

Review

## Getting a Hold of Skitching

Richard C. Franklin <sup>1,2,†,\*</sup> and Jemma C. King <sup>1,2,†</sup>

<sup>1</sup> College of Public Health, Medical and Veterinary Sciences, James Cook University, Townsville, Queensland 4811, Australia; E-Mail: jemma.king@jcu.edu.au

<sup>2</sup> World Safety Organization Collaborating Centre for Injury Prevention and Safety Promotion, James Cook University, Townsville, Queensland, 4811, Australia

<sup>†</sup> These authors contributed equally to this work.

\* Author to whom correspondence should be addressed; E-Mail: richard.franklin@jcu.edu.au; Tel.: +61-7-4781-5939; Fax: +61-7-4781-4040.

Academic Editor: Raphael Grzebieta

Received: 3 August 2015 / Accepted: 4 November 2015 / Published: 10 November 2015

---

**Abstract:** Skitching is the act of hitching a ride on a vehicle while riding/using a non-motorized wheeled device (e.g., skateboard or bicycle). To date there has been little discussion of skitching beyond media reports on the serious and often fatal ramification of this activity. To rectify this and improve our understanding of skitching including: who participates; circumstances and motivation; and possible injury prevention strategies, informed by the Haddon's Matrix, an integrative review was undertaken. To gain a comprehensive overview, the review encapsulated information from a variety of sources including peer reviewed literature, grey and popular internet sources including news and social media. There was an absence of literature from which strong conclusions could be made; however, some preliminary insights were obtained. A key participant group is young males, likely a function of their use of non-motorized wheeled devices, adolescent risk taking and the influence of peers, such that the behavior amongst this group is largely thought to be opportunistic. A number of prevention strategies are proposed including targeting young males and young drivers, provision of/retrofitting skate parks, educating young drivers and improving helmet use. There is also a need to incorporate coding into injury data collections to capture skitching.

**Keywords:** adolescents; recreation; Haddon's Matrix; risk; Motor Vehicle–Non Traffic

---

## 1. Introduction

“Skitching” describes the act of hitching a ride from a motorized vehicle whilst on a non-motorized recreational wheeled device (NMRWD) which includes skateboards, roller skates, inline skates or a bicycle. A variety of slang/colloquial terms are used internationally to describe the same or similar behavior such as “towing”, “bumper-hitching”, “bizzing” and “hopping cars” [1]. The impetus to learn more about this behavior resulted after reading a newspaper article which described skitching as an activity that goes in and out of fashion but which has the potential to, and for the case described, result in serious injuries and even death [2]. The reason that skitching has such negative consequences is due to the energy transfer from the motorized vehicle to the NMRWD, which is not engineered for typical use at such speeds thus influencing subsequent maneuverability and control, often resulting in a fall at speed [2–4]. The term skitcher is used in this article to refer to the person who is undertaking the activity of skitching.

Prior to undertaking this review it was noted there were media reports in Australia and internationally which outline the serious and often fatal injuries which stem from engagement particularly in relation to adolescent engagement [2,5]. To date there has been no coordination of these reports to garner skitching exposure rates, the characteristics of the individuals who engage, the circumstances which lead to engagement and those that result in serious injury or death from skitching. It is hypothesized that a key motivation for engaging in skitching is the thrill associated with risk taking. Risk taking is defined as “one’s purposive participation in some form of behavior that involves potential negative consequences or losses (social, monetary, interpersonal) as well as perceived positive consequence or gains” (P110) [6]. Risk taking is a common cause of fatal injuries in children, adolescent and young adults and recent research suggests that risk-glorifying media increases the likelihood that individuals will increase risk taking behaviors [7]. Risk-glorifying media content when combined with youths’ natural predilection for novelty seeking and differential decision making in high-pressure circumstances culminates in risk engagement [7–9].

The absence of prevention or hazard minimization strategies for skitching needs to be rectified and will be proposed using Haddon’s Matrix and countermeasures as a guide [10]. Haddon’s conceptual framework for understanding how injuries occur, the Haddon Matrix, and the framework for developing injury prevention strategies, the countermeasures, are two important contributions to the field of injury control and prevention [10]. Haddon’s matrix allows consideration of the host, vehicle/agent, physical factors and social factors and the various roles they have pre-event, during the event and post event with the utility of assigning countermeasures on the basis of the cell in the matrix selected [11]. These frameworks were initially applied to the considering of injuries sustained in road crashes however its application has been expanded to consider a range of issues.

This paper aims to explore the high risk activity of skitching to consider the characteristics of participants, circumstances and motivations for engagement, explore the known injury outcomes, risk factors and identify possible injury prevention strategies. To undertake these aims an integrative review was undertaken of the available literature (peer-reviewed and grey), as well as general information related to skitching (popular sources) [12].

## 2. Methods

The quest for information and veracity to inform development of injury prevention strategies typically starts with a consideration of the extent of the problem and risk factors [13]. Obtaining relevant high quality information upon which to base injury prevention strategies is a challenge if: the likelihood of injury is perceived to be low relative to engagement; injury presentations following engagement in an activity are thought to occur sporadically; prevalence data is absent given the legal status of the activity and; subsequently academic discussion of the issue is limited or non-existent [14]. In such circumstances, researchers are forced to be inventive in their initial search for data whilst at the same time drawing attention to the paucity of data. For the purpose of this article a broad search strategy was used including media reports and popular internet broadcasting platform YouTube and blogs.

The authors would like to preemptively acknowledge that the decision to extend the search beyond the academic occurred for two interrelated reasons: after performing a search of the academic literature it was determined there was a paucity of literature and of those located the information contained therein was limited in scope. Secondly, given the suggestion from the initial newspaper article view on skitching that engagement appears to be cyclical it was determined that broadening the search to see the results that a curious individual may find, if performing a similar search, was warranted and may offer insights regarding the activity and not just in relation to injuries and fatalities. On the basis of the expanded search strategy it should be noted that any recommendations that stem from the results should be viewed with caution and as preliminary insights until the research effort and data recording mechanisms which would enable better data collection and exploration of exposure are implemented.

