Tourist Injury

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Abstract Injury is a leading cause of death for tourists and a common complication of travel. Advice for travellers predominantly focuses on infectious diseases. Injury is contextually specific (e.g., environment, age, gender), and consequently, prevention strategies to reduce injury should also be context-specific. There are few recent global studies on tourist injuries; indeed, it is impossible to measure tourist injuries on a global scale (and even at a country-specific level), due to various challenges. Some visitor safety information is accessible to tourists, but a broad, multi-modal approach encompassing novel approaches is required to reach those most at risk. This chapter describes the risk factors and prevention strategies for the most common injuries sustained by tourists. This includes the common mechanisms such as motor vehicle crashes, drowning, envenoming, injury from alcohol use, burns, falls, and violence.

Keywords Injuries · Tourists · Prevention · Safety · Risk-factors · COVID-19

Introduction

Travel broadens the mind through introducing us to new cultures and experiences. Some experiences can take us out of our comfort zone and inspire us to do things we would not normally do in our home environment. However, with travel comes risk. Exposure to different food and food standards, traffic conditions, aquatic environments, and extreme adventure activities can lead to injury. While people who travel are often concerned about risk of infectious diseases (such as food poisoning, malaria, dengue fever, tuberculosis, typhoid, hepatitis, etc.), it is injury that is the most likely cause of preventable travel-related death (Franklin & Leggat, 2015). The magnitude of injury deaths varies substantially by country, however, globally

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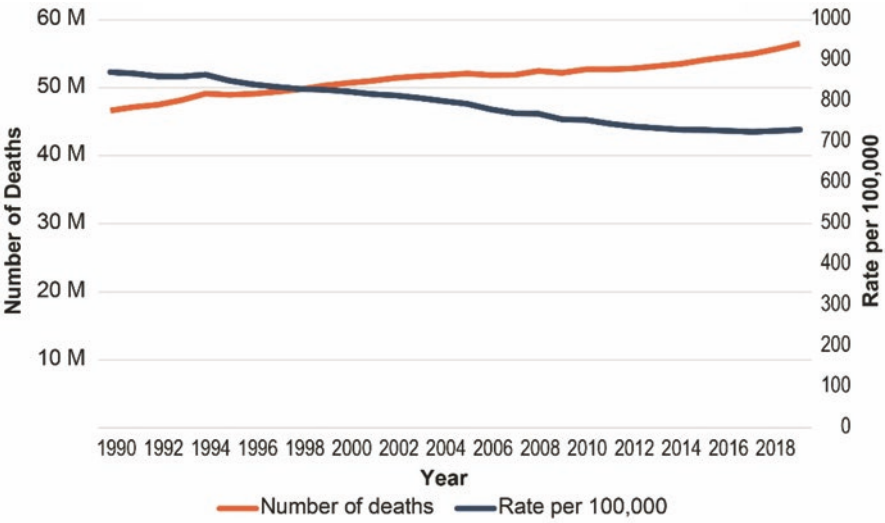

Fig. 1 Trend over time for global injury incidence rate and number 1990–2019. (Source: Data from Institute for Health Metrics and Evaluation (IHME), 2021)

injury deaths have increased over the last two decades (from 4.3 million in 1990 to 4.5 million in 2017) (James et al., 2020a). When population size is taken into account, injury mortality has decreased during this period—rates have decreased from 1079 per 100,000 persons per year to 738 per 100,000 persons per year. Conversely, morbidity due to injury has increased; incidence of injury has increased from 354 million in 1990 to 520.8 million in 2017 (per 100,000 persons per year) (James et al., 2020a). These data provide context for the global burden of disease due to injury, but do not distinguish travellers who become injured (Fig. 1).

What Is an Injury?

Injury occurs when there is an exchange of energy (mechanical, chemical, thermal, electrical, radiant, and includes lack of essential agents such as oxygen or heat) that impacts a person beyond their tolerance, and results in physical damage (Gibson, 1961; Haddon, 1963). More recently, this definition has been expanded to include psychological trauma, although the focus of this chapter is physical injury. Injuries are usually categorised as intentional (where the injury is the result of intentional use of physical force or power by self or others) or unintentional. This is a fundamental distinction in injury prevention, because the process of preventing intentional versus unintentional injuries requires vastly different strategies.

Injuries are most frequently described by the mechanism through which damage is sustained (e.g., motor vehicle crashes, falls, drowning, burns, poisoning/chemical

exposure/envenomation, etc.), and can also be described according to the type of damage sustained to the body (e.g., fracture, head injury, superficial injury), and the severity incurred during the injury (fatal versus non-fatal; major versus minor). While this chapter will have a major focus on death from injuries in tourists, there are many other possible outcomes following an injury, including permanent or temporary disability (ranging from minor to severe), minor damage to the body and no injury. For those who sustain a permanent disability, this may include varying degrees of spinal/brain damage/other organ damage, the loss of limbs, eyesight, hearing and cognition.

Common Causes of Injury in Travellers

Common causes of morbidity and mortality for tourists include road traffic crashes and water-related incidents (such as drowning), often with alcohol and drugs contributing (Wilks & Coory, 2002). Tourists of course experience injuries due to other mechanisms (commonly these are falls, burns, cuts, violence, envenomation, poisoning).

Road

Driving, riding, and walking are great ways to explore novel places; however, they are not without risk. Road-related fatalities and injuries are common across the globe with 1.35 million deaths annually and a further 20–50 million suffering non-fatal injuries on the world's roads (WHO, 2020).

