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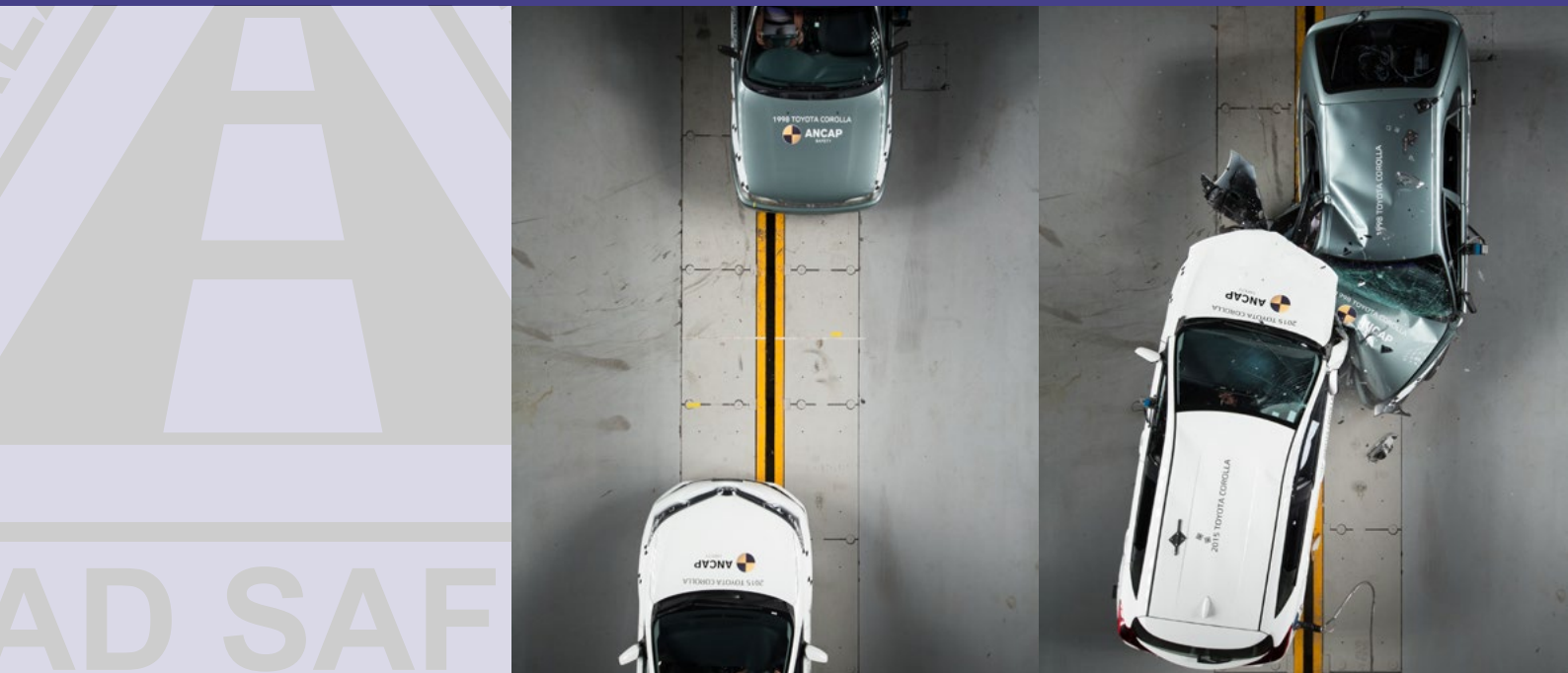


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A Systematic Review of Bicycle Helmet Laws Enacted Worldwide

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Key Findings

- Twenty-eight countries around the world have some form of bicycle helmet legislation;
- Current laws vary by maximum applicable age, the presence and amount of fines;
- All-ages helmet laws exist in nine countries, half of Canadian provinces, some US cities, urban travel in Chile and Slovakia, and interurban travel in Israel and Spain;
- There have been 273 laws enacted worldwide with only two being fully repealed