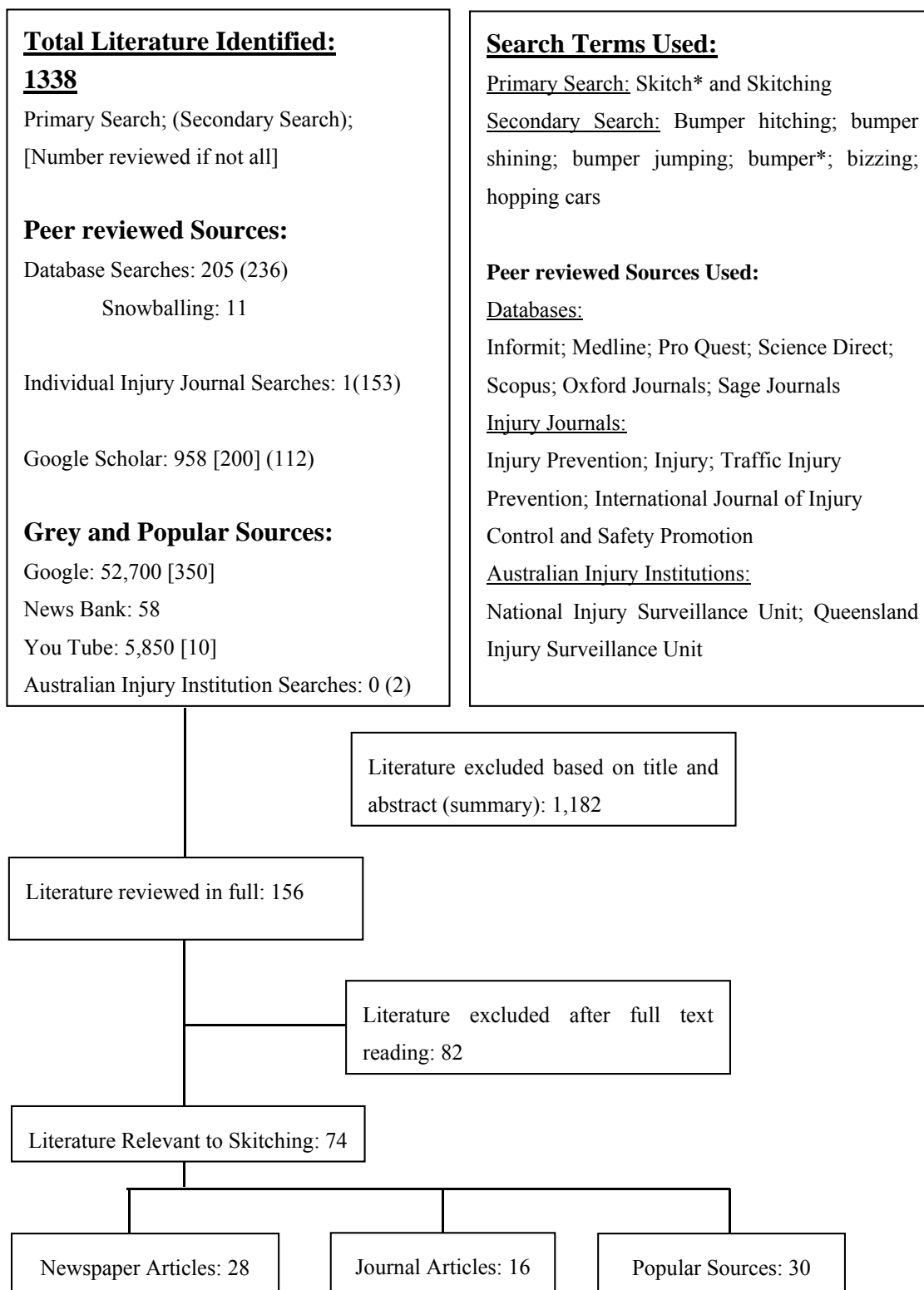
### 2.1. Search Strategy

An integrative review is an approach which attempts to summarize past literature to gain a more comprehensive understanding of a topic and, of all of the review methods, allows the inclusion of diverse methodology and levels of evidence [12]. The integrative review was conducted in October 2013 using two approaches—a review of the peer reviewed literature and of grey and popular sources. The search within the peer reviewed literature used the terms (“skitching” or “skitch\*”; “bumper hitching”; “bumper shining”; “bumper jumping”; “bizzing” and “hopping cars”) and the search of the grey and popular sources used the term “skitching” (or skitch\*). The grey and popular sources provided a large number of results using the term “skitching” and as such it was determined that the search terms should not be expanded in these sources. The specifics of the search protocol for the academic literature included a focus on injury specific journals whereas the grey and popular sources incorporated a wider search parameter (Scheme 1). To allow ease of discussion all relevant results from either the popular sources or the peer reviewed literature will be termed articles.

### 2.2. Inclusion Criteria

The search identified a large number of results ( $n = 60,286$ ) however not all of the Google Scholar, Google and YouTube results were reviewed. An exhaustive approach to the review of the Google and Google Scholar results was applied such that if three pages (or 30 results) were reviewed and no additional relevant results were obtained since the last relevant result then the search ceased. The merit

of watching all of the self-recording skitching footage contained on YouTube was deemed low; so preference of news footage or clips that offered instructions on how to skitch were given priority. Only a few videos met this criteria with all being watched in their entirety ( $n = 10$ ). The search identified 1338 results which were reviewed for relevance (Scheme 1).