Road-related deaths as a traveller are unfortunately all too common with people being injured while driving or as passengers in cars, riding motorbikes or bicycles, walking and less commonly as passengers in other vehicles (bus/train/tram) (Wilks, 1999; Wilks et al., 1999). While many tourists are concerned about road-based crimes, such as car jackings (Spencer, 2013), it is the more common road-related incidents that the traveller needs to be aware of to ensure the safety of all who travel (including infants who require a child-specific restraint).

There are a range of common reasons that travellers are involved in road-related incidents, including: lack of familiarity with the location; different road rules and infrastructure compared to home (e.g., driving on different sides of the road, see Fig. 2); different (and often, lack of) safety standards including poor quality vehicles; the mix and volume of traffic (from pedestrians to rickshaws to cars and heavy vehicles), lack of enforcement of road rules; alcohol and drugs; inexperience with vehicles (e.g., hire cars), especially motorcycles, mopeds, and scooters; poor visibility, lighting, road conditions; and distraction from devices, passengers in the vehicle, and travel (new sights/sounds) (Franklin & Leggat, 2015; Page & Meyer, 1996; Stewart et al., 2016; Wilks, 1999).

Fig. 2 Driving in unfamiliar conditions is a challenge for tourists. (Source: Photo by Thandy Yung on Unsplash, used with permission)

Water

Travel to aquatic locations is common, as there are a plethora of activities near, on and in the water for tourists to enjoy. Travel also occurs on the water in a range of vessels. For those travelling on the water common risks include drowning, slips, trips and falls, violence, cold water exposure, and trauma (Peden et al., 2016). Drowning is by far the most common cause of death around water and occurs across all age groups and swimming abilities; however, by far those at greatest risk are young children, non-swimmers and those who are intoxicated (Cornall et al., 2005; Franklin et al., 2020; Peden et al., 2020a; Reijnen et al., 2018).

Strategies to ensure the safety of people in on or around water are appropriate for all, not just tourists (Barnsley & Peden, 2018). However, there is a need for different strategies to ensure the safety of tourists. This need for differing strategies is due to a wide range of reasons; common reasons include language (this impacts on capacity to interpret safety warnings), previous experience with water including swimming skills, a relaxed attitude to safety due to being on holidays, drinking alcohol/consuming other substances, and lack of supervision (Peden et al., 2016; Peden & Franklin, 2020).

Alcohol and Drugs

Travelling involves meeting new people, and for many, meeting new people can involve the consumption of alcohol and/or illicit drugs in a social setting. Alcohol/drugs can increase the risk of injury through the resulting cognitive and psychomotor effects (Eckardt et al., 1998), including perception, judgement, balance, vision, co-ordination, speech, attention span, reaction time, vigilance, tracking, responding to visual/auditory stimuli, and mood (Jaaskelainen et al., 1995; Perrine, 1974). Importantly, the impairment induced by alcohol/drugs exists for some time after the substance is metabolised and excreted (Anderson & Dawson, 1999; Farnham et al., 2017; Hughes et al., 2011). Not all injuries involve alcohol and not all destinations may have the same risks of alcohol/drug involved injury when visiting.

Alcohol is considered a contributing factor in fatal and non-fatal injury events, however the true magnitude of alcohol-related injury is not well-understood on a global scale. Many studies do not even report if alcohol was involved in an injury (McInnes et al., 2002), and often researchers do not have access to toxicology reports (Flaherty & Caumes, 2018; Ho et al., 2009; Peden et al., 2016). Certainly, there is no standard requirement for routinely collected data sets to record alcohol involvement in any injuries. Despite these limitations, alcohol is a known contributor to injuries in tourists, and has been identified as of particular concern in motor vehicle crashes (Hughes et al., 2011; McInnes et al., 2002), and drowning (Peden et al., 2016).

Why Is Injury and Tourism Important?

Before COVID-19, the ease of travelling to different countries and immersing ourselves into diverse cultures made the world feel a little smaller. Travelling inspires people to experience new things different from their normal life, which usually involve unfamiliar activities in unfamiliar environments (Wilks & Coory, 2002). Before COVID-19, visitors were venturing increasingly away from the well-known tourist locations and visiting untouched areas that even local residents were unfamiliar with. With new adventures and experiences come risks depending on the activity, destination and behavioural choices. Tourism for some countries has an important economic factor, therefore eliminating the tourism industry is not a feasible (or desirable) option to prevent travel risk. Yet tourists do experience injury while travelling, and this can impact negatively on the tourism industry.

Increase in Risk-Taking When Travelling

Before COVID-19, the world was travelling much more. The travelling experience extends to actively choosing to participate in activities in which inherent risks exist, and for many, these activities are unfamiliar. These include water sports (diving, swimming, snorkelling, boating, water-skiing, jet-skiing, etc.), off-road driving, hiking, extreme sports, ecotours, drinking, or visiting beaches. The need to experience new things outside our comfort zone is becoming more of a lifestyle while travelling, with social media leading the way in influencing how and where people "should" travel (International Consultants for Education and Fairs [ICEF], 2020). Driving on the opposite side of the road and swimming in unfamiliar waters are the most common activities that result in injury or death. Drinking excessively and illicit drug use are also contributing factors and are known to occur in young travellers (Farnham et al., 2017; McInnes et al., 2002; Nield, 2011; Reid, 2017; Sanford, 2004). Key factors involved in risk-taking behaviour, specifically in transportation crashes, included the length of travel and previous travel experience. Travelling longer may construct a more complacent attitude, with recent literature showing 90% of a travel study cohort to have ignored specific health advice (Farnham et al., 2017).

