Summary of road safety performance in 2012 and 2013

In **2012** success in reducing road fatalities in the IRTAD member countries was relatively modest, while mobility (in terms of vehicle-kilometres) hardly changed (increase by 0.6% from 2011[1]). At only minus 1.7%[2], IRTAD saw the lowest fatality reduction rate in ten years; the more than 79 000 total fatalities of 2011 were reduced by around 1 300, and ten countries faced an increase in 2012, among them New Zealand (+8.5%), Switzerland (+5.9%) and the United States (+3.3%) (see Table 1).

Preliminary trends for **2013**, based on provisional fatality data in IRTAD Member and observer countries, show an equally dispersed picture: ten of the countries saw an increase in fatalities, in excess of 10% in some cases. 22 countries managed to reduce their road death toll; some by more than 10%, including Austria, the Czech Republic, France, Greece, Lithuania, New Zealand, the Netherlands, Portugal and Switzerland (see Table 2).

Table 1. **Annual evolution in the number of road fatalities**
(Iceland and Luxembourg omitted for small figures)

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Argentina					+10.9%	+13.8%	+8.7%	+6.1%	-9.4%	-2.4%	-1.1%	+1.3%
Australia	-4.4%	-1.3%	-5.5%	-2.3%	+2.8%	-1.5%	+0.1%	-10.4%	+3.5%	-9.1%	-5.6%	+1.7%
Austria	-1.8%	-0.2%	-2.6%	-5.7%	-12.5%	-4.9%	-5.3%	-1.7%	-6.8%	-12.8%	-5.3%	+1.5%
Belgium	+1.1%	-9.0%	-10.3%	-4.2%	-6.3%	-1.8%	+0.2%	-11.9%	-0.1%	-10.9%	+2.5%	-10.9%
Cambodia									+4.8%	+5.8%	+4.9%	+3.2%
Canada*	-5.1%	+6.0%	-4.9%	-1.7%	+6.1%	-0.5%	-4.3%	-11.8%	-8.7%	+0.6%	-10.3%	+4.9%
Czech Republic	-10.2%	+7.3%	+1.1%	-4.5%	-6.9%	-17.3%	+15.0%	-11.9%	-16.3%	-11.0%	-3.6%	-4.0%
Denmark	-13.5%	+7.4%	-6.7%	-14.6%	-10.3%	-7.6%	+32.7%	+0.0%	-25.4%	-15.8%	-13.7%	-24.1%
Finland	+9.3%	-4.2%	-8.7%	-1.1%	+1.1%	-11.3%	+13.1%	-9.5%	-18.9%	-2.5%	+7.4%	-12.7%
France	+1.0%	-6.2%	-20.9%	-7.7%	-4.9%	-11.5%	-2.0%	-7.4%	-0.0%	-6.6%	-0.7%	-7.8%
Germany	-7.0%	-1.9%	-3.3%	-11.7%	-8.2%	-5.0%	-2.8%	-9.5%	-7.3%	-12.1%	+9.9%	-10.2%
Greece	-7.7%	-13.1%	-1.8%	+4.0%	-0.7%	-0.1%	-2.7%	-3.7%	-6.2%	-13.6%	-9.3%	-13.8%
Hungary	+3.3%	+15.3%	-7.2%	-2.3%	-1.4%	+2.0%	-5.4%	-19.2%	-17.3%	-10.2%	-13.8%	-5.2%
Ireland	-1.0%	-8.5%	-10.9%	+11.6%	+5.9%	-7.8%	-7.4%	-17.5%	-14.7%	-10.9%	-12.3%	-12.9%
Israel	+17.5%	-3.0%	-13.6%	+4.9%	-6.4%	-7.3%	-5.7%	+7.9%	-23.8%	+12.1%	-3.1%	-22.9%
Italy	+0.5%	-1.6%	-6.0%	-6.7%	-5.0%	-2.6%	-9.5%	-7.9%	-10.3%	-2.9%	-6.2%	-5.4%
Japan	-3.3%	-4.2%	-7.3%	-4.3%	-6.7%	-8.3%	-8.8%	-9.2%	-3.9%	-0.4%	-5.1%	-4.9%
Korea	-20.9%	-10.8%	-0.1%	-9.0%	-2.8%	-0.8%	-2.5%	-4.8%	-0.5%	-5.7%	-5.0%	+3.1%
Netherlands	-8.2%	-0.6%	+4.2%	-21.8%	-6.7%	-2.7%	-2.9%	-4.5%	-4.9%	-16.6%	+1.7%	+2.9%
New Zealand	-1.5%	-11.2%	+14.1%	-5.4%	-7.1%	-3.0%	+7.1%	-13.3%	+5.2%	-2.3%	-24.3%	+8.5%
Norway	-19.4%	+13.5%	-9.6%	-8.5%	-13.6%	+8.5%	-3.7%	+9.4%	-16.9%	-1.9%	-19.2%	-13.7%
Poland	-12.1%	+5.3%	-3.2%	+1.3%	-4.7%	-3.7%	+6.5%	-2.6%	-15.9%	-14.5%	+7.2%	-14.8%
Portugal	-10.0%	+0.2%	-7.7%	-16.3%	-3.6%	-22.3%	+0.5%	-9.1%	-5.0%	+0.9%	-4.9%	-19.4%
Slovenia	-11.5%	-3.2%	-10.0%	+13.2%	-5.8%	+1.9%	+11.4%	-27.0%	-20.1%	-19.3%	+2.2%	-7.8%
Spain	-4.5%	-3.1%	+1.0%	-12.2%	-6.3%	-7.6%	-6.8%	-18.9%	-12.5%	-8.7%	-16.9%	-7.6%
Sweden	-6.3%	-4.0%	-0.6%	-9.3%	-8.3%	+1.1%	+5.8%	-15.7%	-9.8%	-25.7%	+19.9%	-10.7%
Switzerland	-8.1%	-5.7%	+6.4%	-6.6%	-19.8%	-9.5%	+3.8%	-7.0%	-2.2%	-6.3%	-2.1%	+5.9%
United Kingdom	+0.5%	-0.5%	+2.2%	-7.9%	-1.0%	-1.1%	-7.2%	-13.5%	-11.6%	-18.5%	+2.9%	-8.1%
United States*	+0.6%	+1.9%	-0.3%	-0.1%	+1.6%	-1.8%	-3.4%	-9.3%	-9.5%	-2.6%	-1.6%	+3.3%

Source: IRTAD.
*provisional data for 2012

[1] For the 19 countries which provided mobility data for the given years.

[2] For the 31 countries listed in Table 1, it does not include data from new member and observer countries for which data are currently under review. For a full list of IRTAD countries, including observers, see Page 533 for reference.

Table 2. **Preliminary trends for 2013, based on provisional fatality data**
(compared to the same period in 2012)

Country	Trend	Period	Country	Trend	Period
Argentina	↔	Provisional annual fatality data	Italy		Provisional data for motorways and state roads show a decrease in the number of fatalities.
Australia*	↘↘	Provisional annual fatality data	Japan	↘	Final annual fatality data
Austria*	↘↘↘	Final annual fatality data	Korea*	↘↘	Final annual fatality data
Belgium	↘↘	Provisional annual fatality data	Lithuania*	↘↘↘	Final annual fatality data
Cambodia	↔	Final annual fatality data	Luxembourg	↗↗↗	Final annual fatality data
Canada			Malaysia	↔	Provisional annual fatality data
Chile*	↗↗	Provisional annual fatality data	Netherlands* (real data see country rep.)	↘↘↘	Final annual fatality data
Colombia	↗	Provisional annual fatality data	New Zealand*	↘↘↘	Final annual fatality data
Czech Republic*	↘↘↘	Provisional annual fatality data	Nigeria*	↗↗	Provisional annual fatality data
Denmark	↗↗↗	Provisional annual fatality data	Norway*	↗↗↗	Provisional annual fatality data
Finland	↗	Provisional annual fatality data	Poland*	↘↘	Final annual fatality data
France*	↘↘↘	Provisional annual fatality data	Portugal*	↘↘↘	Provisional fatality data January to September
Germany*	↘↘	Provisional annual fatality data	Serbia	↘	Final annual fatality data
Great Britain	↘	Provisional fatality data 12months gliding to September	Slovenia	↘	Final annual fatality data
Greece*	↘↘↘	Provisional annual fatality data	Spain*	↘↘	Provisional annual fatality data
Hungary	↘	Final annual fatality data	Sweden	↘↘	Final annual fatality data
Iceland	↗↗↗	Provisional annual fatality data	Switzerland*	↘↘↘	Final annual fatality data
Ireland*	↗↗↗	Final annual fatality data	United States*	↘	Provisional fatality data 12months gliding to September
Israel	↗	Final annual fatality data			

Source: IRTAD.