Abstract

A systematic review was undertaken to summarise bicycle helmet laws (BHL) enacted around the world, when they were introduced, available information regarding enforcement fines and whether they were later repealed. Jurisdictions with some form of BHL were identified using several sources including European Commission, Bicycle Helmet Safety Institute, government websites, and news articles. Wikipedia and advocacy group websites were also searched, but material was included only if verified from other sources. Road safety organisations in countries with existing BHL were also contacted. Information regarding date BHL was introduced, age of riders required to wear a helmet, what fines apply, and where and when BHL was modified or repealed, were gathered. There are currently 28 countries in total that have a helmet bicycle law. When the data is broken down in terms of countries, states, and cities, there have been at least 273 bicycle helmet laws enacted all over the world. Nine countries have bicycle helmet laws that apply to all ages as well as half of Canadian provinces, some US cities, urban travel in Chile and Slovakia, and interurban travel in Israel and Spain. To date, seventeen jurisdictions have modified their laws and only two laws have been fully repealed (Mexico City and Bosnia and Herzegovina). Although often presented as unique to cycling in Australia or New Zealand, bicycle helmet legislation has been enacted in many locations around the world. These laws are also robust with less than 1% of these laws (two instances) being fully repealed.

Keywords

Bicycle; helmet legislation; transport policy; cycling safety; systematic review

Introduction

There is no current, comprehensive list of bicycle helmet laws that exist around the world. Bicycle helmet legislation is an often-debated topic and these discussions should be informed by factual information. According to the Bicycle Helmet Safety Institute (2017), the U.S. state of California was the first place to introduce bicycle helmet legislation for passengers under 5 years of age in 1987, followed by the states of New York and Massachusetts in 1989 and 1990 respectively. In July 1990, the Australian state of Victoria became the first jurisdiction to introduce BHL for riders of all ages (Carr et al, 1995). The remaining Australian states and territories introduced similar legislation by 1992 (Australian Transport Safety Bureau, 2006).

Opponents of BHL often claim that only two countries (Australia and New Zealand) have bicycle helmet legislation (Rissel & Wen, 2011; Turner, 2012; Guy, 2015; Greaves, 2016), which is then used to argue for the repeal of such

legislation in Australia and to argue against the introduction of BHL in other countries. This is despite numerous research articles that have assessed the impact of BHL in other countries (Karkhaneh et al, 2013; Dennis et al, 2010; Bonander et al, 2014; Kett et al, 2016; Bauer et al, 2016). Although it is clear multiple jurisdictions have introduced BHL and despite the ongoing arguments for and against the effectiveness of BHL, there has been no systematic review to identify or summarise these laws. A summary of all bicycle helmet laws will greatly improve identifying relevant data which in turn will improve our knowledge of the potential effects of BHL.

This study aims to summarise bicycle helmet laws enacted worldwide. The data collected includes date of legislation, the maximum age the law applies, whether the law is enforced via fines or not, and whether the law was later modified or repealed.



Figure 1. Map of Jurisdictions with Bicycle Helmet Legislation (*Canada and the United States do not have legislation for all provinces or states)

Methods

A Google desktop search was conducted in January 2017 to identify jurisdictions with BHL. Several sources were identified including reports from the European Commission (2015,2016), the Bicycle Helmet Safety Institute (2017), the International Transport Forum (2017), government websites, journal articles, technical reports, dissertations, and news articles.

Information regarding BHL effective date, age of enforcement, and fines, were gathered using the aforementioned sources, searching government websites, and contacting road safety organisations in countries with existing BHL. Wikipedia and websites sponsored by advocacy groups such as the Bicycle Helmet Research Foundation were also searched for relevant data; however, information was included only when verified by another source. Non-English sources were translated to English using Google Translate.

Results

Our search identified 28 countries around the world with some form of bicycle helmet legislation (see Figure 1). This includes legislation adopted in Argentina, Australia, Austria, parts of Canada, Chile, Croatia, Czech Republic, Estonia, Finland, France, Iceland, Israel, Japan, Jersey, Latvia, Lithuania, Malta, Namibia, New Zealand, Nigeria, Slovakia, Slovenia, South Africa, South Korea, Spain, Sweden, United Arab Emirates and parts of the United States. These laws differ in terms of enforcement and many apply only to children below a certain age. Nine countries have bicycle helmet laws that apply to all ages (Argentina, Australia, Finland, Malta, Namibia, New Zealand, Nigeria, South Africa, and United Arab Emirates). Additionally, five out of ten Canadian provinces and some US cities have all-ages

BHL, while all cyclists must wear helmets while travelling in urban areas in Chile and Slovakia, and between urban areas in Israel and Spain.