Considerations for Travel Post-COVID-19

Travelling post-COVID-19 will place more emphasis on the prevention of disease transmission than injury prevention. COVID-19 transmission prevention has become common, with populations enforcing the need to wash hands, to not stay too close to others and to wear masks when in highly populated public areas. However, COVID-19 has also increased the desire to travel, especially in populations that have experienced lockdown. Border closures increase the demand for travel, not only for economic reasons but also for the ability to get away from being in isolation. An overall increase in travel will re-introduce the risks in travelling to countries and unfamiliar locations.

Aim

So far, the definition of injury and common causes of injuries in tourists, have been briefly summarised. The remainder of this chapter explores the common injury risks and strategies to ensure the safety of travellers, at both an individual and a system level.

Review of Literature and Theoretical Frameworks

There is a large volume of research exploring injuries to tourists. Topics range from all mechanisms to focusing on specific mechanisms such as road-related (Bellos et al., 2020; Wang et al., 2016; Wilks, 1999; Wilks et al., 1999) or drowning (Clifford et al., 2018; Gomez et al., 2018; Moran & Ferner, 2017; Peden et al., 2016; Reijnen et al., 2018) to injuries due to unique situations such as taking a "selfie" (Jain & Mavani, 2017). Tables 1, 2, 3, 4, 5 and 6 set out a selection of published research on injuries experienced by tourists, including for overall injury (Table 1), and then by mechanism of injury (Tables 2, 3, 4, 5 and 6). A systematic method was used to search literature from MedLine. Manuscripts taking a global perspective on tourist injuries, published from 2010 to 2020, were included. Papers on injuries to tourists specific to one country or mechanism of injury were also included but due to the volume of work only papers from 2016 to 2020 were included.

Overall, most studies were descriptive in nature (case-series or descriptive epidemiological), and focused on injury rather than specific mechanisms of injury. Data sources included national or regional incident registries followed by death registries. There were some studies on falls, animal-related injuries, violence, substance use and selfies, indicating potential areas that will require further investigation. Falls were also identified as a common injury in tourists. Differences in travel behaviour have been identified recently, such that there has been a trend to visit more "non-touristic" areas; with travellers venturing to more isolated or remote places in order to see and experience picturesque environments. These places include secret waterfalls, unexplored caves, isolated water bodies, or unfamiliar hiking trails not really known to the public. Falls commonly occur in such locations, especially when venturing too close to cliffs or on top of a waterfall, either to get the perfect view or to take the perfect picture for social media (Flaherty & Caumes, 2018; Flaherty & Choi, 2016; Jain & Mavani, 2017).

Much of the existing literature on injuries overall is based in Europe, however these studies have identified that tourists residing in Europe travel overseas and experience injuries in sub-tropical to tropical countries. In addition, those from Europe were identified as experiencing high rates of death from injury overseas, potentially identifying a specific visitor group of interest when looking at visitor injuries outside the European Union (EU) (Leggat & Wilks, 2009). Regardless of travel location, road traffic crashes and drowning were the main mechanisms of injury identified within the studies on tourists injury overall. Risk factors across all mechanisms of injury were being male, aged 20–35 years, and alcohol was cited as a contributing factor, but not investigated thoroughly. Other risk factors for injury included travel experience, days spent travelling, driving on the opposite side of the road, previous swimming experience and partaking in risky behaviours, such as alcohol and drug consumption.

Table 1 A summary of global papers on overall injuries in tourists, 2010–2020

Overall injuries						
Author(s)/ reference	Country	Years covered	Data source	Study design	Sample	Risk factors/ findings
Reid (2017)	Global	2013–2015	Media	Case-series	3121 tourist fatalities	Swimming and boating were the leading causes of mortality (n = 1035, 33.2%)
Behrens and Carroll (2012)	Global	Up to 2011	WTO, WHO and professional literature	Review		Injuries account for a high proportion of deaths—road injuries are the major cause. High-risk groups included older travellers and immigrants visiting friends and family. Causes of mortality and morbidity when travelling included road crashes, high-risk and sporting activities.
Mansanguan et al. (2016)	Thailand	2015	Questionnaire/ survey	Cross-sectional	420 backpackers enrolled in study	Unintentional injuries comprised 7.1% of health problems in tourists. Most travellers were European. Risk factors for injury included, age, gender, nationality, purpose of travel and pre-health travel advice.

(continued)

Table 1 (continued)

Overall injuries						
Author(s)/ reference	Country	Years covered	Data source	Study design	Sample	Risk factors/ findings
Oldenburg et al. (2016)	Germany	1998–2008	Death data	Case-series	135 German shipboard deaths	Average crude death rate was 1.8 per 100,000 German passengers. Three injury deaths were recorded (3.5%)—2 drowning cases and 1 fall
Farnham et al. (2017)	Switzerland (travelling to Thailand)	2015	Questionnaire/ survey	Cross-sectional	101 travellers were recruited; 75 completed the study	22.7% (n = 17) experienced an injury. Of these, 40.0% (n = 30) incurred a wound/ cut and 14.7% (n = 11) a bite from an animal. Risk factors/ predictive factors: days spent travelling, age, previous travel experience, and reporting a sports injury. 53.3% reported becoming intoxicated due to alcohol, 5.3% taking marijuana, and 2.7% using other substances.
Kim et al. (2019)	South Korea	2013–2017	Hospital data	Case-series	33 patients were repatriated during the study period	Most common mechanism of trauma in order: pedestrian incidents, motor vehicle crashes, falls; water sports-related; and drowning.