-1% < change < 1% ↔
Decrease 1-5% ↘ Increase 1-5% ↗
Decrease 5-10% ↘↘ Increase 5-10% ↗↗
Decrease > 10% ↘↘↘ Increase > 10% ↗↗↗

* Change significant at the 5% level.

Table 3. **Road safety trends**

Road Fatalities									
	Recent data				Long-term trends	Average annual change[1]			
Country	2012	2011	2010	Change 2012-2011	Change 2012-2000	2010-2001	2000-1991	1990-1981	1980-1971
Argentina	5 104	5 040	5 094	1.3%	-	-	-	-	-
Australia	1 299	1 277	1 353	1.7%	-28.5%	-2.7%	-1.7%	-3.9%	-1.0%
Austria	531	523	552	1.5%	-45.6%	-5.9%	-5.0%	-2.5%	-3.9%
Belgium	767	861	840	-10.9%	-47.8%	-6.1%	-2.7%	-1.3%	-2.8%
Cambodia	1 966	1 905	1 816	3.2%	-	-	-	-	-
Canada	2 104[p]	2 006	2 237	4.9%	-27.5%	-2.3%	-2.6%	-3.3%	-0.2%
Chile[a]	1 980	2 045	2 074	-3.2%	-10.3%	0.2%	-	-	-
Colombia[a*]	5 922	5 528	5 502	7.1%	-9.6%	-1.6%	-	-	-
Czech Republic	742	773	802	-4.0%	-50.1%	-5.5%	1.2%	0.8%	-4.9%
Denmark	167	220	255	-24.1%	-66.5%	-5.7%	-2.2%	-0.5%	-6.1%
Finland	255	292	272	-12.7%	-35.6%	-5.0%	-5.1%	1.8%	-7.8%
France	3 653	3 963	3 992	-7.8%	-55.3%	-7.8%	-2.5%	-2.1%	-2.8%
Germany	3 600	4 009	3 648	-10.2%	-52.0%	-7.0%	-4.4%	-	-
Greece	984	1 141	1 258	-13.8%	-51.7%	-4.4%	-0.4%	2.8%	3.0%
Hungary	605	638	740	-5.2%	-49.6%	-5.6%	-6.1%	4.7%	-1.3%
Iceland	9	12	8	-25.0%	-71.9%	-11.5%	1.9%	0.0%	2.0%
Ireland	162	186	212	-12.9%	-61.0%	-7.1%	-0.8%	-2.0%	-0.2%
Israel	263	341	352	-22.9%	-41.8%	-4.5%	0.4%	-0.2%	-4.0%
Italy	3 653	3 860	4 114	-5.4%	-48.3%	-5.9%	-1.5%	-2.2%	-1.9%
Jamaica[a]	260[p]	307	319	-15.3%	-22.2%	-1.4%	-3.1%	-	-
Japan	5 237	5 507	5 806	-4.9%	-49.7%	-5.9%	-3.6%	2.8%	-6.7%
Korea	5 392	5 229	5 505	3.1%	-47.3%	-4.2%	-4.5%	8.7%	5.6%
Lithuania[b]	301	296	300	1.7%	-53.0%	-9.1%	-6.5%	2.6%	-
Luxembourg	34	33	32	3.0%	-55.3%	-8.3%	-1.0%	-3.7%	1.5%
Malaysia[b]	6 917	6 877	6 872	0.6%	14.6%	1.8%	-	-	-
Netherlands	650	661	640	-1.7%	-44.3%	-5.7%	-1.0%	-3.0%	-5.0%
New Zealand	308	284	375	8.5%	-33.3%	-2.1%	-3.7%	1.0%	-1.4%
Nigeria[c]	6 092	6 054	6 052	0.6%	-28.1%	-	-	-	-
Norway	145	168	208	-13.7%	-57.5%	-3.1%	0.6%	-0.2%	-4.2%
Poland	3 571	4 189	3 908	-14.8%	-43.3%	-3.8%	-2.5%	2.1%	-
Portugal	718	891	937	-19.4%	-65.0%	-7.3%	-4.5%	0.3%	3.5%
Serbia[c]	688	731	660	-5.9%	-34.4%	-7.1%	-6.4%	0.9%	-
Slovenia	130	141	138	-7.8%	-58.6%	-7.5%	-4.2%	-1.0%	-1.6%
Spain	1 903	2 060	2 478	-7.6%	-67.1%	-8.5%	-4.6%	3.9%	1.9%
Sweden	285	319	266	-10.7%	-51.8%	-7.8%	-2.5%	-0.2%	-3.9%
Switzerland	339	320	327	5.9%	-42.7%	-5.5%	-3.7%	-2.2%	-3.8%
United Kingdom	1 802	1 960	1 905	-8.1%	-49.7%	-6.8%	-3.1%	-1.3%	-2.8%
United States	33 561[p]	32 479	32 999	3.3%	-20.0%	-2.7%	0.1%	-1.1%	-0.3%

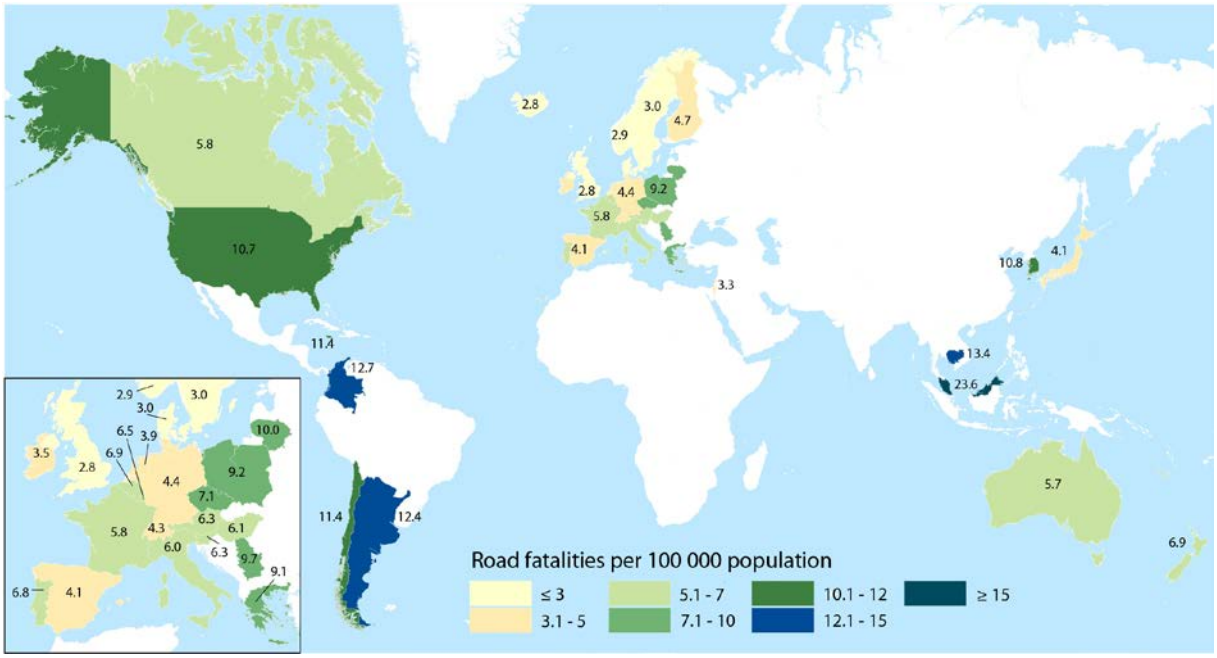
Source: IRTAD
Police-recorded fatalities (except the Netherlands for 2000 onwards: real data, see country report). Death within 30 days.
For recent methodology changes in calculation of the fatality data in Austria, Spain and Portugal, see country reports.
a=IRTAD LAC b=accession country. Data are under review. c=observer. Data not reviewed by IRTAD. p=provisional data for 2012.
*Information provided by CFPV not validated by the Government of Colombia.