In Australia, Canada and the United States, road rules are often created at state, provincial, territorial or city levels. Therefore, these countries are discussed separately.

Australia

The state of Victoria was the first jurisdiction in the world to introduce bicycle helmet legislation for bicycle riders with effect from July 1990 for all ages and in all areas (Cameron et al, 1994). The remaining Australian states and territories followed with similar legislation by July 1992 (see Table 1).

New South Wales enacted a law for adults (16+ years of age, 1 January 1991) which was modified six months later (1 July 1991) to apply to all ages (Smith & Milthorpe, 1993). The Northern Territory (NT) first introduced legislation for adults (17+ years of age) on January 1992 and all ages by July 1992 (van Zyl, 1993). The NT law was further modified from 31 March 1994 to no longer apply to cyclists over the age of 17 who ride along footpaths or on cycle paths. Bicycle helmet legislation in the states of Queensland (July 1991) and Western Australia (January 1992) was initially introduced without enforcement, then with enforcement from January 1993 for Queensland and in July 1992 for Western Australia (King & Fraine, 1995; Healy & Maisey, 1992).

Note that although fines were not issued for the first six months in Western Australia, the police issued over 3,000 cautions during this time (Healy & Maisey, 1992), and fines of \$25 could be withdrawn during the first six months of enforcement if the cyclist provided proof of a helmet purchase within 14 days of being fined.

Table 1. Bicycle helmet legislation, Australia

	Effective date	Current fine (AUD)	Maximum age
Australian Capital Territory	Jul 1992	\$118	All
New South Wales	Jan 1991/Jul 1991	\$330	All
Northern Territory	Jan 1992/Jul 1992/Mar 1994	\$25	All
Queensland	Jul 1991	\$121	All
South Australia	Jul 1991	\$153	All
Tasmania	Jan 1991	\$260	All
Victoria	Jul 1990	\$194	All
Western Australia	Jan 1992	\$50	All

Canada

Eight out of ten Canadian provinces have some form of bicycle helmet legislation (Dennis et al, 2010; Bicycle Helmet Safety Institute, 2017). Ontario was the first province to enact BHL in October 1995, followed by seven other provinces by 2015 (see Table 2). The all-ages helmet law in Newfoundland and Labrador is applied to all cyclists riding on the province's roadways. A provincial map of Canadian helmet laws is given in Figure 2.

Quebec and Saskatchewan do not have bicycle helmet legislation although Yorkton, Saskatchewan has its own bicycle helmet bylaw and there are some municipal bylaws in Québec. None of the three territories of Canada

(Northwest Territories (NWT), Nunavut and Yukon) has a bicycle helmet law. However, the town of Inuvik, NWT, and the city of Whitehorse, Yukon, have enacted all-ages helmet bylaws.

Canada's current population is around 37 million with Quebec at 8.4 million (23%), Saskatchewan at 1.2 million (3%) and the three territories of NWT, Nunavut and Yukon totalling around 0.12 million (0.3%) (Statistics Canada, 2018). This means that around 73.7% (27.2 million) of Canada's population is subject to some form of BHL where 20% (7.2 million) is an all ages BHL. For provinces with child only laws (Alberta, British Columbia, and Manitoba), the population 14 years and younger was an estimated 3.2 million on 1 July 2017 (Statistics Canada, 2017).