(continued)

Table 1 (continued)

Overall injuries						
Author(s)/ reference	Country	Years covered	Data source	Study design	Sample	Risk factors/ findings
Heggie (2018)	Lake Powell, Arizona, US	1959–2005	Death data	Case-series	351 incidents resulting in 386 deaths during the study period	282 of the 386 deaths were unintentional injuries (73%) and, 18 were intentional (13 self-harm and 5 were homicides). Out of all unintentional injury deaths, boating (29%) and swimming (22%) were the most common pre-death activities.
Gstaettner (2020)	Australia	2011–2017	Incident register Western Australia	Case-series	459 visitor incidents were recorded	77 ± 11 incidents per year. Most incidents (58%, $n = 264$) involved visitors from WA, 16% ($n = 75$) were international visitors, and 11% ($n = 50$) visited from out of state. Minor incidents accounted for 48%, 43% were major, and 8% were fatal. Trip/ slip incidents were most frequent. Fatalities were mostly falls from a height or water-related incidents.

Table 2 A summary of papers on transport-related injuries in tourists, 2016–2020

Road traffic crashes		
Author(s)/ reference	Bellos et al. (2020)	Wang et al. (2016)
Country	Greece	US
Years covered	2011–2015	2006–2012
Data source	Incident register	Incident register
Study design	Case-series	Case-series
Sample	Total of 39,720 crashes from police reports	1092 crash drivers
Risk factors/ findings	Risk factors include: nationality, season, purpose of travelling, and region. Tourism as the purpose of road travelling was found to be high in road crashes compared to other purposes of travelling.	Risk factors include: older tourists, not using safety restraints; environmental factors (dim light conditions, road surface and unfamiliarity with route)

Travel-Related Injury

There are a range of risks when travelling, some more obvious than others, which is why pre-travel information and travel advice is essential in preventing injuries while travelling to new places (see *Part I Health: Pre- and Post-Travel Medical Consultations*). The following sections explore the different travel-related injury risks, and prevention strategies that are current or require further exploration. Common travel-related risks include road risks, drowning, envenoming, burns, alcohol and selfies.

Epidemiology

The epidemiological features of tourist injuries are dependent on travel location and duration, visitor demographics, travel activities, alcohol or drug consumption, and overall risk awareness.

Exposure

Exposure is an important consideration for injury prevention strategies as it aids in determining those who are more at risk, or who are more likely to partake in risky activities. For example, not everyone who travels may go to the beach or go swimming, therefore risk exposure for drowning is not high in these people. Risk exposure varies by location, activities, and purpose of travel. Education about risk

Table 3 A summary of papers on drowning in tourists, 2016–2020

Drowning						
Author(s)/ reference	Country	Years covered	Data source	Study design	Sample	Risk factors/findings
Peden et al. (2016)	Australia	2002–2012	Death data	Descriptive epidemiology	2870 drowning deaths reported	123 international tourists drowned over the 10-year period. Average yearly rate of drowning was 0.22 per 100,000. Most common drowning locations were: beaches (39.0%); ocean/harbours (22.0%); inland waterways (17.1%). Risk factors were being male (78.9%), aged 25–34 years (22.8%), and being European (45.5%).
Reijnen et al. (2018)	Amsterdam, Netherlands	2011–2015	Incident register	Descriptive epidemiology	88 fatal drownings and 515 non-fatal drownings	67% of drowning events involved tourists. Risk factors were: being male (82%); alcohol (up to 55%). 19 drowning events were suicide.
Clifford et al. (2018)	Australia	2017	Questionnaire/ survey	Cross-sectional	254 international students participated in a survey on water safety	Nearly all students received no beach safety information before visiting Australia (92%). 85% did not know the Australian beach safety flag system and only 24% were able to identify or describe dangerous rip currents.
Gomez et al. (2018)	Spain	2013–2018	Incident register	Case-series	3758 drowning incidents involving 4736 people (819 cases extracted)	581 (59.23%) fatal drowning events, of which 448 (45.67%) were men. Water conditions (rip current, dumping waves,) were identified as the cause in 20.61%, fall or dive in 16.04%.

Table 4 A summary of papers on envenomation in tourists, 2016–2020

Envenomation						
Author(s)/ reference	Country	Years covered	Data source	Study design	Sample	Risk factors/findings
Suan et al. (2016)	Malaysia	2012–2014	Hospital data	Case-series	759 patients presented with jellyfish stings during 3-year period	Average age: 26.7 years, 59.4% were males, 68.1% were tourists. No deaths were reported.
Henn et al. (2016)	France	2008–2013	Incident register—tropical disease unit	Case-series	3315 travellers	43 potential marine envenomation (37 confirmed) Median age: 42 years (range: 25–68). Main travel destinations were South-East Asia followed by islands of East-Africa. Most cases were caused by corals (n = 11) followed by stonefish (n = 10) and jellyfish (n = 8).
Mghili et al. (2020)	Morocco	2018	Hospital data	Case-series	1321 patients presented with *Pelagia noctiluca* stings	61% were Moroccan tourists, 29% were local, and 9% were foreign tourists. The majority were aged 11–20 years; most were males.

perceptions and potential exposures is therefore important in preventing injury and should be provided to travellers and incorporated when making travel plans.

Risk

There are a range of risks identified in the literature that may increase injury in tourists. A summary is provided below by area.