[1]Geometric mean: $1-(\Sigma Fatalities_{EndYear}/\Sigma Fatalities_{StartYear})^{1/n}$ n…Number of years (n=9 for period 2001 to 2010)

Five countries now at 3 or less fatalities per 100 000 population

2012 nevertheless saw some significant successes: a record number of countries managed to reduce the number of road fatalities per 100 000 population to three or less, namely Iceland, United Kingdom, Norway, Denmark and Sweden (see Figure 1). These countries may serve as role models for other countries, showing that further progress in road safety is always possible, even for the best performers.

Figure 1. **Road fatalities per 100 000 population in 2012 in IRTAD member and observer countries**



Source: IRTAD.

Success since 2000

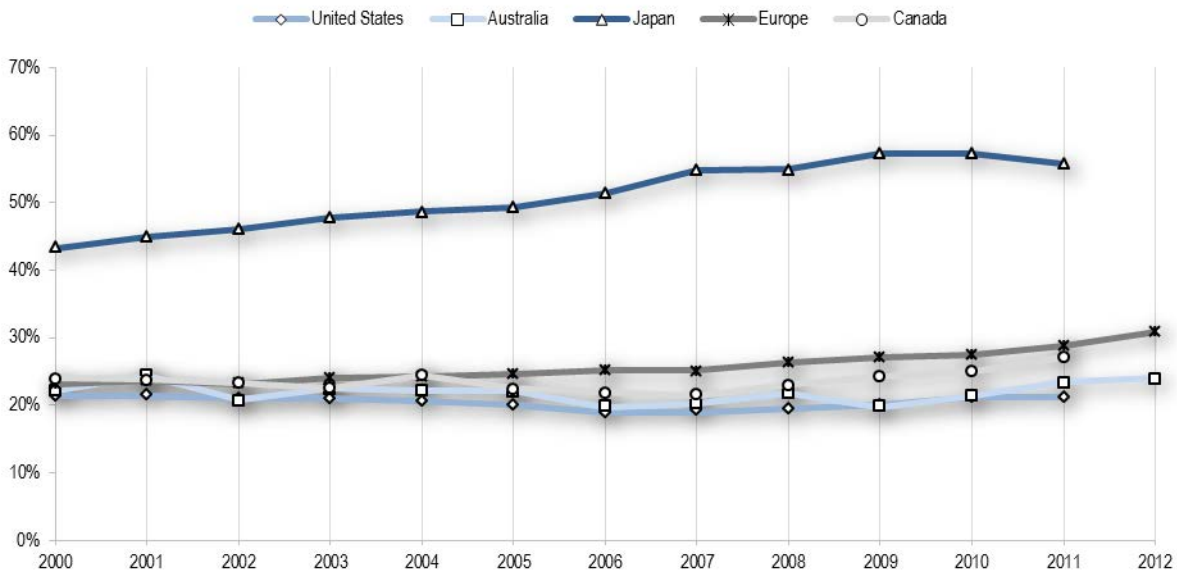
Success in improving safety levels over the decade since 2000 continues to be unequally spread, both across countries and across transport modes. The highest fatality reductions since 2000 were achieved in Spain (-67.1%), Denmark (-66.5%) and Portugal (-65.0%), whereas least success was recorded for the United States (-20.0%) and Australia (-28.5%)[3] as well as in a number of observer countries (see figure 9).

[3] Iceland not listed here because of small numbers.

Share of elderly road user fatalities increasing

The share of fatalities among elderly road users is on a slow increase in many IRTAD countries, reflecting the changing age structure of populations and a trend to stay mobile for longer. In 2012, for European IRTAD members the share of fatalities in the age group 65+ was, for the first time, in excess of 30%. In Japan, this share is traditionally much higher, now around 55%. The share of the elderly among the population varies substantially at 14% in the United States, Canada and Australia, 18% for Europe and 23% for Japan, indicating that the chance of surviving a road crash is significantly reduced for elderly road users. In many IRTAD regions the elderly population has continuously grown since 2000 – by more than 10% in the United States, Canada, Europe and Japan.

Figure 2. **Road fatalities in the age group 65+ in selected IRTAD countries/regions**
(% of all fatalities)

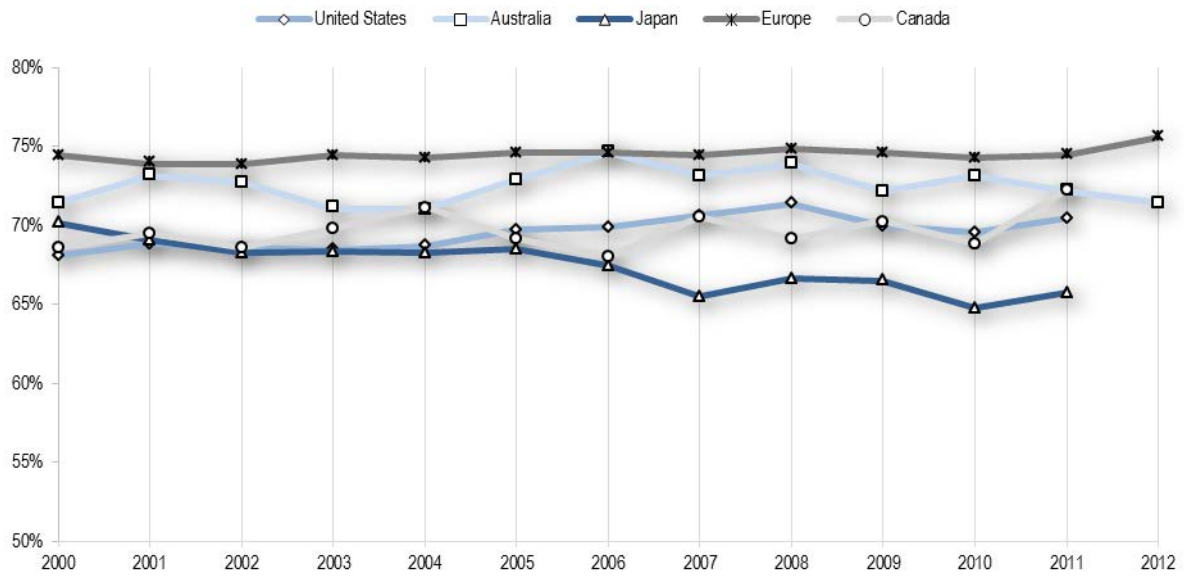


Source: IRTAD.

The majority of fatalities are male

Males account for the largest share of fatalities across all modes (including pedestrians), with the lowest shares in Japan (around 65% of all fatalities) and the highest in Europe (more than 75% in 2012). Except for Japan, slight increases in the share of male fatalities are noted in several OECD regions since 2000, such as North America and Europe (see Figure 3**Error! Reference source not found.**). The percentage of males in the general population in the regions observed ranges from 48.7% in Japan to 49.8% in Australia, with no obvious trend in the observation period.