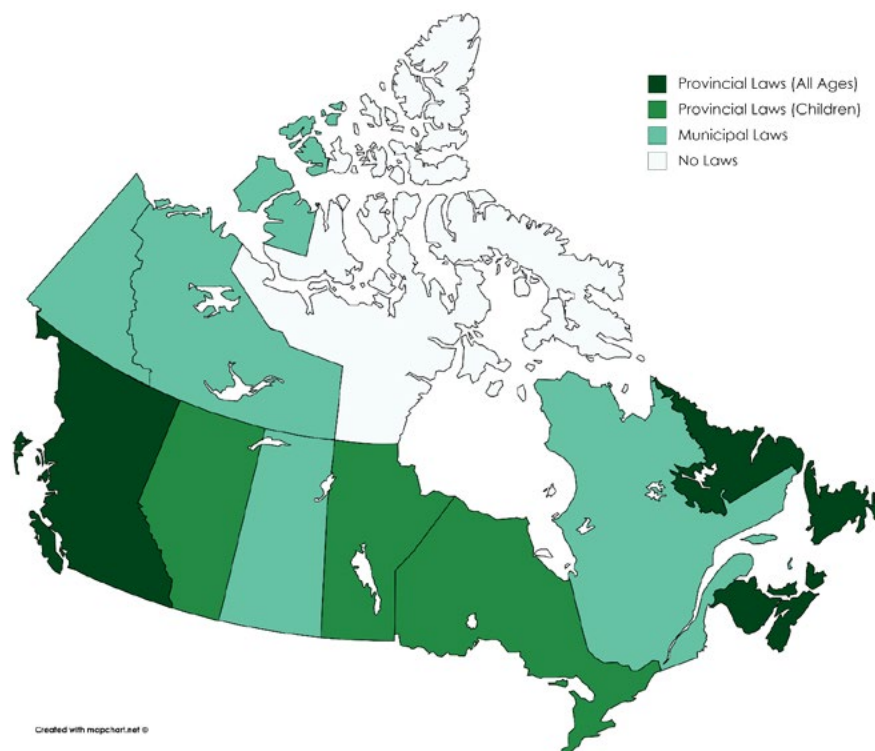
**Figure 2. Map of Canadian Provinces with Bicycle Helmet Legislation**

Table 2. Bicycle helmet legislation, Canada

	Effective date	Current fine		Maximum age
		(CAD)	(AUD) ^c	
Alberta	May 2002	\$69	\$70	17
British Columbia	Sep 1996	\$100	\$102	All
Manitoba	May 2013	Up to \$50 ^a	Up to \$51	17
New Brunswick	Dec 1995	\$21	\$21	All
Newfoundland & Labrador	Apr 2015	\$25-\$180	\$26-\$184	All
Nova Scotia ^b	Jul 1997	\$128	\$131	All
Ontario	Oct 1995	\$60	\$61	17
Prince Edward Island	Jul 2003	\$100	\$102	All

^a Fine can be dismissed if the cyclist takes the Manitoba Bike Helmet Safety Course.

^b Fine is replaced with a 2-hour education program delivered by police, health professionals and injury survivors

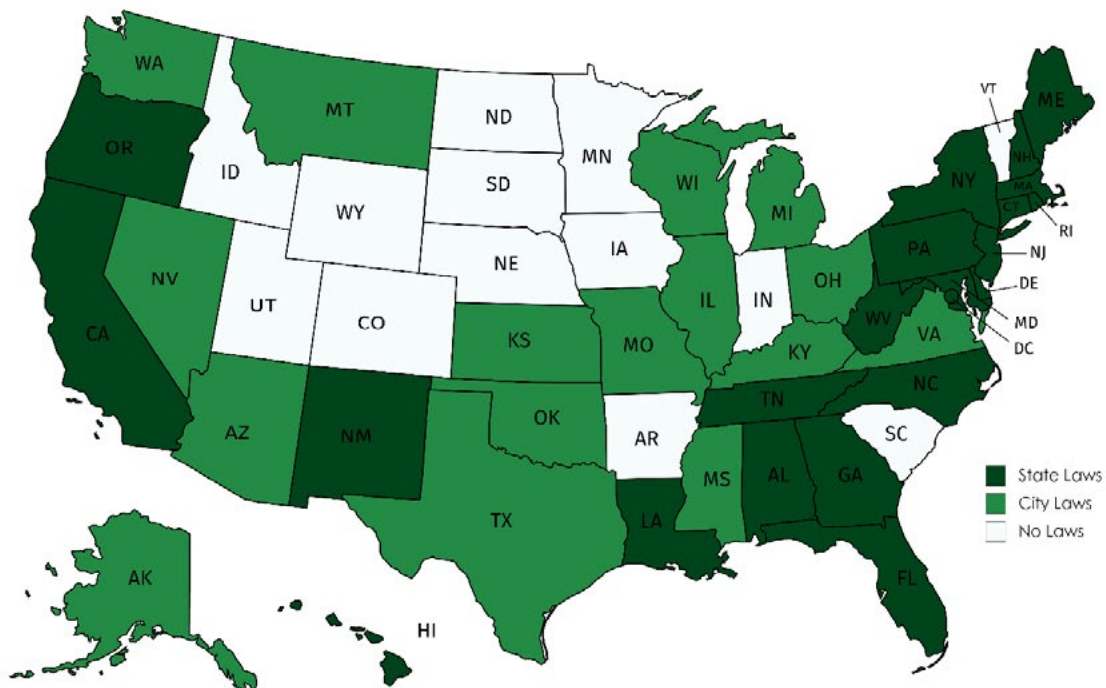
^c Conversion rate based on 10th April 2018 exchange rate rounded to nearest dollar value