**Scheme 1.** Literature Search Strategy and Results.

Articles were selected for review if they included the common terminology (skitch\*, bumper\*, bizzing, hopping cars) in the title, abstract or Google summary; or mentioned a NMRWD (skateboard, roller skates, in-line skates/rollerblades or bicycle); or discussed injuries or fatalities sustained whilst undertaking an activity involving a motor vehicle. All retrieved articles ( $n = 158$ ) were then read in full and kept for analysis if the article directly related to skitching ( $n = 74$ ).

### 3. Results and Discussion

A total of 74 articles were retrieved relevant to skitching majority of which were online articles and newspaper articles (Scheme 1). It is important to point out that none of the peer reviewed publications specifically focused on skitching but this activity was mentioned within the context of skateboarding or skating injuries. An exploration of the descriptions of the skitching events which resulted in a serious injury or fatality were reviewed separately ( $n = 20$ ) and from these articles, although majority portrayed American events or were from American sources (65%,  $n = 13$ ), it was gleamed that young males are a specific at risk group (Table 1). In addition, the articles helped to provide a more consolidated insight into the act of skitching, the risk factors and from this identification of possible prevention approaches.

#### 3.1. What is Skitching and What is Required?

Skitching is not a new activity, according to published personal reflections [15] and at least one photographic image [16], which dates back to at least 1922. It is suggested that engaging in skitching now may be representative of a differentially heightened risk due to changes in car design, road maintenance, road environment and acceleration speeds [17]. Further, it was suggested that skitching can be undertaken in any season; however, movement from loose snow to compacted winter surfaces or concrete roads has played a part in changing the injury dynamic and severity of ensuring injuries [18].

It would appear that three things are required to facilitate skitching: a motor vehicle, a person on a NMRWD and, ideally to reduce the potential for serious injuries and fatalities, a location wide enough to accommodate a motor vehicle that is free from obstacles including other vehicles, road debris and is on a flat surface [19]. As noted previously, the energy transfer which occurs when combining a device which is designed to be self-propelled, and therefore has operational capacity within a smaller speed range, with a motorized vehicle exponentially increased the energy involved [4]. Such an increase in energy has the potential to influence the maneuverability of the device and this, in combination with the terrain and speed, are hypothesized to be a key determinant of the serious injuries and fatalities that results from skitching [3].

**Table 1.** Summary of articles relating to skitching injuries or fatalities.

Skitching Type	Skitcher Characteristics					Source
	Age	Gender	Motorized Vehicle Involved	Outcome	Other Information	
Bicycle Skitching	12 & 14	Male	truck	internal injuries after losing balance and being partially run over ( $n = 1$ ); fatality ( $n = 1$ )	<i>Location of Incidents:</i> Australia ( $n = 2$ ) <i>Driver Characteristics:</i> stranger to cyclist ( $n = 2$ ); truck driver became aware of the cyclists and tried to take evasive action ( $n = 1$ ) <i>Circumstances that lead to fatality or injuries (if known or speculated):</i> tyre of bike hit the car, bike flipped and cyclist run over ( $n = 1$ )	Newspaper Articles: 2 Incidents Covered in Articles: 2 Sources: [2,20]
Skateboard Skitching	14–36; Mean Age: 19	Male	car ( $n = 8$ ); truck ( $n = 3$ ); pickup/ute ( $n = 2$ ); moped ( $n = 1$ ) and golf cart ( $n = 1$ )	Fatalities ( $n = 8$ ); Serious Injuries: serious internal injuries ( $n = 2$ ); serious head injuries ( $n = 4$ ) and other minor injuries ( $n = 2$ ).	<i>Location of Incidents:</i> USA ( $n = 12$ ); Australia ( $n = 5$ ) <i>Driver Characteristics:</i> Ages-16–18; most common friend or relative; driver suggested to be under influence of alcohol ( $n = 2$ ) <i>Circumstances that lead to fatality or injuries (if known or speculated):</i> speed-20–25 mph (USA articles); 30–50 km/h (Australian articles); lost control or let go; skitchers listed as wearing a helmet ( $n = 0$ ); small towns ( $n = 3$ –Australia); multiple skitchers on the one car ( $n = 2$ ); videos footage being taken ( $n = 2$ ); person had prior experience undertaking skitching ( $n = 3$ )	Newspaper Articles: 13 Other Sources: 7 Incidents Covered in Articles: 17 Sources: [21–40]
Long board Skitching	18	Male	Car	Fatality	<i>Location of Incident:</i> USA ( $n = 1$ ) <i>Driver Characteristic:</i> Age-18 <i>Circumstances that lead to fatality or injuries (if known of speculated):</i> <40 km/h (<25 mph); not wearing a helmet	Newspaper Articles: 1 Incidents Covered in Articles: 1 Source: [41]

### 3.2. *Who Skitches and Why?*

Media representation of skitching, like the description on other topics, are likely to represent only the most newsworthy or those with the most serious consequences [42]. Thus use of these sources to derive a picture of skitching activity needs to occur with a caveat, that it is likely to under represent the scope of activity and is unlikely to be representative of all skitching injuries or indicative of the characteristics or scope of participation [43]. However, it is also interesting to note that the media content may also purposefully or unintentionally glorify the risks inherent in undertaking skitching particularly amongst adolescents [7,9].

Teenage males are highly represented in the serious and fatal skitching incidents (Table 1) however this may be related to exposure and likelihood of participating in risk-taking activities [21,44]. There is a dearth of information about less serious injuries and people who skitch on a regular basis [43]. For example, in New York in the 1990's, prior to the state prohibiting skitching in 1996, skitchers were identified as being young, white collar professionals using roller skates and roller blades [44–46].

Improved and consolidated reporting on the circumstance which culminates in serious injuries or fatalities in the future will improve injury prevention strategies, including exposure information. In particular, information about the skitcher's experience and abilities, condition of the vehicle and NMWRD prior to engagement, speed at which travelling prior to the injury occurring and the use of protection equipment would greatly improve the knowledge and subsequent harm minimization approaches used. Understanding the motivation for skitching has assisted in outlining potential injury prevention strategies with four interrelated motivations preliminarily identified: amusement, opportunity, thrill-seeking and transport [47].