Figure 3. **Share of male road fatalities in selected IRTAD countries / regions**
(% of all fatalities)

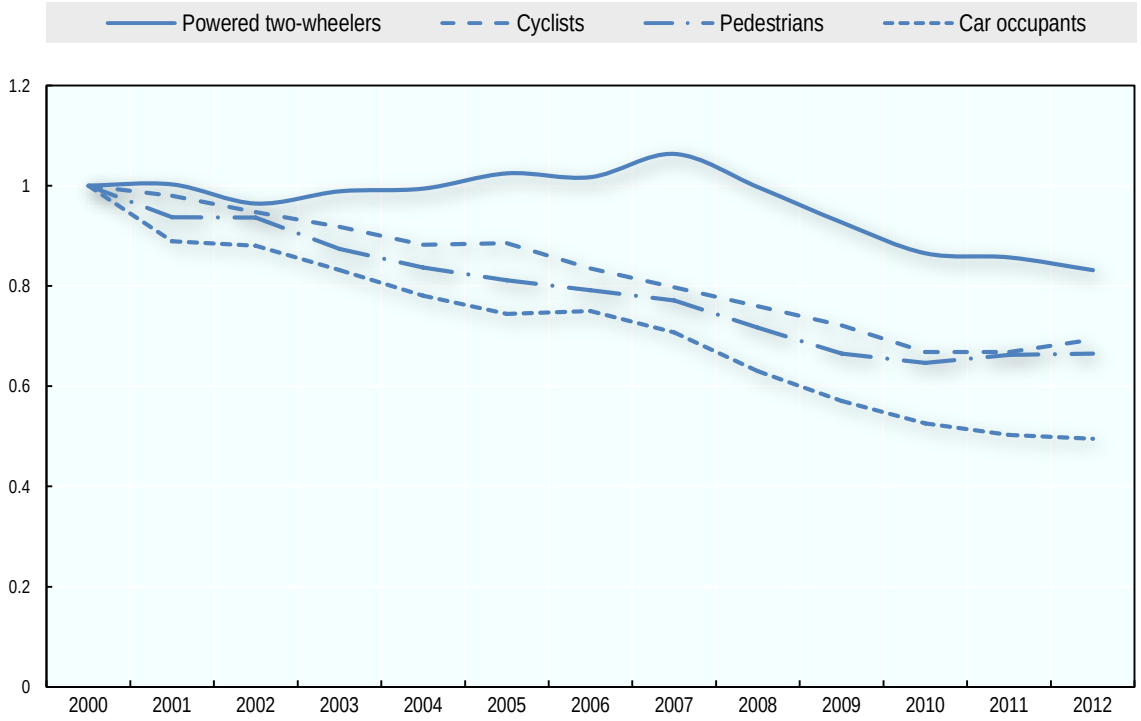


Source: IRTAD.

Only moderate safety improvements for vulnerable road users

Since the year 2000, there has been, however, less success in saving lives among vulnerable road users than amongst car occupants: reduction in deaths among pedestrians, cyclists and motorcyclists have levelled-off and some increases have been recorded since 2009-10. Fatalities among car occupants were reduced by 50% between 2000 and 2012, whereas decreases were only 34% for pedestrians, 31% for cyclists and 17% for motorcyclists – the latter after an initial increase until 2007.

Figure 4. **Development of fatalities in IRTAD countries by road user type**
(2000 = 1)

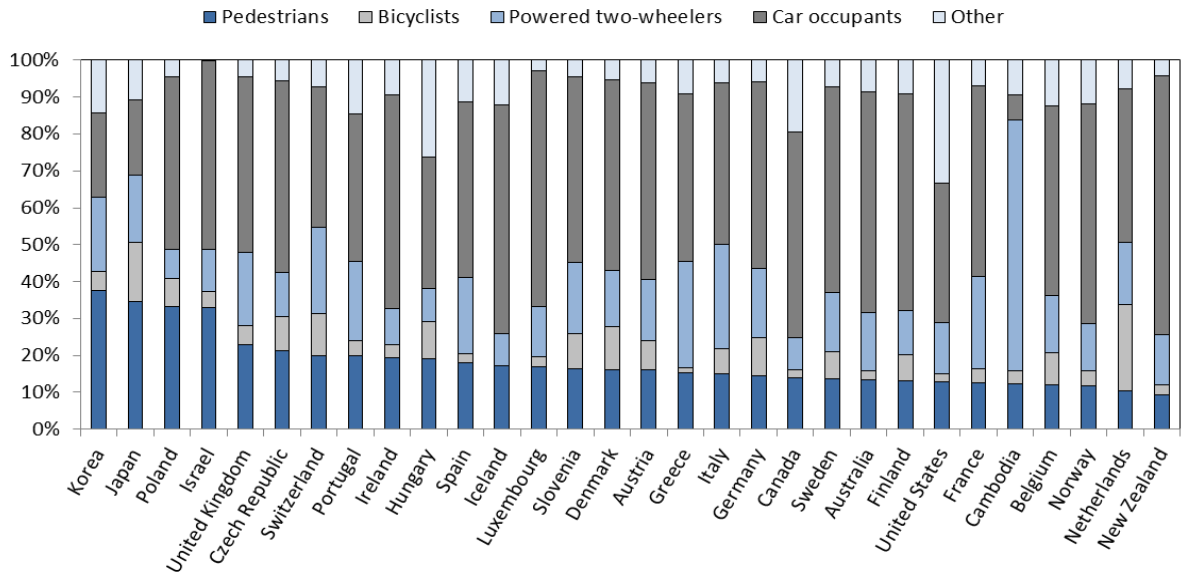


Source: IRTAD.

Pedestrian safety

Pedestrians are the largest group of vulnerable road users in most countries and account for around 19% of all fatalities in IRTAD countries. Close to 40% of all pedestrians killed belong to the age group 65+; this share has constantly increased from less than 34% in 2000, indicating the changing safety requirements of an ageing society which will have to be met by our transport system. The highest shares of pedestrian fatalities were recorded in Korea, Japan, Poland and Israel (see Figure 5**Error! Reference source not found.**). Pedestrian safety continues to be one of the major road safety issues around the world, especially in lower income countries.

Figure 5. **Fatalities (average 2008-2012)**
Share of different road user categories



Source: IRTAD.

As the comparatively poor improvements in pedestrian safety have become a concern at OECD level, the Joint Transport Research Centre of OECD and the International Transport Forum (JTRC) convened an international expert group and published a report entitled "Pedestrian Safety, Urban Space and Health in 2012"[4]. The report sets out strategies to provide a safe walking infrastructure - both from the urban stages of urban development projects and in on-going transport investment – and to promote walking as a healthy alternative and complement to motorised transport.

[4] http://internationaltransportforum.org/jtrc/safety/PUSH/index.html

The 9 key messages of the JTRC Research Report "Pedestrian Safety, Urban Space and Health in 2012":

1. Walking is the most fundamental form of mobility. It is inexpensive, emission-free, uses human power rather than fossil fuel, offers important health benefits, is equally accessible for all – except those with substantially impaired mobility – regardless of income, and for many citizens is a source of great pleasure. Yet walking presents challenges to society's least robust individuals.
2. The vitality of a city is closely linked to people being out and about on foot for many purposes. Beyond walking for access to goods and services, these other activities in the urban space are collectively termed "sojourning". Walking and sojourning are at the heart of urban life and contribute to liveable, attractive, prosperous and sustainable cities.
3. Walking is, however, the neglected transport mode and, despite being at the start and end of all trips, is rarely captured in government statistics on mobility and is often neglected in planning and policy development.
4. Public institutions representing specifically the interests of pedestrians – including the socially disadvantaged members of society who rely heavily on walking – are rare.
5. Walking and public transport are interdependent elements of sustainable urban mobility. Walking is facilitated by a well-connected network with pedestrian-friendly infrastructure and well-designed urban space.
6. Pedestrians are among the road users most vulnerable to traffic injury. It has become highly challenging, especially for older and young people, to cope with the complex, sometimes hostile, traffic conditions that characterise today's cities and towns.
7. Pedestrians suffer severe trauma from falls in public spaces and in traffic collisions while crossing streets. The magnitude of the consequences of falls is known to be underestimated. Older people have an elevated risk of severe injury and death from both falls and traffic collisions.
8. Lowering motorised traffic speeds reduces the frequency and severity of crashes, especially those involving pedestrians. Reducing speed also contributes to smoother traffic flow, and enhances in many ways the liveability and sustainability of cities.
9. Motorisation has contributed to urban sprawl, and cities have evolved to accommodate car use, with many negative impacts on life and social cohesion. Changes are required now to manage the preponderant role of motorised traffic in industrialised countries. This is also urgent in low- and middle-income countries, which are now moving rapidly towards much higher levels of motorisation.

Cycling safety

Cycling is an increasingly popular alternative transport mode for short trips – for economic and ecological reasons, and – not least – as a means to improve health. The increasing number of cyclists has coincided with a tailing-off of cycling safety improvement over the past decade. Cyclists currently represent around 5% of all fatalities in IRTAD countries, with an increasing trend since 2010. This prompted the JTRC to convene an international expert group. Their research report, "Cycling, Health and Safety", was published in 2013[5]. The report monitors international trends in cycling, safety and policy, and explores options that may help decision-makers design safe environments for cycling. The safety impacts of a wide range of pro-cycling measures are examined in detail and a range of good-practice examples presented.