United States

The state of California was the first jurisdiction in the world to introduce bicycle helmet legislation, although it applied only to passengers under 5 years of age. By 2007, an additional 36 states and the District of Columbia (DC) had enacted some form of bicycle helmet legislation (see Table 3). Sixteen states have only city-wide laws and 13 other states do not follow any form of bicycle helmet legislation

including Arkansas, Colorado, Idaho, Indiana, Iowa, Minnesota, Nebraska, North Dakota, South Carolina, South Dakota, Utah, Vermont, and Wyoming. In total, 21 states, the District of Columbia, and 203 cities, have some form of bicycle helmet legislation. Note that all state-level helmet laws in the US relate to children.

Further information related to the laws for each state/city of the United States can be found on the Bicycle Helmet

**Figure 3. Map of US States with Bicycle Helmet Legislation**

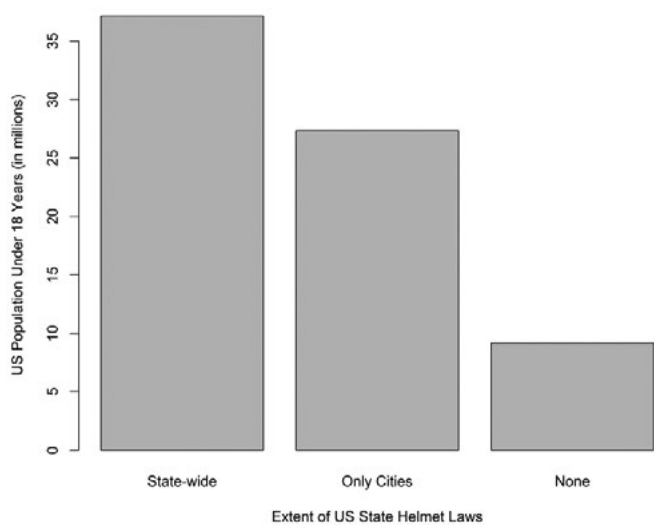


Figure 4. US population under 18 years of age by helmet law categories (source: US Census Bureau, 2017)

Safety Institute website (<http://www.bhsi.org/>). A state map of US helmet laws is given in Figure 3, and Figure 4 summarises the US population under 18 years of age by states categorised as having state-wide helmet laws, city only laws, or no laws.

In 1994, Tennessee passed a law requiring the use of helmets for cyclists under the age of 16. There was a move to repeal the law, but it was reconfirmed in 2000. Following a referendum in the City of Seymour, Connecticut, the all-ages helmet law was repealed in September 1998, two months after its introduction in July 1998. However, helmet legislation still applies to children up to 16 years of age due to a state-wide law in Connecticut. In Dallas, Texas, all-ages bicycle helmet legislation was enacted in 1996 and was relaxed in 2014, which then applied to children under 18 years. In Snohomish, Washington, an all-ages law was repealed in 2002; however, an existing law still applies to skate parks.

The original 1987 California helmet law was later modified in 1994 to apply to child riders under 18 years of age. Similarly, the Massachusetts' 1990 law was modified in 1994 and 2004, which applied to children under 12 and 17, respectively. Bicycle helmet legislation was also modified in the state of New York. The 1989 law was modified in 1994 to apply to children under 14 years. Pennsylvania introduced legislation in 1991 for children under 5 years, which was modified in 1995 to apply to children under 12 years. Rhode Island also modified the applicable age in their 1996 law for children under 9 years to children under 16 years in 1998

Other Jurisdictions

Apart from Australia, Canada, and United States, there are 25 countries with some form of bicycle helmet legislation (see Table 4). Among these countries, New Zealand (Povey et al, 1999) and France (Ministry of the Interior, 2016) were the first and the last to introduce legislation in 1994 and 2017, respectively.