### 3.3. *Why is Skitching Dangerous and What Are the Risk Factors?*

The availability and large number of views (47,500) for instructions about how to skitch (skateboard or bicycle), highlight the interest in skitching [19,47]. These instructions appear to be authored/presented by individuals who have experience skitching and their insight about the critical phases and considerations when undertaking skitching presents a novel but vital information into the act of skitching [19,47].

The instructions suggest there are three critical junctions which influence the resulting skitch: when the skitcher attaches to the motor vehicle, when the motor vehicle increases its speed or changes trajectory and when the skitcher detaches which can include intentional and unintentional/uncontrolled detachment [19]. All three of these critical junctions highlight that combining a self-propelled (*i.e.*, non-motorized) wheeled recreational device with the velocity of a motor vehicle is likely to change the dynamics of the ride for the recreational device user who may not anticipate how the increased speed influences the ability to maneuver and control the recreational device [3,48].

#### 3.3.1. *The Skitching Host: The Motor Vehicle*

There are multiple places on modern cars and trucks where a handhold can be grabbed, thus enabling the skitching process, these include wheel wells, roof racks, spare tire racks, tail lights, door handles and towbars [19]. There is no indication that any of these handholds promote better skitching or enable

prolonged contact with the host vehicle. Although trucks, which have multiple handholds, are identified as the optimal choice for beginner skitchers, which is concerning as the workers driving these vehicles are likely to be unaware of the presence of the skitcher due to job demands, vehicle blind spots and the vehicle is significantly heavier [19,49]. A review of and the possibility for re-engineering the handholds to still be functional for the driver and the tasks performed but to limit the opportunity for skitchers to grab a hold has been suggested [49].

The skitcher is travelling at the same velocity as the vehicle so even at low speeds (20 mph) injuries or death can and have occurred (Table 1) [17]. Another potential hazard which is not readily identified is the creation of a drag force around the car and specifically the tyres; which creates a suction effect similar to that seen in downhill skateboarding [50,51]. Whether this drag effect is directly responsible for the large number of skitchers falling and being run over by the vehicle they are skitching from is undetermined [2,34]. The drag effect may be minimized by skitchers positioning themselves behind the vehicle; however, it is noted this entails a different set of safety concerns including limited visibility and the associated inability to anticipate and brace for changes in speed and trajectory [52,53].

### 3.3.2. The Skitching Host: Willing or Unwilling; Aware or Unaware?

Regardless of vehicle type, the driver has a very different perception of speed compared to the skitcher, assuming they know they are there, thus even a marginal increase in acceleration or trajectory has the potential to unseat the skitcher if they aren't prepared for these changes [17,18]. Further, it is assumed there will likely be different driving behavior depending on drivers awareness of the skitcher on their vehicle and also if the skitcher is known to the driver or not. It is posited that the relationship looks like this (Table 2).

**Table 2.** Driver relationship, awareness, behavior and danger level.

Relationship— Driver Known to Skitcher	Driver Awareness— Skitcher's Presence on Vehicle	Driving Behavior—Likely Informed by Relationship and Awareness	Hypothesized Danger Level—Least (1) to Most (7) Dangerous * Based on Driving Speed and Stability, Capacity for Skitcher to Disengage Safely and Presence of Road Conditions
Driver Unknown	Unaware	Driving to road conditions	6—as likely following speed restrictions (typically reasonable acceleration $\geq 40$ km/h)
		Attempts to dislodge skitcher—going faster and/or swerving	7—Erratic driving behavior likely to result in a fall
	Aware	Attempts to dislodge skitcher— purposefully stopping or slowing down	1—Skitcher will quickly detach from a slow or uncooperative vehicle
		Drives normally as per road conditions	4—Likely to have concentration strongly diverted so dangerous for driver, other road users and skitcher
Driver Known	Unaware	Driving to road conditions	5—Assuming skitcher has good visibility of road, traffic and drivers behaviour
	Aware	Driving to road conditions	3—Likely following speed restrictions but with concentration diverted
		Driving for the sole purpose of being the host to the skitcher	2—Likely to not anticipate the impact of rapid acceleration on skitcher.