Table 5 A summary of papers on selfie-related injuries in tourists, 2016–2020

Selfies						
Author(s)/ reference	Country	Years covered	Data source	Study design	Sample	Risk factors/findings
Jain and Mavani (2017)	Global	2014–2016	Review		75 people died while attempting to photograph themselves in 52 incidents	Average age 23.3 years, range 14–66. 82% were males. Largest age group was 0–25 years. Falling was the most common cause followed by drowning.
Bansal et al. (2018)	Global	2011–2017	Media	Case-series	259 deaths while clicking selfies in 137 incidents	Average age was 22.94 years. 72.5% occurred in males. The highest number were reported in India, followed by Russia, the US, and Pakistan. Top mechanisms of injury resulting in death were drowning, transport, and falls. The largest number of deaths were in the 20–29 year age group.
Flaherty and Choi (2016)	Global	2015	PubMed and Scopus databases	Review		Lack of situational awareness and distraction exposes the traveller to hazards. Mechanisms of injury include falls, attacks from wild animals, electrocution, and road traffic incidents.

Road

Studies identified in the literature relating to road injuries in tourists are summarised in Table 2. Travelling to different countries may require visitors to drive on the other side of the road, compared to their home country. Driving on the other side of the road was consistently identified as a risk factor in motor vehicle crashes (Franklin & Leggat, 2015; Page & Meyer, 1996; Stewart et al., 2016). Road rules also differ by country, signs may be in different languages, subjecting visitors to try and navigate themselves to their unfamiliar destination without guidance. Speed differences may also add risk—the speed limits on highways and other roads differ markedly between countries, which can result in tourists driving faster or slower than the rest of the traffic. Renting vehicles (different models, sizes) and different types of vehicles (such as scooters, mopeds, or quad bikes), also has risks. Safety issues include inexperience in driving/riding, inattention, and lack of protective clothing/footwear and/or equipment (seatbelts/helmets) (Blackman & Haworth, 2013; Wilks,

Table 6 A summary of papers on child injuries in tourists, 2016–2020

Drowning						
Author(s)/ reference	Country	Years covered	Data source	Study design	Sample	Risk factors/findings
Han et al. (2010)	Global	2008	Questionnaire/ survey	Cross-sectional	Of 1704 respondents, 131 had travelled recently, the majority were between 14–18 years of age (n = 75, 57%) and female (n = 78, 59%)	16.7% sought out pre-travel medical care, and 20% experienced an illness or injury during travel, 83% of which were travelling with their parents. Most common injury experienced was motorised vehicle crash.
Pye (2011)	Global	Up to 2010	Review		Recommendations	Road travel: Second leading cause among young people (5–14 years) in the world—car seats for under the age of 4, seatbelts and insurance. Drowning: Second leading cause of death in child travellers. Attributed to playing in water and falling into water—with boys higher than girls.
Nield (2011)	Global	1991–2011			Recommendations and health advice	Injury prevention, including for adolescents: avoid driving on unfamiliar roads, avoid drinking and partaking in illicit drug use, and to partake in water sports, hiking, biking, and other activities with others.

1999). This includes lack of or inappropriate child seats and restraints. Scooters or mopeds may be the main form of transportation in some countries, encouraging visitors to drive these unfamiliar vehicles on unfamiliar roads (Blackman & Haworth, 2013; Wilks, 1999). Environmental factors such as inadequate roadways, spending more time in vehicles to get around from location to location, also contribute to motor vehicle crashes in tourists (Wilks, 1999; Wilks et al., 1999). Other risk factors include:

- Road design
- Poor maintenance of roads
- Different road rules (and tourists not following them)
- Lack of safety equipment on roads (e.g., guardrails)
- Alcohol use
- Lack of seatbelts or seatbelt use
- Dangerous weather conditions
- Lack of emergency care

Drowning

Drowning is a common cause of death in travellers, due to their unfamiliarity with the host country's water conditions, swimming and drinking alcohol, and swimming ability and inexperience (Leggat & Wilks, 2009; Peden et al., 2016). Recent studies have shown oceans/beaches followed by inland waterways were the most common drowning locations, with the majority of victims being male (Peden et al., 2016; Reijnen et al., 2018). Knowledge of beach and water safety were key factors in studies, indicating the lack of knowledge by visitors on certain water-safety factors before visiting destination countries, such as Australia (Clifford et al., 2018; Wilks, 2019). Risk of drowning in travellers can occur in all ages. Travelling to countries where water-related activities or sports are popular, or wanting to swim in pristine lakes, rivers or tropical oases can be dangerous if visitors are not aware of their surroundings, water conditions or swimming in monitored areas (see also *Part IV Contexts: Safety in Coastal and Marine Tourism*). Travellers may know how to swim, but may overestimate their ability in waters they have never swum in before.

Envenomation

The risk of being envenomated for anyone is low, with 1.06 (0.7–1.32) deaths per 100,000 for males and 1.0 (0.5–1.35) deaths per 100,000 for females in 2019 globally (Institute for Health Metrics and Evaluation (IHME), 2021). Despite the overall low global risk, many international visitors are concerned about this as a potential risk, depending on travel destination (see Fig. 3). The misconceptions about being

Fig. 3 Lifesaver with jellyfish. (Image courtesy of Surf Life Saving Australia, used with permission)

bitten or stung when travelling to high-risk envenoming countries can mislead visitors on what they should be concerned about. However, there are risks when visiting locations with venomous creatures and not all travellers are familiar with these risks, nor are they familiar with the seasonality of some venomous creatures, particularly marine organisms (Harrison et al., 2004). Such lack of awareness and knowledge on the subject before and during travel identifies an area in which educational prevention strategies should be implemented. Risks of marine and onshore envenoming should be explicitly communicated to tourists visiting these areas (Mohd et al., 2016). The global burden of envenoming in tourists is difficult if not impossible to quantify.