The 11 key recommendations of the JTRC Research Report "Cycling, Health and Safety"

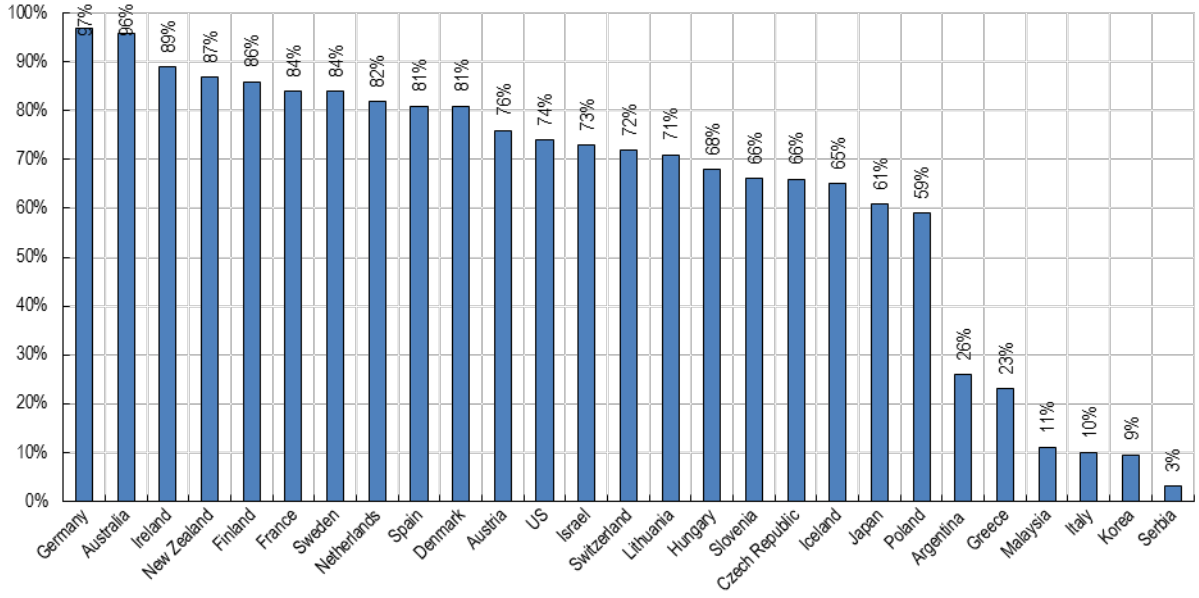
1. Where it does not reduce the quality of cycling networks, bicycle facilities should be located away from road traffic when feasible – especially for sections where cars are accelerating (hills, long straightaways).
2. Insufficient evidence supports causality for the "safety in numbers" phenomenon – policies increasing the number of cyclists should be accompanied by risk-reduction actions.
3. Efforts must be made to harmonise definitions of bicycle accident terminology so as to be able to make reliable international comparisons on cyclist safety.
4. National authorities should set standards for, collect or otherwise facilitate the collection of data on non-fatal cycling crashes based on police reports and, in either a systematic or periodic way, on hospital records.
5. National authorities should set standards for, collect or otherwise facilitate the collection of accurate, frequent and comparable data on bicycle usage.
6. Speed management acts as "hidden infrastructure" protecting cyclists and should be included as an integral part of cycle safety strategies.
7. Cyclists should not be the only target of cycling safety policies – motorists are at least as important to target.
8. Cycle safety policies should pay close attention to intersection design – visibility, predictability and speed reduction should be incorporated as key design principles.
9. Authorities seeking to improve cyclists' safety should adopt the Safe System approach – policy should focus on improving the inherent safety of the traffic system, not simply securing cyclists in an inherently unsafe system.
10. Authorities should match investments in cycle safety to local contexts, including levels of bicycle usage and account for cyclist heterogeneity.
11. Cycle safety plans should address safety improvement and the improvement of perceived safety.

[5] http://internationaltransportforum.org/jtrc/safety/cycling.html

Use of safety equipment: Seat-belt use

The use of seat belts is regarded as one of the most efficient measures to save lives and reduce crash injury severity for car occupants. Despite the fact that most IRTAD countries have mandatory seat-belt regulations in place, use rates vary widely both between countries and between front and rear seats. For front seats, values typically range between 80% and 100% whereas for rear seats the range is between 3% (Serbia) and over 90% (Germany, Australia) (see Figure 6).

Figure 6. **Seat-belt use on rear seats in IRTAD member countries**
(most recent available data)



Source: IRTAD.

Examples of road safety policy activities in IRTAD countries

The IRTAD Group is not only a platform for collection and analysis of key crash and fatality data but also a forum for exchange of good practices in terms of policy developments, road safety strategies and successful interventions. Therefore, a regular survey is carried out annually among members, regarding progress among all dimensions of road safety management. Detailed information on particular member states can be found in the Country Reports of the IRTAD annual report.

A number of new policy initiatives were implemented. In Europe, for example, alcohol ignition interlocks have entered into legislation in Sweden and Finland; Belgium and Austria have introduced regulations for streets where cyclists have priority; the Netherlands are testing self-reporting of road accidents in a pilot study; France is increasing the use of red light cameras as well as mobile speed cameras. From Malaysia, a set of promising safety initiatives was reported, among them an automated enforcement programme and a customer response-based safety performance check of bus operators. In Canada and the United States, a Fatigue Management Programme for professional drivers was launched.

Figure 7 presents an overview on policy activities in the IRTAD countries.