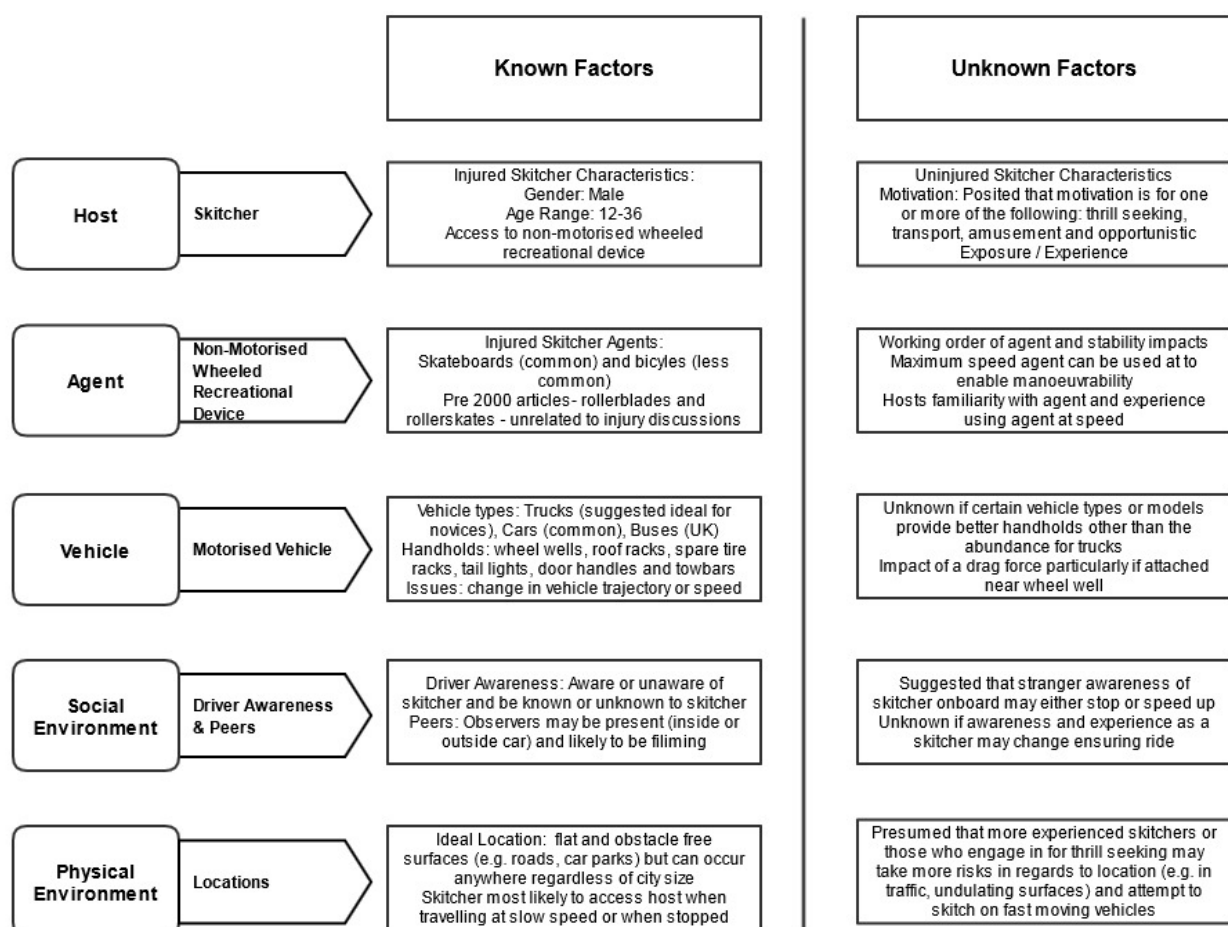


### 3.3.3. The Skitcher and Agent: Experience, Environment and NMRWD

The main risk factors for skitchers, are similar to those identified for skaters generally, and include speed, obstacles, surface type, ability to have sufficient control of the device and the potential to be run over by a motor vehicle [54]. The skills and experience of the skitcher will influence their ability to handle travelling at high speeds but is also influenced by the type of equipment they are using [38,53]. A factor which influences the speed and potential for wobble in skateboards is the style of board being used with longboards being able to handle higher speeds [38]. Awareness of the capacity of the skateboard to be handled when used differently and the impact of terrain is evidenced by the different recommendations for safety equipment use being determined by the type of skateboarding activity being undertaken [38].

### 3.4. What Can Be Done to Prevent Engagement or the Injuries and Fatalities That Result from Engagement?

Skitching represents a challenge for injury prevention professionals, akin to similar behavior such as “scutting”, a term used in Dublin to describe the act of riding on the back of a moving vehicle, or “car surfing” which is when a person stands or rides on top of a motor vehicle whilst it is moving [55,56]. This review has enabled identification of a number of agent, host and environment characteristics which can inform future injury prevention efforts for skitching (Scheme 2 and Table 3).



**Scheme 2.** Overview of Skitching knowledge as informed by the literature.

**Table 3.** Skitching and the Haddon’s Matrix.

Event Stage	Host	Agent	Vehicle	Physical Environment	Social Environment
<i>Pre-event (before the fall)</i>	Encourage appropriate use of NMRWD—including appropriate places for use and need for PPE use at all times	Manufacturers acknowledging limitations of device such as use at speed, stability and need for maintenance	Separate motorized vehicles from pedestrians and users of NMRWD	Provision of public amenities suitable for demographic to safely practice/use devices	Foster adolescent’s social norms to “call out” their friends when planning risky activities and if they proceed inform an adult.
<i>Event (during fall and time of impact)</i>	Teaching NMRWD users to fall safely and away from traffic/other users	Capacity for device to be controllable by user in times of instability at speed	Driver awareness and safe driving practices. Specific to skitching- if driver aware of skitcher’s presence to be conscious of their visibility and slow immediately if no longer visible	Suitable amount of space between motorized vehicles and between lanes and side walks	Observers if present to call for emergency assistance immediately upon witnessing a fall. Faster assistance increases the injured skitchers chances of survival.
<i>Post-Event (after skitcher injured by fall)</i>	Remain still, on the ground and in the recovery position until medical personnel arrive	Remove device away if in the way of provision of emergency medical assistance.	Driver and car to be moved if facilitates emergency medical personnel gaining better access to skitcher if not then do not attempt to move.	If something in physical environment resulted in causing instability of skitcher inform the appropriate council to remedy.	Surrender of any video footage to emergency service personnel who may require this for evidence. Observers seek counselling if required.

Note: NMRWD—Non-motorized recreational wheeled devices.

### 3.4.1. Injury Prevention Strategies—Hierarchy of Control

#### Elimination—Law, Policies and Bans

Skitching is prohibited in Australia and some American states [44,46,57]. However there is a large difference between prohibiting an activity and actively enforcing and communicating the prohibition; as such it is proposed when the emergence of skitchers increases targeted education should be used to inform them of the illegality of their behavior [53].

