., Marx, A., Gregory, V., Lin, Y.P., &Hay, A.J. (2005). Influenza virus infection in travelers to tropical and subtropical countries. *Clinical Infectious Disease.*;40:1282–7 10.1086/429243

Monath, T. P. (1999). Ecology ofMarburg and Ebola viruses: Speculations and directions for future research. *Journal of Infectious Diseases*, 179, S127–S138.

Moser, M.R., Bender, T.R., &Margolis, H.S. (1979). An outbreak of influenza aboard a commercial airliner. *American Journal of Epidemiology*,110:1–6. Olsen, S.J., Chang, H.L., &Cheung, T.Y. (2003). Transmission of the severe acute respiratory syndrome on aircraft. *New England Journal of Medicine*, 349:2416–22.

Panning, M., Grywna, K., & Van Esbroeck, M.(2007).Chikungunya fever in travelers returning to Europe from the Indian Ocean region, 2006. *Emerging Infectious Diseases* 14(3):416–22.

Paris, N. (2015). Ebola fears Hurting African Tourism. Telegraph: Travel 17 February

Parola, P., de Lamballerie, X., &Jourdan, J. (2006).Novel chikungunya virus variant in travelers returning from Indian Ocean Islands. *EmergingInfectiousDiseases*, 12:1493–9.

Patz, J. A., Daszak, P., Tabor, G. M., Aguirre, A. A., Pearl, M., &Epstein, J. (2004). Unhealthy landscapes: Policy recommendations on land use change and infectiousdiseaseemergence. *EnvironmentalHealth Perspectives*, 112, 1092–1098.

Peterson, A. T., Carroll, D. S.,Mills, J. N.,& Johnson, K. M. (2004). Potentialmammalian filovirusreservoirs. *EmergingInfectiousDiseases*, 10, 2073–2081.

Pizam, A. (1999). A comprehensiveapproach to classifyingacts of crime and violence at tourism destinations. *Journal of TravelResearch*, 38, 5-12.

Pourrut, X., Kumulungui, B.,Wittmann, T.,Moussavou, G., D´elicat, A., &Yaba, P.(2005). The naturalhistory of Ebola virus in Africa. *Microbes and Infection*, 7, 1005–1014.

Priest, S. (1990). The adventureexperienceparadigm. In J. Miles & S. Priest (Eds.), Adventure Education (pp. 157–162). State College, PA: Venture Publishing.

Reisinger, Y., &Mavondo, F. (2005). Travelanxiety and intentions to travelinternationally: Implications of travelrisk perception. *Journal of TravelResearch*, 43(3), 212-225.

Rezza, G., Nicolleti, L., &Angelleti, R. (2007). Infection withchikungunya virus in Italy: anoutbreak in a temperateregion. Lancet, 370:1840–6.

Roehl, W.S., &Fesenmaier, D.R. (1992). Risk perceptions and pleasuretravel: An exploratory analysis. *Journal of TravelResearch*, 2, 17-26.

Rogers, G.O. (1997). The dynamics of risk perception: how doesperceivedriskrespondto risk events? *RiskAnalysis*, 17(6), 745-757.

Russell, C.A., Jones, T.C., &Barr, I.G. (2008). The global circulation of influenza A (H3N2) viruses.*Science*, 320(5874):340–6.

Rvachev, L., &Longini, I. (1985). A mathematical model for the global spread of influenza. Math Biosci 1985;75:3–22.

Santana, G. (2004). Crisis management and tourism: Beyond the rhetoric. *Journal of Travel& Tourism Marketing*, 15(4), 299-321.

Seddighi, H.R., Nuttall, M.W., &Theocharous, A.L. (2000). Does cultural background of tourists influence the destination choice? An empiricalstudywithspecialreference to politicalinstability. *Tourism Management*, 22(2), 181–191.

Simon, F., Parola, P., &Grandalam, M. (2007).Chikungunya infection: an emerging rheumatismamongtravellersreturnedfromIndianOceanIslands. A report of47 patients. Medicine;86(3):123–37.

Sjoberg, L. (2000). Factors in risk perception. *RiskAnalysis*, 20(1), 1-11.

Sönmez , S. (1998). Tourism, terrorism, and politicalinstability. *Annals of TourismResearch*, 25, 416-456.

Sönmez, S., Apostolopoulos, Y., &Tarlow, P. (1999) Tourism in crisis: Managing the effects of terrorism. *Journal of TravelResearch*, 38, 13-18.

Sönmez, S.F., &Graefe, A.R. (1996). Risk perceptions of US international vacation travelers. Proceedings of the 27th AnnualTravel and TourismResearch Association (pp. 97-108). LasVegas, NV.

Sönmez, S. &Graefe, A.R. (1998a). Influence of terrorismrisk on foreigntourismdecisions. *Annals of TourismResearch*, 25, 112-144.

Sönmez, S. &Graefe, A.R. (1998b). Determining future travelbehaviorfrompasttravel experience and perceptions of risk and safety. *Journal of TravelResearch*, 37, 171-177.

Tarlow, P. (2002). Tourism in the twenty-first century. Futurist, Sept 2002, 36(5), 48-51.

Tarlow, P. (2005). Terrorism and tourism.e-Review of Tourism Research (eRTR), 3(5), 18-21. Retrieved from http://ertr.tamu.edu/appliedresearch.cfm

Taylor, L. H., Latham, S. M., &Woolhouse, M. E. (2001). Risk factors for human disease emergence. Philosophical Transactions of the Royal Society of London, Series B, 356, 983–989.

Tierney, K. J. (1999). Toward a critical sociology of risk.*Sociological Forum*, 14(2), 215-242.

Uyeki, T.M., Zane, S.B., &Bodnar, U.R. (2003). Large summertime influenza A outbreak among tourists in Alaska and the Yukon territory. *Clinical Infectious Diseases*, 36(9): 1095–102.

United Nations World Tourism Organization – (UNWTO), (2014).

Walsh, P.D., Abernethy, K.A., Bermejo, M., Beyers, R., De Wachter, P., Ella Akou, M.(2003).Catastrophic ape decline in western equatorial Africa.*Nature*, 422, 611–614.

Widdowson, M.A., Glass, R., &Monroe, S.(2005). Probable transmission of norovirus on an airplane. *Journal of the American Medical Association*, 293:1859-60.

Wilson, M.E. (2003). The traveller and emerging infections: sentinel, courier, transmitter. Journal of Applied Microbiology, 94:1S–11S.

Woolhouse, M., & Gaunt, E. (2007). Ecological origins of novel human pathogens.*Critical Reviews in Microbiology, 33*, 1–12.

World Bank, (2014). World Bank Group economic analysis report 2014

World Tourism Organization, (2004). Tourism highlights, edition 2004. Available at: http:// www.unwto.org. Accessed October 27, 2005.

World Tourism Organization, (2014).Tourism indicators. Available at: http://www. world-tourism.org/facts/menu.html. Accessed June 8, 2015.

World Health Organization, (2003). Summary of probable SARS cases with onset of illness from 1 November 2002 to 31 July 2003. Available at: http://www.who.int/ csr/sars/country/table2004_04_21/en/. Accessed March 1, 2006.

Zuckerman, J.N., &Steffen, R. (2000). Risks of hepatitis B in travelers as compared to immunizationstatus. Journal of Travel Medicine, 7:170–4.