Figure 7. **Policy activities in IRTAD member countries**

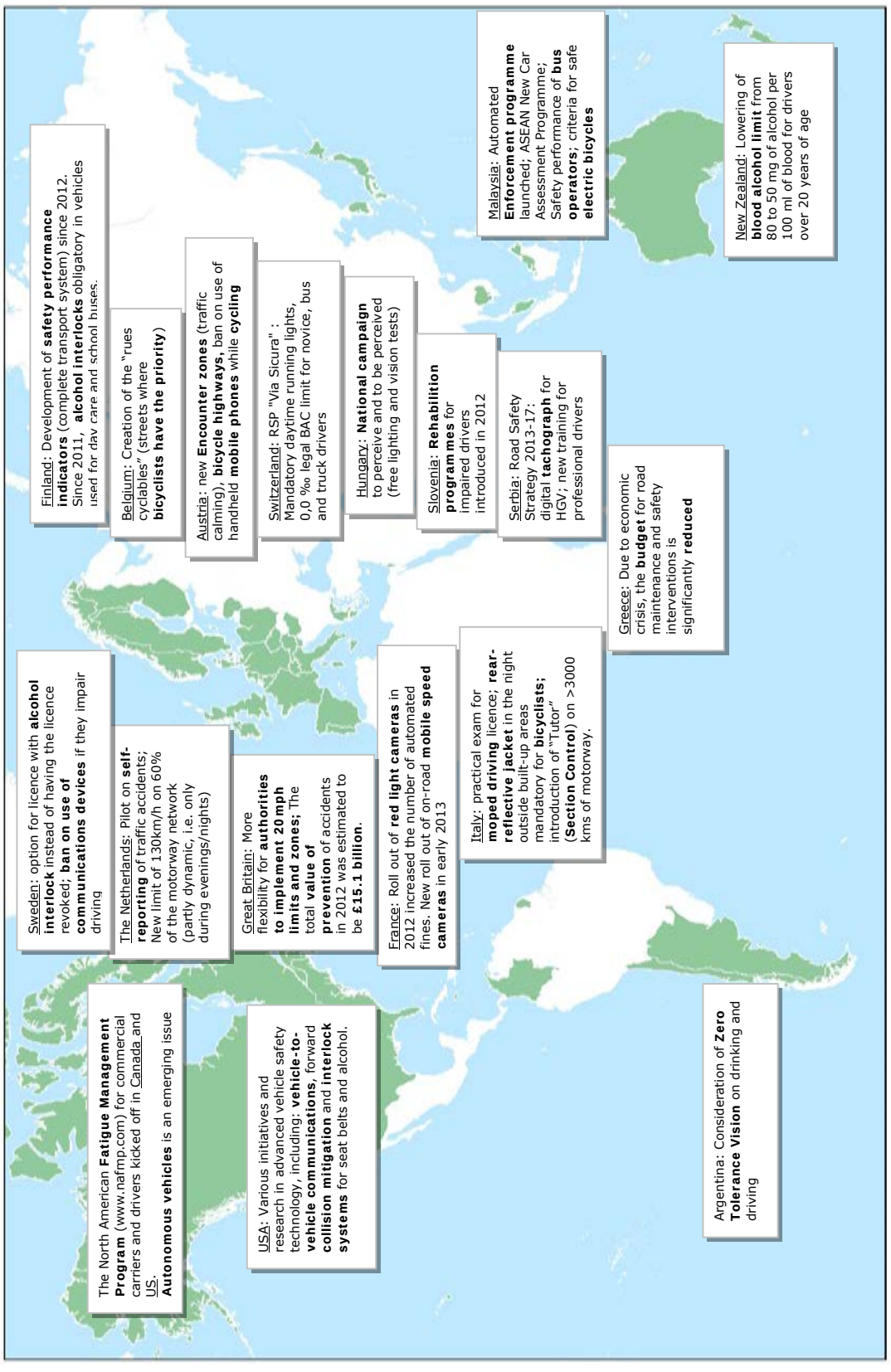
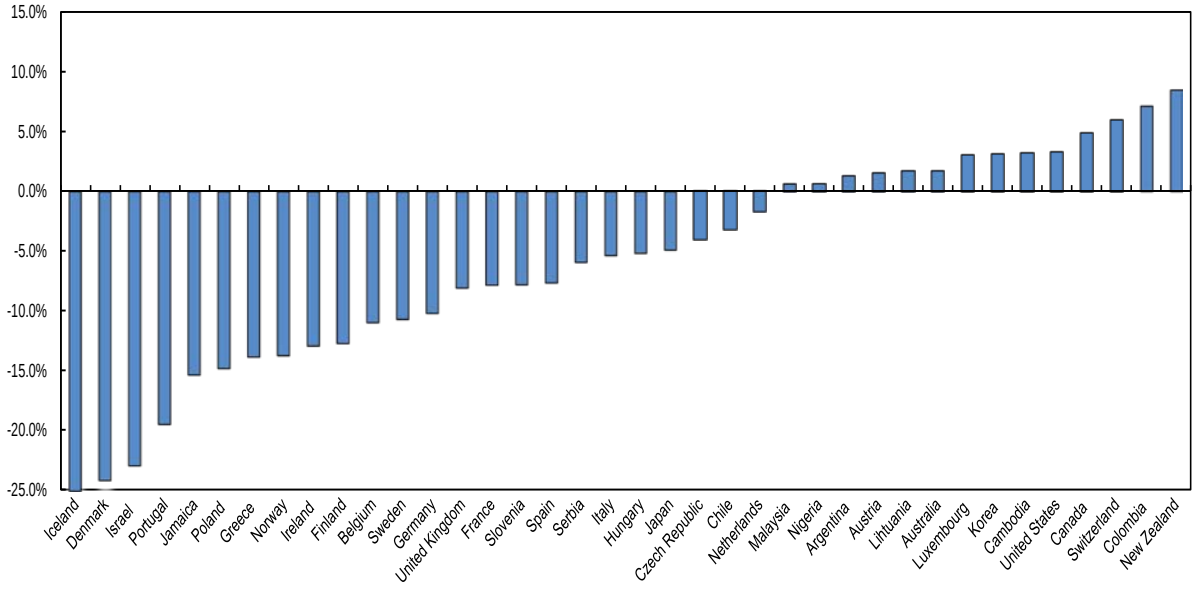
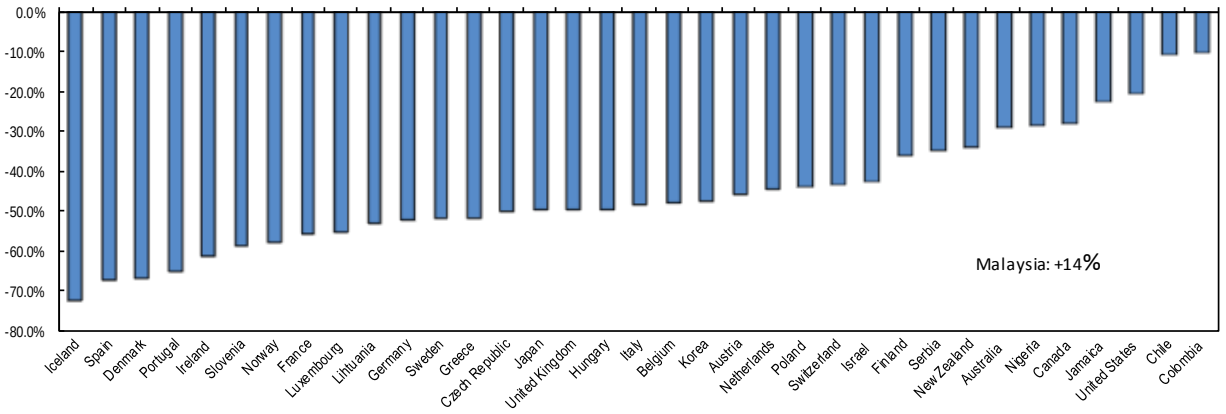


Figure 8. **Short-term change**
Road fatalities: 2012 in comparison to 2011



Source: IRTAD.
Note: provisional data for Jamaica, United States and Canada. Real data for the Netherlands.

Figure 9. **Medium term change**
Road fatalities: 2012 in comparison to 2000



Source: IRTAD.
Note: provisional data for Canada, Jamaica and the United States. Real data for the Netherlands.

Trends in death rates

This section presents the performance of IRTAD countries in relation to various road safety indicators.

Measuring the mortality rate and fatality risk

To measure road safety performance two different indicators can be used: the number of fatalities or (serious) injuries per head of population (mortality rate resp. morbidity rate) or the number of fatalities or (serious) injuries per distance travelled by (motorised) vehicles (fatality rate or casualty rate). The first indicator is used in the health sector, since it permits comparisons with other causes of injury and death, including infectious diseases. In the transport sector it has been common to use fatalities per distance travelled (e.g. fatalities per million vehicle-kilometres) as a principal indicator. If good data on kilometres travelled is not available a proxy is used: per 10 000 vehicles. Both indicators are used next to each other and they serve different purposes.

Fatalities per 100 000 head of population. The number of inhabitants is the denominator most often used, as the figure is readily available in most countries. This rate expresses the mortality rate, or an overall risk of being killed in traffic, for the average citizen. It can be compared with other causes of death, like heart disease, HIV/Aids, etc. This is a particularly useful indicator to compare risk in countries with comparable levels of motorisation. It is, however, not very meaningful to compare safety levels between high-motorised countries and countries where the level of motorisation is low.

Fatalities per billion vehicle–kilometres (or fatalities per billon person-kilometres, taking vehicle occupancy into account). This is the indicator to describe the safety quality of road traffic. Only a limited number of countries collect data on distance travelled.

Fatalities per 10 000 registered (motorised) vehicles. This rate can be seen as an alternative to the previous indicator, although it differs in that the annual distance travelled is unknown. This indicator can therefore only be used to compare the safety performance between countries with similar traffic and car-use characteristics. It requires reliable statistics on the number of vehicles. In some countries, scrapped vehicles are not systematically removed from the registration database, thereby undermining accuracy. This indicator does not take into account non-motorised vehicles (such as bicycles), which can in some countries represent a large part of the vehicle fleet and of the fatality figures. Most countries report their vehicle fleet without mopeds.

Fatalities per head of population

Table 4. shows the evolution of mortality expressed in terms of deaths per 100 000 population since 1970, and the evolution in risk expressed in terms of deaths per billion vehicle-kilometres.

Thirteen countries now constitute the league of well-performing countries with mortality rates in terms of road fatalities per 100 000 population of five or less. In 2012, five countries even managed to lower this rate to 3 or less: United Kingdom, Iceland, Norway, Denmark and Sweden (see Figure 10).