#### Substitution—Improving Skate Park Design

Skateboards are not the only recreational device used to skitch; however, the majority of the serious injuries and fatalities identified in this review are related to skateboards and as such are identified as a key target group (Table 1). Skitching using a bicycle may be more common but results in less serious and fatal injuries due to the ability of bicycles to withstand and operate at greater speeds [1]. Skateboards are inherently unstable which means there is a smaller margin for error, compared to a bicycle, which is important if control of the device is lost [3]. Promoting use of skateboard at speeds which they are able to be functionally used and improving the utility and availability of skating infrastructure may reduce engagement in skitching [38].

The provision of skate parks offers many benefits for skaters, parents and the community as it provides an outlet in which skating can be undertaken in a safe location (*i.e.*, removed from motor vehicles), promotes skill development when various terrains are provided for within the park, is a means of physical activity and represents a recreational sport which is cheaper to participate in than other mainstream sports [38,58]. Advocating for increased provision, regular maintenance or updating/retrofitting of infrastructure offers similar benefits to the provision of parks but may draw back skaters “bored” with the existing facilities and thereby reducing the propensity for opportunistic skitching [59].

#### Engineering Controls—Vehicle Modifications

There was limited discussion in the literature regarding the use engineering controls with the exception of reducing the number of holds on vehicles or improving the stability of skateboard [3,49]. The mechanism and the benefit of making these changes would need to be considered further. It is noted that there are wider discussions around modification to trucks which may also contribute to reducing skitching injuries, such as rear under-run barriers, reduction in size and electronic monitoring around the vehicle [60].

#### Administrative Controls—Training and Restricting Purchasing

It would appear there are two types of skitching –the driver is a stranger (either unaware or aware of the skitchers’ presence) or the driver is known to the skitcher (friends or relatives, *etc.* and they are either aware or unaware of the skitchers’ presence) (Table 2) [17,19]. Educating drivers on how to react if a skitcher is noticed on their vehicle and the legal consequences if spotted may be one mechanism to ensure driver mindfulness. Such educational campaigns should emphasize the benefit of slowing down

with the view to ceasing movement until the would-be skitcher has detached and moved on from the vehicle.

Skitchers are unlikely to stay attached to a car they anticipated would accelerate yet remains motionless. It is important that drivers be warned of the serious ramifications that may occur if, upon seeing the skitcher, they speed up or start driving erratically to try and extricate the skitcher; as this is likely to occur but without the skitcher being in control, thus the potential for the skitcher to fall and sustain serious injuries is likely [19,34]. To date the penalties imposed on the drivers where a skitcher is/was attached have included fines, community service and disqualified licenses [5,48]. Targeting drivers and youth, particularly young drivers who the articles suggest willingly facilitate their friends skitching, will be required with effort focusing on education [25,61].

In the event that new skate parks are installed or retrofitted, such events could co-occur with the provision of coaching clinics/training where skaters can learn the unwritten social rules, etiquette and general recreational device skills such as how to control the recreational device and how to fall [58,59]. Skitching is increasingly depicted in video games, highlighting that changing the classification on such games to reduce the ability for them to be purchased and/or access by impressionable young people may be one way to reduce exposure to such risk-promoting material [7].

Another approach that could be utilized is for those working in the media to consider the content of the stories regarding skitching. Avoidance of specific details or presenting the story in a way so that it does not risk-glorifying may reduce the potential for others attempting skitching [7,9,42]. A consolidated media approach which utilizes injury prevention personnel to advocate for safety could also be beneficial.

### Personal Protective Equipment—Helmets

Mandatory helmet use laws are often met with controversy, however little attention is focused on which types of recreational users are required by law or should be wearing helmets [50,59]. The efficacy of helmets, when worn correctly, to prevent serious head injuries and further sequelae in cyclists are clear [62]. The most serious skitching injuries occur as a result of sustaining a fall and either sustaining head injuries, when the skitchers head comes into contact with the road surface, and/or from being run over by a motor vehicle, usually the vehicle that is towing the skitcher [2]. Helmets can potentially reduce serious and fatal head injuries but are less likely to change the outcomes when the skitcher is run over by a vehicle [17]. A variety of approaches to improve helmet use are required including mechanisms which change the culture surrounding helmet use, particularly in sports such as skateboarding [50,53].

### 3.5. Limitations

Skitching is not a new activity, yet despite this it is currently not well described in the academic literature. A further obstacle to advancement in a consolidated understanding of skitching is the variety of terms used to denote engagement and as a result of limiting the search terms to only a couple it is likely that some material may have been missed. Inclusion of some of these colloquial terms in the search strategy may have reduced the potential for missed articles but given the amount of results initially retrieved it is deemed that as an introduction to the literature the benefit gained from an expanded use of search terms would be minimal. Further, including peer reviewed, grey and popular sources in the search

strategy has enabled a more consolidated understanding of skitching and particularly how it is discussed in the media following an incident when a skitcher was injured or died. The current information in this article is intended to start the discussion about skitching and skitching related- incidents and although informative it is not comprehensive. There are three areas which, despite this review, remain largely undeveloped: prevalence, exposure and the monitoring for minor injuries. Being able to quantify the number of people who have attempted skitching and to explore their perception of risk and any injuries sustained, including minor injuries, will assist in developing a more comprehensive understanding of skitching and the best mechanisms to reduce engagement. A related future endeavor that would assist in providing a more detailed understanding of skitching prevalence is for of skitching incidents to be given a unique classification code so as to enable incorporation of this data into existing injury surveillance databases.

#### 4. Conclusions

Scientific, grey and popular sources were reviewed to explore the characteristics of skitchers, motivations for skitching and injury outcomes. Potential injury prevention approaches were outlined (such as enforcement of legislation, design of skate park and helmet use) but there is cause to consider that these prevention efforts don't unintentionally result in reduced recreational engagement (*i.e.*, reduced physical activity). Contrary to what the popular media suggests, skitching is not a new activity although participation appears to experience peaks and troughs similar to engagement in other recreational activities and use of recreational devices. The suggested primary injury prevention objective for skitching, stemming from this review, is to reduce future potential skitching injuries and fatalities by targeting young males, young drivers and skaters. These three groups were over represented in serious skitching injuries and fatalities that have occurred and been documented in the last decade.