Mexico City repealed their bicycle helmet law in February 2010, two years after its introduction in 2008. The repeal was motivated to support their shared bicycle rental program (Bicycle Helmet Safety Institute, 2017), although no evaluation of the repeal on cycling distances/trips travelled or any other measure of cycling exposure, cycling injury or road deaths could be found. Bosnia and Herzegovina introduced an all-ages bicycle helmet law in 2006 and was later repealed in March 2017. The repeal occurred after a six-year effort by the Centre for Environment campaign (Reid, 2017). There was an initial proposal in Finland to modify or repeal their helmet law; however, any potential changes in helmet legislation have been removed from discussions of their road traffic laws (Finnish Government, 2017 (b)). Malta is currently considering repealing their bicycle helmet law; however, new rules are currently being drafted and have not taken effect (Reljic, 2018).

In Argentina, children under 12 years of age are allowed to ride in parks without having to wear helmets. In Chile, helmet wearing is mandatory in urban areas for all ages, and not obligatory when riding in rural zones. Israel modified its all-ages law enacted in 2007. Since 2011, children under 18 years and all cyclists on interurban roads must wear a helmet when cycling. Czech Republic first introduced BHL for children under 16 years in 2001 which then changed in 2006 and applied to children under 18 years. In Slovakia, cyclists of all ages must wear a helmet except for cyclists older than 15 years when riding outside populated areas. Spain modified its all-ages law in 2014 where children under 16 years must wear a helmet regardless of the route and adults must wear a helmet when riding on interurban routes, except when travelling uphill, presumably because of heat effects and travelling uphill is slower.

There have been seventeen jurisdictions that have modified existing bicycle helmet laws, including three countries (Czech Republic, Israel, Spain), two Australian states (New South Wales, Northern Territory), six US states (California, Connecticut, Massachusetts, New York, Pennsylvania, Rhode Island), and six US cities (Austin TX, Seymour CT, Dallas TX, Snohomish WA, Southlake TX, St Louis County MO).

As summarised in the tables, the fines levied for violation of bicycle helmet legislation vary substantially among the jurisdictions. In all states of Australia, fines range from AUD25 to AUD330. In Canada, fines between CAD21 and CAD180 apply in all provinces with legislation. In the United States, fines apply in some states (between USD2 and USD100), but not all. In addition, fines apply in 12 out of the 23 other countries with some form of bicycle helmet legislation, with the highest rate in Spain (€200 which is equal to about AUD317 at the time this paper was written). The Australian state of New South Wales currently has the largest fine in the world (AUD330).

Table 3. Bicycle helmet legislation, United States

	State or city law ^a	Effective date	Current fine		Maximum age
			(USD)	(AUD) ^c	
Alabama	S	1995	\$50	\$65	15
Alaska	C (5)	-	-	-	-
Arizona	C (5)	-	-	-	-
California	S	1987/1994	up to \$25	Up to \$32	4/17
Connecticut	S	1993/1997	No fine	No fine	15
Delaware	S	1996	\$25-\$50 ^b	\$32-\$65 ^b	17
District of Columbia	S	2000	\$25	\$32	15
Florida	S	1997	\$17	\$22	15
Georgia	S	1993	No fine	No fine	15
Hawaii	S	2001	\$25	\$32	15
Illinois	C (6)	-	-	-	-
Kansas	C (1)	-	-	-	-
Kentucky	C (1)	-	-	-	-
Louisiana	S	2002	No fine	No fine	11
Maine	S	1999	\$25	\$32	15
Maryland	S	1995	No fine	No fine	15
Massachusetts	S	1990/1994/2004	No fine	No fine	4/11/16
Michigan	C (3)	-	-	-	-
Mississippi	C (4)	-	-	-	-
Missouri	C (39)	-	-	-	-
Montana	C (1)	-	-	-	-
Nevada	C (2)	-	-	-	-
New Hampshire	S	2006	No fine	No fine	15
New Jersey	S	1992	up to \$100	up to \$129	16
New Mexico	S	2007	up to \$10 ^c	Up to \$13 ^c	17
New York	S	1989/1994	\$50	\$65	4/13
North Carolina	S	2001	\$10 ^c	\$13 ^c	17
Ohio	C (24)	-	-	-	-
Oklahoma	C (2)	-	-	-	-
Oregon	S	1994	\$25 ^c	\$32 ^c	15
Pennsylvania	S	1991/1995	up to \$25 ^c	up to \$32 ^c	4/11
Rhode Island	S	1996/1998	No fine	No fine	8/15
Tennessee	S	1994/2000	\$2	\$3	15
Texas	C (9)	-	-	-	-
Virginia	C (31)	-	-	-	-
Washington	C (34)	-	-	-	-
West Virginia	S	1996	\$10 ^d	\$13 ^d	14
Wisconsin	C (1)	-	-	-	-