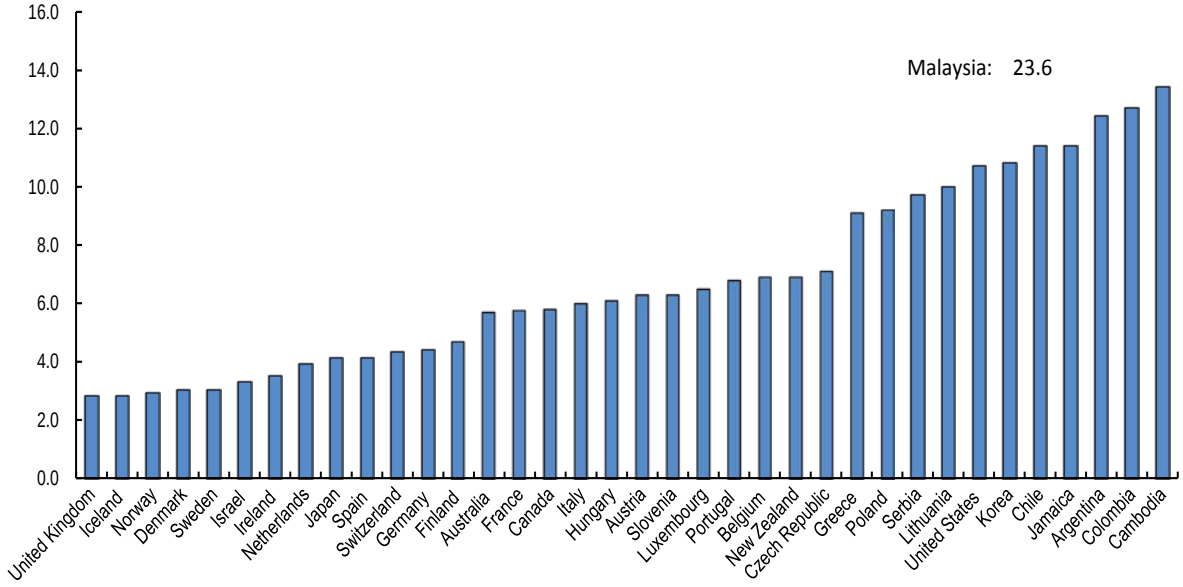
Table 4. **Road fatalities per 100 000 population and per billion vehicle-km**

Country	Killed per 100 000 inhabitants						Killed per billion v-km					
	1970	1980	1990	2000	2010	2012	1970	1980	1990	2000	2010	2012
Argentina	-	14.5	-	-	12.6	12.4	-	-	-	-	-	-
Australia	30.4	22.3	13.7	9.4	6.1	5.7	49.3	28.2	14.4	9.3	6.1	5.6
Austria	34.5	26.5	20.4	12.2	6.6	6.3	109.0	56.3	32.0	15.0	7.3	6.9
Belgium	31.8	24.3	19.9	14.4	7.7	6.9	104.6	50.0	28.1	16.3	8.5	7.7
Cambodia	-	-	-	-	12.7	13.4	-	-	-	-	-	-
Canada	23.8	22.3	14.3	9.5	6.6	5.8[e]	-	-	-	9.3	6.5	5.9[e]
Chile[a]	-	-	15.7	14.3	12.1	11.4	-	-	-	-	-	-
Colombia[a*]	-	-	-	16.5	12.1	12.7	-	-	-	-	-	-
Czech Republic	20.2	12.2	12.5	14.5	7.6	7.1	-	53.9	48.3	36.7	16.2	15.7
Denmark	24.6	13.5	12.3	9.3	4.6	3.0	50.5	25.0	17.3	10.7	5.6	3.4
Finland	22.9	11.5	13.0	7.7	5.1	4.7	-	20.6	16.3	8.5	5.1	4.7
France	32.5	25.4	19.8	13.7	6.4	5.8	90.4	43.9	25.7	15.6	7.1	6.5
Germany	-	-	14.2	9.1	4.5	4.4	-	-	19.7[f]	11.3	5.2	5.0
Greece	12.5	15.1	20.3	18.7	11.1	9.1[p]	-	-	-	-	-	-
Hungary	15.8	15.2	23.4	11.7	7.4	6.1	-	-	-	-	-	-
Iceland	9.8	11	9.5	11.5	2.5	2.8	-	26.5	14.9	13.8	2.5	2.9
Ireland	18.3	16.6	13.6	11.0	4.7	3.5	44.3	28.4	19.2	11.5	4.5	3.4
Israel	17.1	10.8	8.7	7.1	4.6	3.3	87.9	38.8	22.4	12.4	7.1	5.2
Italy	20.5	16.4	12.8	12.4	6.8	6.0	-	-	-	-	-	-
Jamaica[a]	-	-	-	12.9	11.8	11.4[p]	-	-	-	-	-	-
Japan	21	9.7	11.8	8.2	4.5	4.1	96.4	29.3	23.2	13.4	8.0	7.2
Korea	10.9	16.9	33.1	21.8	11.3	10.8	-	-	-	49.5	18.7	18.4
Lithuania[b]	-	-	26.9	17.3	9.2	10.0	-	-	-	-	-	-
Luxembourg	39.0	27.0	18.7	17.5	6.4	6.5	-	-	-	-	-	-
Malaysia[b]	-	-	22.7	25.9	23.8	23.6	-	-	-	26.3	16.2	13.4
Netherlands	24.6	14.2	9.2	7.3	3.9	3.9	-	26.7	14.2	10.0	4.9	4.9
New Zealand	23.0	18.8	21.4	12.0	8.6	6.9	-	-	-	13.6	9.4	7.7
Norway	14.5	8.9	7.8	7.6	4.3	2.9	41.7	19.3	12.0	10.5	4.9	3.3
Poland	10.5	16.9	19.3	16.4	10.2	9.2	-	-	-	-	-	-
Portugal	20.5	29.3	29.3	20.1	8.8	6.8	-	-	-	-	-	-
Serbia[c]	-	-	20.0	14.0	9.0	9.7	-	-	-	-	-	-
Slovenia	36.1	29.5	25.9	15.8	6.7	6.3	166.7	96.1	65.1	26.7	7.7	7.8[e]
Spain	16.2	17.5	23.3	14.4	5.4	4.1	-	-	-	-	-	-
Sweden	16.3	10.2	9.1	6.7	2.8	3.0	35.3	16.4	12.0	8.5	3.2	3.6
Switzerland	26.6	19.2	13.9	8.3	4.2	4.3	56.5	30.9	18.6	10.6	5.2	5.6
United Kingdom	14.0	11.0	9.4	6.1	3.1	2.8	37.4[d]	21.9[d]	12.8	7.4	3.8	3.6[p]
United States	25.8	22.5	17.9	14.9	10.7	10.7[p]	29.6	20.8	12.9	9.5	6.9	7.1[p]

Death within 30 days. Police recorded data (except the Netherlands: real data for 2000 onwards)
For recent methodology changes in calculation of the fatality data in Austria, Spain and Portugal, see country reports.

a = IRTAD LAC
b = accession country. Data are under review.
c = observer. Data not yet reviewed by IRTAD.
d = Great Britain.
e = 2011.
f = 1991 p= provisional.
* Information provided by CFPV not validated by the Government of Colombia.

Figure 10. **Road fatalities per 100 000 population in 2012**



Source: IRTAD.
Note: Provisional data for Colombia, Jamaica and the United States. Canada: data 2011. Real data for the Netherlands.

Since 1970, substantial progress has been made in all countries. In Luxembourg (from 39.0 to 6.5), Switzerland (from 26.6 to 4.3) and the Netherlands (from 24.6 to 4.0), the rate in terms of fatalities per 100 000 population has been divided by more than six.

In the last decade (2000-2012), the rate has been reduced by two in about half of the countries. The greatest improvements were seen in Iceland (-75%), Spain (-71%), Denmark (68%), Ireland (68%), Portugal (-66%) and Luxembourg (63%) as well as for Slovenia, France and Sweden (reduction greater than 55%; see Figure 10).