Campfires and Burns Risk to Children

Burns have received little focus in studies of tourist injuries. Some studies have focused on children, and the risk of burns around campfires and post-campfires (i.e., while the ground is still hot). Burn-related injuries are often significant, requiring multiple surgeries to repair. Burns in Australia are known to increase during school holiday months for both adults and children.

Selfies

The act of taking a selfie has become common when visiting exotic locations and is encouraged via social media to influence others and promote travel locations. However, through the desire for the perfect photograph comes risk and reduced awareness of one's immediate environment (Flaherty & Choi, 2016). Travellers partaking in adventurous activities are more likely to be vulnerable when taking selfies such as while climbing a waterfall, standing on or near a railway line, and on or around a moving vehicle. Alcohol also contributes to the dangers when taking a selfie under the influence, increasing a lack of awareness of their surrounds. Selfie-related deaths have occurred from falls, drowning, rail accidents, gunshot, electrocution, and contact with an animal (Bansal et al., 2018; Jain & Mavani, 2017). Most selfie-related deaths occur in those aged less than 25 years (Jain & Mavani, 2017).

Females have been found to take more selfies; however, risk-taking behaviour related to selfies is more common in males, resulting in a higher number of deaths (Jain & Mavani, 2017). One suggested reason for an increase in selfies over time is that people want to be recognised as leading an exciting life (Bansal et al., 2018; Jain & Mavani, 2017). Deaths from taking a selfie suggests a rising addiction in wanting to take the perfect photo to post on social media, making people go to the extreme by risking their lives to take such a photo (Jain & Mavani, 2017). Further research is needed to explore the role of selfies in tourist injuries to fully understand the potential risk of selfies when travelling (Flaherty & Choi, 2016).

Prevention

Prevention strategies have not changed significantly over time; but they have had to adjust and explore diverse ways in which to inform travellers on the types of injury risks. With new activities, such as taking selfies, comes the need to find new ways in which to warn and prevent visitors from injuring themselves. The following discusses prevention strategies (whether old or new) by mechanisms of injury and where safety strategies may need to expand outside the tourism industry and healthcare centres.

Road

Strategies for the prevention of road-related injuries include seatbelts and child safety seats, fatigue management, helmet use, not driving under the influence of alcohol or drugs, avoiding night driving, not speeding, reducing distraction, knowing the local road rules, avoiding crowded/overweight/top-heavy buses or minivans, using cross walks, checking before crossing the street, watching what locals do,

using official taxis especially if intoxicated and especially avoiding night trips on mountainous terrain particularly in the wet (Leggat & Klein, 2001).

When travelling to unfamiliar destinations, tourists should familiarise themselves with the local laws, make sure when renting a vehicle that there are seatbelts and airbags and be vigilant to local road hazards (Stewart et al., 2016). Signage may also differ therefore familiarising oneself with the local road signs, prior to driving, will help improve safety (Stewart et al., 2016). Prevention strategies such as pre-travel advice, and personal research on destination, should be encouraged prior to travel if not prior to leaving home country, and not just on arrival.

Drowning

Prevention strategies for the aquatic environment depend on setting and age; however there are some general principles that should be followed to prevent drowning. These include making sure you familiarise yourself with the local conditions before entering any body of water (i.e., check depth, temperature, water flow, submerged objects, etc.), understand your own ability, when was the last time you went for a swim and not just a play in the water, how far can you swim in a pool remembering that this is flat still clean water. Alcohol and water do not mix and if you are planning on drinking make sure that you do it after being in or around water. (Peden et al., 2017, 2018).

For children under the age of five supervision is essential, this means that you can see and hear the child, they are within arm's reach so you can respond quickly if something goes wrong, you are with them all the time they are in or near the water and you are prepared, this includes making sure you have all the equipment that you need (towels, sunscreen, water, etc.) ready and that if you do need to leave the location then you take the child with you (Peden & Franklin, 2020). You may be going to an area where there are many other parents and children but don't assume that they will be keeping an eye on your child. Lifeguards are not babysitters and have responsibility for all people across the aquatic location.

If staying somewhere close to water make sure that if the child is playing, they are not able to access the water location, i.e., there is a barrier between them and the water such as a locked door, or gate to a pool. As the child ages their supervision will change, for children 5–9 years you still need to be watching the child, however you can move away from where they are noting that this is not an opportunity to read a book or look at your phone. You also need to set rules so that it is clear when they can go into the water. For a child over 10, check on them on a regular basis, make sure they know what the rules are and play safely (Peden & Franklin, 2020; Peden et al., 2020b; Wallis et al., 2015).

There are a range of other groups and activities which need to be considered when we are thinking about safety, these include older people, people who have been drinking, those whose swimming and water safety skills are poor, and those with underlying medical conditions including disabilities (Franklin et al., 2017;

Mahony et al., 2017). The prevention strategies remain the same. With consideration for underlying medical conditions there is a need to visit your doctor before travelling and finding out what the impact of your condition might be on undertaking physical activity, this is especially important for people who are undertaking snorkelling or scuba diving (Franklin et al., 2017; Mahony et al., 2017; see also *Part IV Contexts: Safety in Coastal and Marine Tourism*).

When undertaking boating or on watercraft where wearing a life jacket is an effective safety strategy (Willcox-Pidgeon et al., 2019), these should be size and condition appropriate as there are different rated lifejackets based on conditions and activity. People often forget about the risk of travelling on boats as a mode of transport, however there are risks involved, make sure the vessel is not overloaded, there are lifejackets for all the travellers, it is in good working order and the weather conditions are appropriate for travel. Emergency Position Indicating Radio Beacons (EPIRBs) are also an essential device to carry as these will alert the authorities if there is a problem and let them know where you are located.