#### Acknowledgments

We would like to acknowledge the Masters of Public Health students at James Cook University who initially facilitated the exploration of this issues as part of the 2012 Injury Prevention and Safety Promotion.

#### Conflicts of Interest

The authors declare no conflict of interest.

#### References

1. Wikipedia Contributors. Skitching. Available online: <http://en.wikipedia.org/wiki/Skitching> (accessed on 1 October 2013).
2. Templeton, A. Young cyclists risking their lives in truck-hitching trend. *Townsville Bulletin*, 19 June 2012.
3. Hubbard, M. Human control of the skateboard. *J. Biomech.* **1980**, *13*, 745–754.
4. Haddon, W. Energy damage and the ten countermeasure strategies. *Hum. Factors J. Hum. Factors Ergon. Soc.* **1973**, *15*, 355–366.

5. Rice, S. Teen sentenced in vancouver for skitching death, wa. *The Columbian*, 19 September 2008.
6. Ben-Zur, H.; Zeidner, M. Threat to life and risk-taking behaviors: A review of empirical findings and explanatory models. *Personal. Soc. Psychol. Rev.* **2009**, *13*, 109–128.
7. Fischer, P.; Vingilis, E.; Greitemeyer, T.; Vogrincic, C. Risk-taking and the media. *Risk Anal.* **2011**, *31*, 699–705.
8. Reliance Risk. “Skitching” Accident Claims Young Life. Available online: <http://www.reliancerisk.com.au/skitching-accident-claims-young-life/> (accessed on 2 October 2013).
9. Johnson, S.B.; Jones, V.C. Adolescent development and risk of injury: Using developmental science to improve interventions. *Inj. Prev.* **2011**, *17*, 50–54.
10. Runyan, C.W. Introduction: Back to the future—Revisiting haddon’s conceptualization of injury epidemiology and prevention. *Epidemiol. Rev.* **2003**, *25*, 60–64.
11. Haddon, W., Jr. Advances in the epidemiology of injuries as a basis for public policy. *Public Health Rep.* **1980**, *95*, 411.
12. Whittemore, R.; Knafl, K. The integrative review: Updated methodology. *J. Adv. Nurs.* **2005**, *52*, 546–553.
13. McClure, R.; Stevenson, M.; McEvoy, S. Section iv intervention development: Introduction. In *The Scientific Basis of Injury Prevention and Control*; McClure, R., Stevenson, M., McEvoy, S., Eds.; IP Communications: East Hawthorn, Australia, 2004; p. 398.
14. Thompson, N.J. Study methods for understanding injury behavior. In *Injury and Violence Prevention: Behavioral Science Theories, Methods and Applications*, 1st ed.; Gielen, A.C., Sleet, D.A., DiClemente, R.J., Eds.; Jossey-Bass: San Francisco, CA, USA, 2006; p. 534.
15. Perry, R. Letters to the editor: A skitch in time. *Wall Street Journal*, 16 September 1991.
16. Stone, A.R. *Messenger Boy Hitching a Ride on an Automobile*; Albert R Stone Negative Collection: New York, NY, USA, 1922.
17. The City of Arvada. Skitching can be tragic fun. Available online: <http://arvada.org/pages/skitching-can-be-tragic-fun> (accessed on 8 November 2015).
18. Bolger, R. Snow skitching. Available online: <http://skiernet.com/skitching.php> (accessed on 8 November 2015).
19. Elevatormajor. How to Skitch on a Bicycle (Grab onto a Moving Car). Available online: <http://www.instructables.com/id/How-To-Skitch-on-a-Bicycle-Grab-onto-a-moving-Car/> (accessed on 8 November 2015).
20. Sheridan, B. Boy cyclist dies in truck stunt. *The Advertiser*, 18 September 2004, p. 019.
21. Garcia, M. The dangerous itch to skitch. *Chicago Tribune*, 27 August 2010.
22. Sullivan, J. Skateboarder in critical condition after “skitching” behind pickup. *The Seattle Times*, 24 April 2008.
23. Danks, K. Skateboarder lachlan burgess dies after hitting head while being towed by mate in car in wagga wagga. *The Daily Telegraph*, 17 January 2012.
24. Mahoney, P.; Gleeson, A. Skateboarder, 17, dies while being towed by car: Police. *The Sydney Morning Herald*, 17 January 2012.
25. Keene, N. Dark and perilous side of teen spirit-kids behaving badly. *The Daily Telegraph*, 21 January 2012.