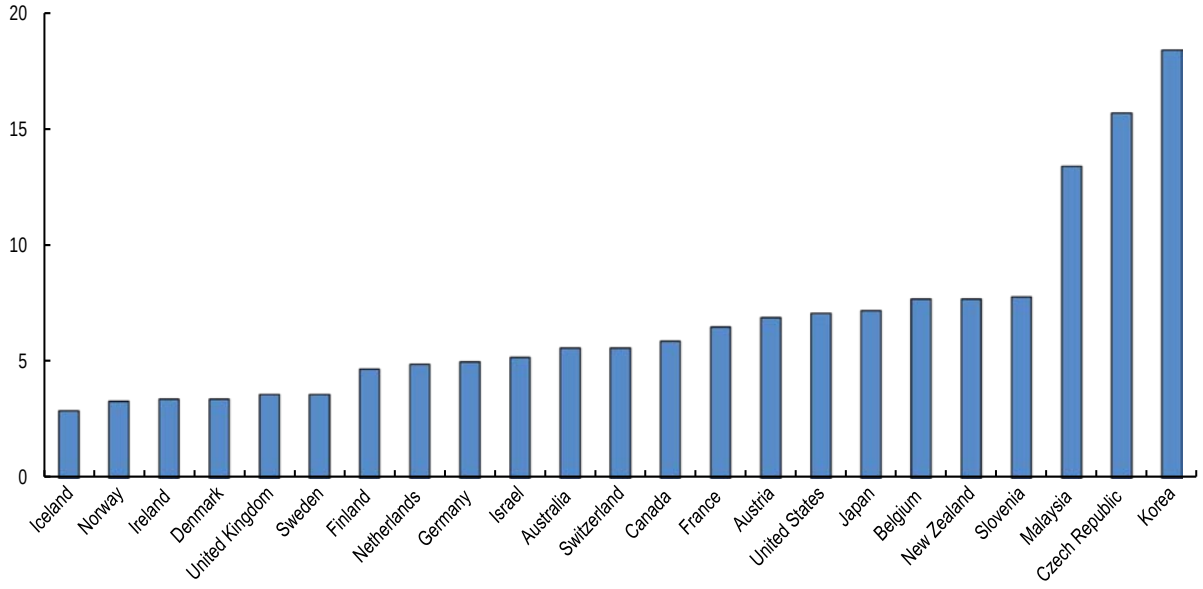
While the mortality rate is useful for comparing the performance of countries with similar levels of development and motorisation, it should not be used as a universal tool to rank all countries.

Fatalities per vehicle-kilometre

Data on risks expressed in terms of deaths per billion vehicle-kilometres are summarized in Figure 11. Analysis in terms of fatalities over distance travelled is a very useful indicator for assessing the risk of travelling on the road network. However, only a subset of IRTAD countries collects regular data on vehicle–kilometres.

Based on this indicator, the situation has also improved substantially for all countries for which data are available. In 2012, the best-performing countries recorded less than five deaths per billion vehicle-kilometres; namely, Norway, Ireland, Great Britain, Sweden, Iceland, Finland, Denmark and the Netherlands.

Figure 11. **Road fatalities per billion vehicle-kilometres in 2012**

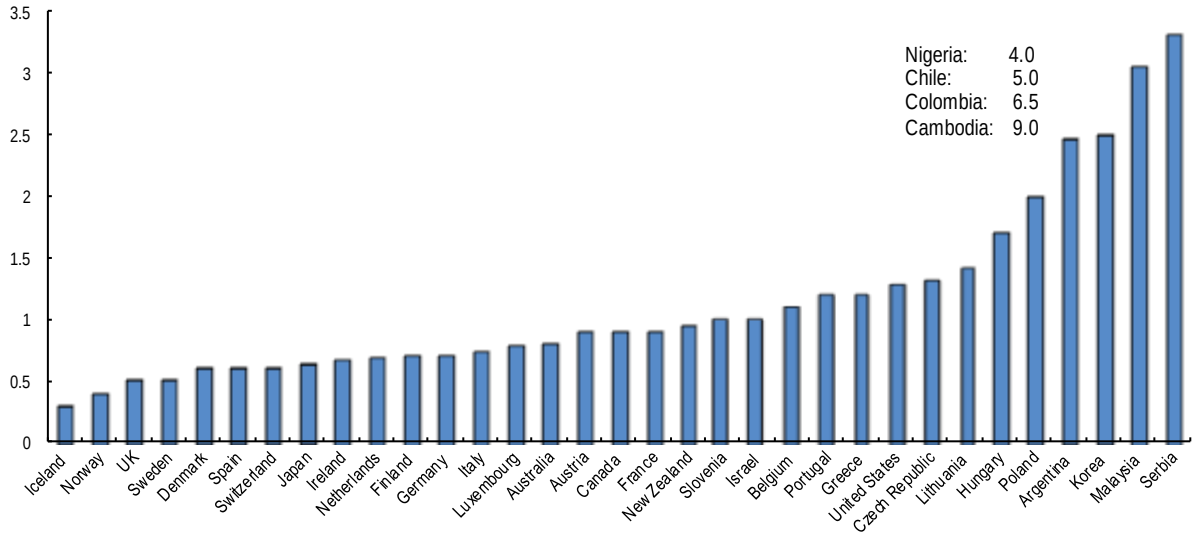


Source: IRTAD
Note: Provisional data for the United States. Canada and Slovenia: data 2011. Real data for the Netherlands.

Fatalities per registered vehicle

Figure 12 illustrates risk exposure expressed as the number of deaths per 10 000 registered vehicles. In the absence of data on vehicle kilometres for many IRTAD countries, the fatality rate per registered vehicle may be used as an approximation of exposure in order to describe risks and make comparisons between countries.

Figure 12. **Road fatalities per 10 000 registered vehicles in 2012**



Source: IRTAD.
Note: Ireland: total vehicles; Canada: data 2011; United Stats provisional data; Colombia: incl. mopeds.

The fight against serious injuries

Several IRTAD countries have shown remarkable reductions in road fatalities over the last decades. However, the numbers of serious injuries are usually decreasing at a much slower pace and many survivors of severe crashes will never recover completely. According to data from the German DGU Trauma Registry[1], the number of very severely injured – i.e. persons who are likely to suffer permanent consequences from a crash – did not increase at all in recent years. It goes without saying that severe injury not only entails grave consequences for people's quality of life but also on the economy.

Police records alone are usually inadequate to carry out analysis on the nature and consequences of serious injuries. Moreover, international comparisons are currently unfeasible, as counts and definitions of a "serious injury" vary widely between the member states. The JTRC report, "Reporting on Serious Road Traffic Casualties"[2], outlines options for combined analysis of police and hospital data and devises a common definition of serious injuries on the basis of the Abbreviated Injury Scale (AIS), proposing that an injury at or above a Maximum AIS score of 3 (MAIS 3+) should be defined as serious.

Currently, IRTAD encourages its member states to set up adequate mechanisms for such combined analysis and will gradually enlarge the database to host additional country-wise information on the development of serious injury counts.

Likewise, the European Commission agreed with the EU Member States to provide MAIS3+ data by 2015 and will enlarge the CARE[3] database accordingly. The Commission proposed three potential methods for this procedure:

- Continue to use police data but apply a correction coefficient;
- Report the number of injuries based on data from hospitals;
- Create a link between police and hospital data.

A first analysis for the small number of countries which are already able to provide MAIS3+ data, among them Sweden, the UK, Spain and the Netherlands, shows that in part results vary substantially: the reason behind this is that different versions are currently in use, both of the AIS and the ICD[4], the basis from which the AIS code is often derived. Moreover, results vary according to which of the above methods (or combinations thereof) are used by a country.

Therefore, IRTAD will now join forces together with the European Commission and expert organisations such as FERSI[5] in order to devise harmonised methodologies to produce comparable data on serious injuries in due time; only when their true character and frequency is assessed in a sound and uniform way, can effective road safety management mechanisms be employed (such as target setting, implementation, monitoring and evaluation).

1 http://www.bast.de/DE/Publikationen/Archiv/Infos/2009-2008/10-2009.html
2 http://internationaltransportforum.org/irtadpublic/pdf/Road-Casualties-Web.pdf
3 Community database on Accidents on the Roads in Europe
4 International Statistical Classification of Diseases and Related Health Problems
5 Forum of European Road Safety Research Institutes, www.fersi.org