Envenomation

Prevention strategies target encouraging and implementing public awareness campaigns with variable effectiveness depending on the type of envenomation (i.e., snake or jellyfish) and are usually only available once in the country. Other prevention strategies include the use of stinger suits, to stick to the paths while bushwalking, staying in between the flags when swimming, and access to envenoming information. Previous management strategies, for example Australian jellyfish stinger prevention, included focusing on a four-factor model: Anticipation, Calculation, Preparation and Attention (Gershwin et al., 2010). These factors incorporate the understanding of what visitors anticipate when travelling in Australia and how strategies will implement safety procedures without completely taking away from the adventure experience. Calculations are to assess the burden and risk of being envenomed, whereas preparation includes Personal Protective Equipment (PPE), access to medical care and the accessibility of information. The final factor includes attention in which there is a risk when swimming in the ocean, such strategies include signage, lifeguard/lifesavers and overall communication of the risks (Gershwin et al., 2010).

Other envenoming creatures such as snakes are not as popular in the awareness campaign area in comparison to jellyfish. Although information is accessible to the local public of endemic regions, visitors may not be as aware especially when having to identify the lethal snakes from the harmless. Tourists in countries with high snake bites cases, particularly India, are not necessarily treated right away, or are treated by a non-health professional, resulting in death (Dandona et al., 2018). Antivenoms are normally in short supply or are not located or accessible when required. Although snake bites are rare, encountering one while camping or hiking is likely, depending on the country and region in which travellers choose to venture.

Envenoming is preventable and normally treatable through public education, accessible anti-venoms and training healthcare workers and health professionals (The Lancet, 2017). A greater emphasis on community education and tourist awareness should consider focusing on pre-travel information and safety awareness campaigns in the visiting country, such as being able to identify deadly snakes and the use of appropriate clothing and/or equipment when swimming or hiking.

Burns

Burns should be considered a risk from campfires or bonfires and also a potential risk in buildings or housing accommodation. Not all countries have building codes or have appropriate emergency services to address fires. This needs to be considered when choosing accommodation before or while travelling. Risk prevention strategies towards burns from building fires include: staying on lower levels of your accommodation to make escape easier, staying in accommodations with smoke detectors and fire alarms, familiarising yourself with exits once in your accommodation and being familiar with local emergency service numbers in case of an emergency (Stewart et al., 2016).

Other risks involving burns come from the increase in adventure tourism, particularly geo-tourism, which involves visiting natural sites such as volcanoes. These types of burns are rare, however visitor numbers to these natural events have shown to increase over time (You Lim & Flaherty, 2020). In this case, it is important to be familiar with tour company safety briefings, and importantly to go with a tour and not on your own. Protective clothing and equipment should be available for visitors who are visiting a volcano and should be a necessity to anyone who wishes to approach a volcano.

Burns from bonfires and campfires are common risks when travelling to beaches or camping and have been found to be a high risk for children (Choo et al., 2002; Okon et al., 2018). Consumption of alcohol is a significant contributor to campfire/bonfire burns and therefore should be avoided when around fires of any kind. Recent and previous prevention strategies have included public education campaigns, posters and discussions, public service announcements, and brochures. Children being a high-risk group are found to not really benefit from public service announcements or education campaigns, relying on adults to supervise children when around fires and to extinguish fires completely (Okon et al., 2018). Specifically, it was found that although fires may be extinguished using sand, they can still be hazardous for up to 8–12 hours. This is the same for fire pit casings (Fraga et al., 2010). Casings can remain very hot despite not seeing any flames, requiring adults to be aware of potential dangers for children. Depending on the country, campfires/bonfires may be banned during specific seasons in order to prevent forest fires. Knowledge of local laws and seasonal restrictions should be considered when staying in certain countries.

Poisoning

There are many forms of poisoning when travelling such as alcohol poisoning, illicit drug use and overdose, psychedelic drug use and other poisonings such as being "roofied" also known as "date rape drugs". Travelling for some can be about experiencing the night life in popular party areas, which can lead to the potential over consumption of alcohol and/or drug use. Prevention strategies over time have always encouraged people, especially women, to watch their drink, to be aware of their surroundings and to be accompanied by others they know.

Some people prefer to experiment with certain psychedelic or hallucinogenic drugs, to experience something completely different or something more meaningful. In some cases, visitors seek out experimentation with certain drugs, such as trying a hallucinogenic cactus called San Pedro in Peru or the Bedouin experience through consuming opium in the Sinai desert (Uriely & Belhassen, 2005). These experiences can have fatal consequences, especially when new to trying certain drugs. Prevention strategies must address risk-taking behaviour, as travel can be considered as an opportunity to partake in experimenting with drugs, and usually coincides with wanting to experience a high through fear, pleasure, and excitement (Uriely & Belhassen, 2006). Pre-travel health advice is useful but may not be enough, and education campaigns may have some benefit if they focus on risk perceptions and drug hazards/knowledge. The need for legal understanding and information on a country of interest should be accessible (see *Part V Government and Industry Activity: Government Travel Advisories*). Other forms of information on drug usage while travelling such as through websites, travel agencies, travel supply stores, and information centres designated to backpackers are some of the prevention methods available to travellers (Uriely & Belhassen, 2006). However, they are not available everywhere.