^a S = state law exists. C = no state law, but there is/are city law/s. Number of cities with some form of legislation in parentheses.

^b Cyclists will be fined \$25 for the first offense and \$50 for each subsequent offense.

^c In New Mexico, North Carolina, Oregon, and Pennsylvania, fine for not wearing a helmet waived if the cyclist provides a proof of helmet purchase.

^d Parents will be fined \$10 or be required to perform two hours in community service related to a child injury prevention program.

^e Conversion rate based on 10th April 2018 exchange rate rounded to nearest dollar value

Table 4. Bicycle helmet legislation, All Jurisdictions

	Effective date	Current fine^a	Maximum age
Argentina	2004	No fine	All
Australia	July 1990-July 1992	A\$25 – A\$330	All
Austria	Jun 2011	*	12
Canada	Oct 1995-Apr 2015	C\$21 - C\$180 (A\$21 - A\$184)	All/17
Chile	2009	UTM 0.5 - 1	
(A\$29 - A\$58)	All		
Czech Republic	2001/2006	Fines apply	15/18
Croatia	2008	HRK 300 (A\$64)	16
Estonia	Jul 2011	€15-20 (A\$24-A\$32)	16
Finland	Jan 2003	No fine	All
France	Mar 2017	€135 (A\$215)	12
Iceland	Sep 1999	No fine	15
Israel	Jul 2007/Aug 2011	No fine	All/18
Japan	2008	No fine	13
Jersey	Oct 2014	Fines apply (unknown)	12
Latvia	Oct 2014	*	12
Lithuania	*	*	18
Malta	Apr 2004	*	All
Namibia	*	NAD 100 (A\$11)	All
New Zealand	Jan 1994	NZD 55 (A\$52)	All
Nigeria	At least since 2012	N2000 (A\$7)	All
Slovakia	*	Fines apply	All
Slovenia	2000	€120 (A\$191)	15
South Africa	Oct 2004	No fine	All
South Korea	2006	*	13
Spain	2004/2014	€200 (A\$319)	All/15
Sweden	Jan 2005	€55 ^b (A\$88)	15
United Arab Emirates	2010	AED 500 (A\$176)	All
United States	1987-2007	US\$0 - US\$100 (A\$0 - A\$129)	

^a Conversion rate based on 10th April 2018 exchange rate rounded to nearest dollar value

^b There is no penalty for children. However, parents cycling with unhelmeted children are liable to a fine of €55 Euro.

* Information was not found

ALL is law applies to 'All Ages'

Discussion

Since the introduction of the first bicycle helmet law in 1987, there have been at least 273 bicycle helmet laws enacted all over the world (encompassing countries, states, provinces, territories, and cities). Two of these laws have been fully repealed including Mexico City (2010) and Bosnia and Herzegovina (2017). To the best of our knowledge, there have been no assessments regarding the impact of these repealed laws on either cycling distances/trips travelled, injury or road deaths.

The motivation for introducing BHL is to increase bicycle helmet wearing and, consequently, decrease bicycle related

head injury and fatalities as well as any associated societal costs. Although it has often been presented as being limited to Australia and New Zealand, BHL exists in many parts of the world with varying rules, enforcement levels, and affected ages.