26. Kakesako, G.K. Kaneohe teen dies after fall from skateboard in car-towing accident. *Star Advertiser*, 20 August 2013.
27. Van den Broeke, L. Teenager injured while “skitching”-skateboarding while being towed by a car. *The Daily Telegraph*, 13 March 2012.
28. Skitchers could end up dead: Police. Available online: <http://www.smh.com.au/breaking-news-national/skitchers-could-end-up-dead-police-20120313-1uxqz.html> (accessed on 8 November 2015).
29. Driver charged over “skitching” accident. Available online: <http://www.smh.com.au/nsw/driver-charged-over-skitching-accident-20120314-1v3xl.html> (accessed on 8 November 2015).
30. Cherry, B. Northern beaches teens plead guilty after skitching. *The Daily Telegraph*, 30 June 2012.
31. Gardiner, S. “Skitching” teen suffers serious head injuries at olympic park. *The Sydney Morning Herald*, 13 March 2012.
32. Parsons, J. Skateboarder’s death on tape. *The Dallas Morning News*, 24 August 2007, p. 10B.
33. Brower, K. “Always wear a helmet” hospital sees rising numbers of kids with head injuries. *Los Angeles Times*, 6 July 1997.
34. DiPietro, M. 18-Year Old Skater Killed in Nyc. Available online: <http://www.skatetheeast.net/2013/09/18-year-old-skater-killed-nyc/> (accessed on 8 November 2015).
35. Stickney, R.; Luke, S. Paraplegic War Veteran Critically Injured on Skateboard. Available online: <http://www.nbcsandiego.com/news/local/Paraplegic-Skateboarder-Injured-Hitching-Ride-Truck-Ocean-Beach-168761076.html> (accessed on 8 November 2015).
36. Congedo, J. “It’s not worth it”: Teen warns other against dangers of “skitching”. Available online: [www.wlwt.com/news/local-news/butler-county/-It-s-not-worth-it-Teen-warns-others-against-dangers-of-skitching/19868682](http://www.wlwt.com/news/local-news/butler-county/-It-s-not-worth-it-Teen-warns-others-against-dangers-of-skitching/19868682) (accessed on 8 November 2015).
37. Skateboarder Towed by Mum in Hospital. Available online: <http://www.news.com.au/breaking-news/skateboarder-towed-by-mum-in-hospital/story-e6frfku0-1226131031452> (accessed on 8 November 2015).
38. Waters, T. 2011 Skateboarding Fatalities. Available online: <http://www.skatepark.org/park-development/2012/01/2011-skateboarding-fatalities/> (accessed on 8 November 2015).
39. Group to be Charged over Skateboard Towing. Available online: <http://www.abc.net.au/news/2005-12-20/group-to-be-charged-over-skateboard-towing/765052> (accessed on 8 November 2015).
40. Man Hurt in “Stupid” Skateboard Stunt. Available online: <http://www.abc.net.au/news/2007-04-30/man-hurt-in-stupid-skateboard-stunt/2535134> (accessed on 8 November 2015).
41. Nicholson, K. Popularity of “skitching” skates the edge of danger. *The Denver Post*, 20 May 2007.
42. McArthur, D.L.; Magaña, D.; Peek-Asa, C.; Kraus, J.F. Local television news coverage of traumatic deaths and injuries. *West. J. Med.* **2001**, *175*, 380.
43. O’Neil, D. Skateboard Towing Accidents on the Rise. Available online: <http://sports.espn.go.com/action/skateboarding/news/story?id=6533848> (accessed on 8 November 2015).
44. Devlin, R. Skating fad puts teens in danger daredevils “skitch” rides on bumpers of passing vehicles. *The Morning Call*, 12 May 1996.
45. Jackson, R.B. Meet the skitchers’ hall of fame: Stumpy, lefty, billy one-eye. *Wall Street Journal*, 5 September 1991.
46. Schmunk, R.B. New York State Consolidated Laws-Vehicle & Traffic: Article 34. Available online: [http://www.skatecity.com/nyc/law/ny/vt\\_7a34.html#1233](http://www.skatecity.com/nyc/law/ny/vt_7a34.html#1233) (accessed on 8 November 2015).

47. How-To Skateboarding: Skitching cars with dave abair. Available online: <https://www.youtube.com/watch?v=Ezi-vEqOdR8> (accessed on 8 November 2015).
48. Teen Charged after Skateboarder Dies. Available online: <http://www.abc.net.au/news/2012-01-17/boy-dies-after-falling-from-skateboard-towed-by-car/3776854> (accessed on 8 November 2015).
49. Brogmus, G.; Gosnell, R. A free ride can be costly: Reducing the risk of unintended riders on delivery vehicles. *Prof. Saf.* **1995**, *40*, 18.
50. Hopkin. Skitching is just skateboarders wanting to be longboarders. In *Hopkin Skate Blog*; WordPress: Sydney, Australia, 2012; Volume 2013.
51. Hart, J.H.; Allen, T.; Holroyd, M. Downhill skateboard aerodynamics. *Procedia Eng.* **2010**, *2*, 2523–2528.
52. Committee on Injury and Poison Prevention. Skateboard and scooter injuries. *Pediatrics* **2002**, *109*, 542–543.
53. Sherker, S.; Cassell, E. Preventing in-line skating injuries. *Sports Med.* **1999**, *28*, 325–335.
54. Shield, J. Splinters and fragments: Skating on thin ice. *Inj. Prev.* **1998**, *4*, 244.
55. Casserly, H.B.; O'Brien, T. Scutting: A dangerous pastime? *Injury* **1989**, *20*, 337–338.
56. Geiger, J.; Newsted, J.; Drongowski, R.; Lelli, J., Jr. Car surfing: An underreported mechanism of serious injury in children and adolescents. *J. Pediatr. Surg.* **2001**, *36*, 232–234.
57. Robertson, D. Skateboarding—Basic Legal FAQ Forum Post. Available online: <http://www.skateboardracing.org.au/forum/topics/skateboarding-basic-legal-faq> (accessed on 8 November 2015).
58. Kellett, P.; Russell, R. A comparison between mainstream and action sport industries in Australia: A case study of the skateboarding cluster. *Sport Manag. Rev.* **2009**, *12*, 66–78.
59. Inoue, N.; Barker, R.; Scott, D.A. *Skateboard Injury*; Queensland Injury Surveillance Unit (QISU): Brisbane, Australia, 2009; pp. 1–6.
60. Pattinson, W.; Thompson, R.G. Trucks and bikes: Sharing the roads. *Procedia-Soc. Behav. Sci.* **2014**, *125*, 251–261.
61. Steinberg, L. Risk taking in adolescence: What changes, and why? *Ann. NY Acad. Sci.* **2004**, *1021*, 51–58.
62. Karkhanav, M.; Rowe, B.H.; Saunders, L.D.; Voaklander, D.C.; Hagel, B.E. Trends in head injuries associated with mandatory bicycle helmet legislation targeting children and adolescents. *Accid. Anal. Prev.* **2013**, *59*, 206–212.