Children

Children are more vulnerable when it comes to injury, coupled with their curiosity and a desire to experience new things. Road traffic crashes were found to be the second leading cause of death globally for children from 5–14 years of age (Pye, 2011). Prevention strategies have included the use of car seats, provided at any car rental service, and the use of seat belts. Injury prevention strategies during air travel with a child under the age of two have focused on the importance of securing infants to the parents during travel and making sure the appropriate seat and seat belts are used during flight for older children (Pye, 2011). Some planes will allow for some car seats to be used to secure the child during flight. Fallen objects from the overhead bin and trauma to extremities by the service cart or aisle traffic are also factors in child injuries during air travel, emphasising the importance of monitoring children, especially when they are not in their seats.

Supervising children is seen as beneficial across all domains in child risk exposure. Drowning was found to be the second leading cause of deaths in paediatric travellers (Konop & Kamat, 2001), with children being more at risk when swimming or playing in water, and children that fall into water unintentionally (Pye, 2011). Supervision of children around bodies of water is crucial in preventing child drownings and is still found to be the most successful prevention measure. The use of appropriate flotation devices such as lifejackets, especially when on boats, is also a necessity in drowning prevention. Encouraging children at a young age to wear personal flotation devices can help instil better water-safety practices when they're older. Community-based knowledge and support can create the use of lifejackets and flotation devices, as being a social norm, promoting better safety strategies in the long run.

Burns from either sun exposure or campfires are common risks when travelling to beaches or camping and have been found to be high-risk for children, as stated before (Choo et al., 2002; Okon et al., 2018). Although community prevention strategies, incorporating public awareness campaigns are not successful in preventing burns in children, such public health interventions can encourage public awareness in adults, improving child supervision around fires and practising appropriate sun protection application.

Falls

We mention falls as this is often an area that people do not consider a risk, as it happens often with a wide range of outcomes from no injury to death (James et al., 2020b). Falls can occur anywhere and at any time, however there are some risk factors to consider, these include limited mobility or impaired gait, balance or sight, poor muscle strength, alcohol consumption, poor reaction time, underlying medical conditions, being older or younger, footwear and also the walking surface, being on medication especially multiple medications (Ambrose et al., 2013; Boehm et al., 2014).

Steps to prevent falls include: having a check-up and especially a review of the medications you are on prior to travel; exercise such as walking, tai chi or dancing which help improve balance, flexibility and core strength; having appropriate footwear for the task you are undertaking and ensuring that you have worn them prior to travel; take care in poorly lit environments and if required take a torch or head lamp with you to light the way; minimise your alcohol intake; hold onto the hand railings when using stairs; and supervise children.

Violence

While violence was not a focus of this chapter, as we were exploring unintentional injury it would be remiss not to mention injury due to violence, which is an ever-present risk when travelling (Pizam, 1999). There are three general categories of violence, these include self-harm, physical violence (of which sexual violence is a sub-group) and psychological or emotional violence including verbal abuse and financial abuse, noting that the World Health Organization (WHO) groups physical and psychological into interpersonal and adds a third group of collective violence, which is about social, political, and economic violence committed by larger groups (WHO, 2021).

Strategies for the prevention of violence include understanding your destination and avoiding areas of high crime or "seedier" areas, travelling in groups, not telling strangers your travel plans, not hitching rides, avoiding travelling at night as well as walking the streets alone at night, asking the hotel or place where you are staying about safe and unsafe venues to visit, using automated teller machines during the day, not wearing expensive clothes or accessories, try and avoid accommodation on the ground floor or near to exists and lifts, close and lock windows, use designated safe modes of transport (don't share taxis with strangers), have a fake wallet with a little money to give in case you are robbed, do not resist when being robbed, have the details for your accommodation and embassy, try and blend in with the locals, use credit cards with low limits and don't get into fights. (Leggat & Klein, 2001)

Selfies

Selfie behaviour resulting in mortality has increased the need to make individuals more aware of the risks when choosing to take photos in certain environments. Overall phone usage has also increased over time, indicating the need for better risk awareness campaigns. These types of messages may be required to be implemented outside of travel health clinics or through other travel resources (Flaherty & Choi, 2016; Leggat & Franklin, 2013). Recent literature has identified countries of high selfie deaths to have implemented, by government authority, "No Selfie Zones" and large signs to warn people what not to do when wanting to take a selfie (Bansal et al., 2018; Jain & Mavani, 2017). These signs included icons of bad selfie ideas and slogans such as "A cool selfie could cost you your life" and "A selfie with a weapon, kills" (Jain & Mavani, 2017). The "want" and "need" for people to receive positive comments, likes and followers on social media is becoming more a social necessity, particularly for those who are lonely, insecure, or isolated (Jain & Mavani, 2017). Prevention strategies may need to consider the mental health implications of taking selfies, and how to encourage better self-esteem in individuals (Jain & Mavani, 2017). Marketing strategies should also try to encourage being more in the moment rather than on the phone when travelling.

Conclusion

Travel has made the world smaller, with the increasing ease to visit different countries and experience different cultures. Although COVID-19 has slowed down travel, the reopening of international borders will re-introduce travel-related risk. Road-related injuries and drowning are still the most common mechanisms of injury for travellers. However with the advancement of technology and social media, new risks have emerged, such as selfie-related injuries. Travel misconceptions on what travellers should actually be concerned about when travelling is another factor that needs to be addressed according to destination. Child injury prevention strategies have mainly focused on supervision; however, adolescents experience injuries and partake in risky behaviour such as alcohol and drug use. Alcohol is known to be attributed to travel-related injuries; however its role is yet to be quantified in the majority of the literature. Future research should incorporate data linking in order to understand the true burden of alcohol-related injuries. There are ways to go about travelling safely while partaking in activities and experiencing new things when travelling, the importance is to be mindful and aware of certain risks and dangers, and to not ignore the signs when they're right in front of you.

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