BHL has been enacted in about half of the OECD, IRTAD and EU countries around the world irrespective of the measure. This includes nineteen of thirty-five members of the Organisation for Economic Co-operation and Development (OECD, 2018), nineteen of the forty members of the International Traffic Safety Data and Analysis Group (IRTAD) (International Transport Forum, 2018), and thirteen of the twenty-eight members of the European Union (EU).

Bicycle helmet laws often differ across jurisdictions due to discussions and debates prior to and following enactment. The Northern Territory, for example, discussed three options based on the cyclist's age – (1) all ages, (2) young people first and then adults, and (3) adults first and then young people (van Zyl, 1993). The NT government decided on the third option since adults comprised more than 70% of cycling injuries. Other jurisdictions have pushed for helmet legislation for children only since there is greater acceptance for younger age groups than adults (Hooper & Spicer, 2012; Biegler & Johnson, 2015; Swedish Government, 2004). In Finland, there have been discussions regarding the word *yleensä* mentioned in their helmet law. This word can be translated as both “usually” or “in general”, which limits the government's ability to enforce the law and has led some to interpret the law as a recommendation. Helmet laws have previously been discussed for New York City which was opposed by then mayor Michael Bloomberg. There was speculation that Bloomberg was not opposed to the law itself but to the city councilman who proposed the bill (Bateman-House, 2014).

Helmet legislation has been introduced for electric bicycles (ebikes) as well. To our knowledge, this includes all of Australia, parts of Canada, New Zealand, Switzerland, and parts of the United States. The proportion of ebikes has been rising, especially among older cyclists (Fishman & Cherry, 2016).

There are several limitations to the current systematic review. First, jurisdictions often report laws only in their own language and an accurate translation to English may be difficult. Second, there was conflicting information identified for some jurisdictions, such as Argentina, which was not listed as having a bicycle helmet law by IRTAD (ITF, 2017). However, article 40 of their road rules (Ley de tránsito, artículo 40) and an Argentinian legal advice website (Luchemos por la vida, 2009) state cyclists are required to wear protective helmet when riding a bicycle. Similarly, some sources reported that Nigeria does not have BHL; however, Nigeria has been listed with all ages BHL by IRTAD (ITF, 2017) which was verified by their road rules (regulation 195 of the National Road Traffic Regulations).

Conclusions

It is often claimed Australia and New Zealand are the only countries with bicycle helmet legislation and this claim is sometimes qualified as they are the only countries with all-ages laws. In this search, 28 countries were identified in total that have bicycle helmet legislation with nine countries (Argentina, Australia, Finland, Malta, Namibia, New Zealand, Nigeria, South Africa, and United Arab Emirates) having all-ages BHL. All-ages helmet laws also exist in Canada, Chile, Israel, Slovakia, Spain and the US depending on location or whether the cyclist is travelling in an urban or interurban area.

When the data is broken down in terms of countries, states, provinces, territories, and cities, there have been at least 273 bicycle helmet laws enacted worldwide. Additionally, these laws have been reasonably robust over the past 30 years with only two jurisdictions having fully repealed their laws.

Acknowledgements

This study was funded by the Swedish Transport Administration (Trafikverket). The funders had no part in the design, data collection, or interpretation of the reported results.

The authors would like to thank Catharina Arvidsson (VTI), Michal Bil (Czech Transport Research Centre), Erin Berenbaum (Public Health Ontario), Carl Bonander (Karlstad University), David Cosgrove (Australian Bureau of Infrastructure, Transport and Regional Economics), Spiros Frangos (Bellevue Hospital Center, New York University), Lindsay Gaudet (University of Alberta), John Hurlbert (University of Calgary), Soames Job (Global Road Safety Solutions), Mohammad Karkhaneh (University of Alberta), Michael Koucky (Koucky & Partners AB), Pablo Lardelli-Claret (University of Granada), Carmen Meneses Falcón (Universidad Pontificia Comillas), Tom Petersen (Trafikanalys, Sweden), Igor Radun (University of Helsinki), Chika Sakashita (Global Road Safety Solutions), Katja Schleinitz (University of Technology Chemnitz), Robert J. Schneider (University of Wisconsin-Milwaukee), Jónína Snorradóttir (Icelandic Association for Search and Rescue), Helena Stigson (Folksam), Randy Swart (BHSA), and Naveen Wijemanne (ACT Justice and Community Safety) for providing valuable information for this report.

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