
Save LIVES

اپیدمیولوژی و بار ناشی از حوادث ترافیکی در جهان و ایران و راهکارهای کاهش آن

دکتر بختیار پیروزی

استادیار سیاستگذاری سلامت

مرکز تحقیقات عوامل اجتماعی موثر بر سلامت دانشگاه علوم پزشکی کردستان

تعریف حادثه ترافیکی
Road Traffic Accident

- **حادثه ترافیکی از منظر کمیسیون ایمنی راه ها در ایران:** حادثه‌ای است که برای یک وسیله نقلیه متحرک به تنهائی (انحراف، خروج از راه، واژگونی، سقوط در پرتگاه) و یا بین یک وسیله نقلیه موتوری متحرک با یک عامل دیگر همچون یک یا چند وسیله نقلیه، عابر، حیوان، اشیاء ثابت به وقوع می‌پیوندد و منجر به خسارت مالی یا جانی می‌گردد.

مقدمه

- با افزایش روزافزون خودروها ترددها در شهرها و جاده‌ها بر تعداد و شدت حوادث ترافیکی به میزان زیادی افزوده شده و ضایعات جانی و مالی ناشی از این حوادث، بار سنگینی بر جامعه بشری تحمیل می‌کند.
- **حوادث ترافیکی، خسارت های مالی قابل توجهی را برای قربانیان، خانواده آنها و جامعه ایجاد می‌کند.** این هزینه ها عبارتند از: هزینه های درمان و بازتوانی، مراقبت از فرد مصدوم، از دست دادن بهره وری، غیب از کار...
- **حوادث ترافیکی اولین علت مرگ‌های ناشی از حوات است.**
- **در جهان هر ۲۴ ثانیه یک نفر در تصادفات جاده ای جان خود را از دست می دهد. این معادل مرگ ۱.۳۵ میلیون نفر در سال است.**
- مردان ۷۵ درصد از تلفات جاده ای را تشکیل می دهند.
- **در سراسر جهان، روزانه بیش از ۵۰۰ کودک زیر ۱۸ سال در جاده ها کشته می شوند.**

مقدمه

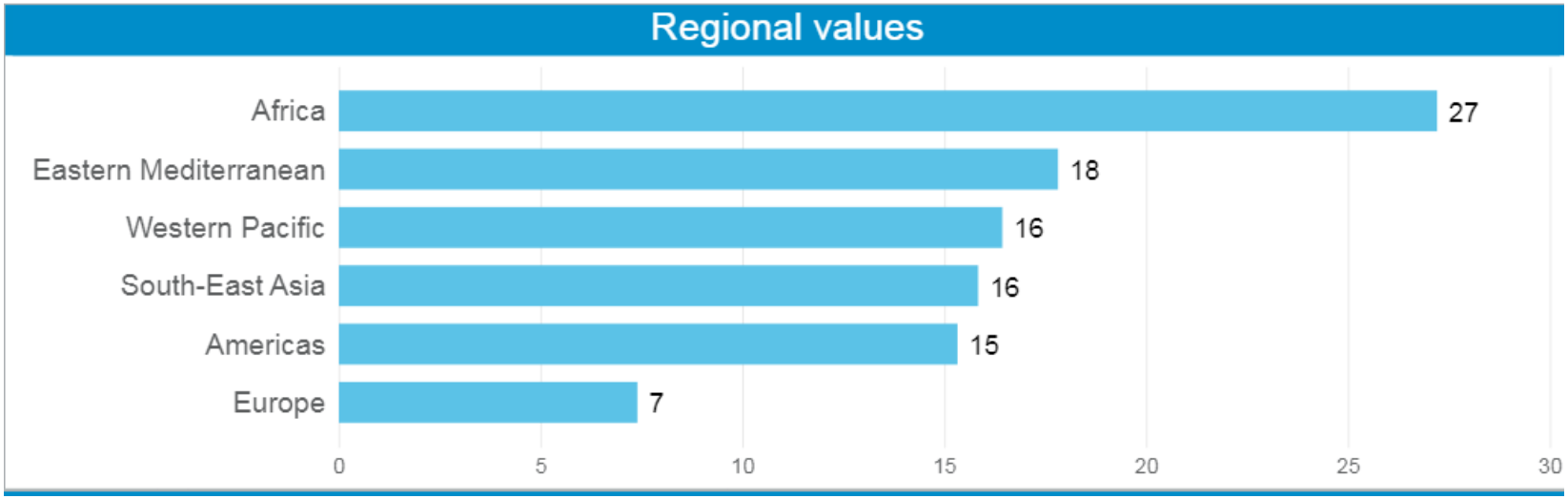
- سالانه بین **۲۰ تا ۵۰ میلیون جراحت غیرکشنده** در اثر تصادفات جاده ای ایجاد می شود که بسیاری از آنها در نتیجه آسیب دیدگی خود دچار معلولیت می شوند.
- آسیب های ناشی از تصادفات جاده ای **هشتمین** علت مرگ برای افراد در تمام سنین و **اولین** علت مرگ کودکان، جوانان و بزرگسالان ۵ تا ۲۹ ساله در سراسر جهان است.
- **۹۳ درصد** از مرگ و میرها در جاده ها در جهان در کشورهای با درآمد کم و متوسط رخ می دهد، گرچه این کشورها تقریباً ۶۰ درصد وسایل نقلیه ثبت شده در جهان را در اختیار دارند.
- بیش از نیمی از مرگ و میرهای جهانی در تصادفات جاده ای در بین **عابران پیاده، دوچرخه سواران و موتورسواران** است.
- بار اقتصادی جهانی ناشی از صدمات ناشی از تصادفات جاده ای ۵۱۸ میلیارد دلار تخمین زده شده که در اکثر کشورها به **۳ درصد تولید ناخالص داخلی** (GDP) می رسد.

مقدمه

- در سال ۲۰۱۵، نرخ مرگ و میر به هر علت ۷۶۹ مرگ در هر ۱۰۰۰۰۰ نفر بود. مرگ و میر ناشی از تصادفات رانندگی **۲.۴ درصد از کل مرگ و میرها در جهان** را تشکیل می دهد.

Estimated road traffic death rate per 100000 population

- نرخ مرگ و میر ناشی از تصادفات جاده ای در منطقه آفریقا بالاترین و در منطقه اروپا پایین ترین است.
- نرخ مرگ ناشی از تصادفات جاده ای در کشورهای کم درآمد بیش از ۳.۵ برابر بیشتر است.

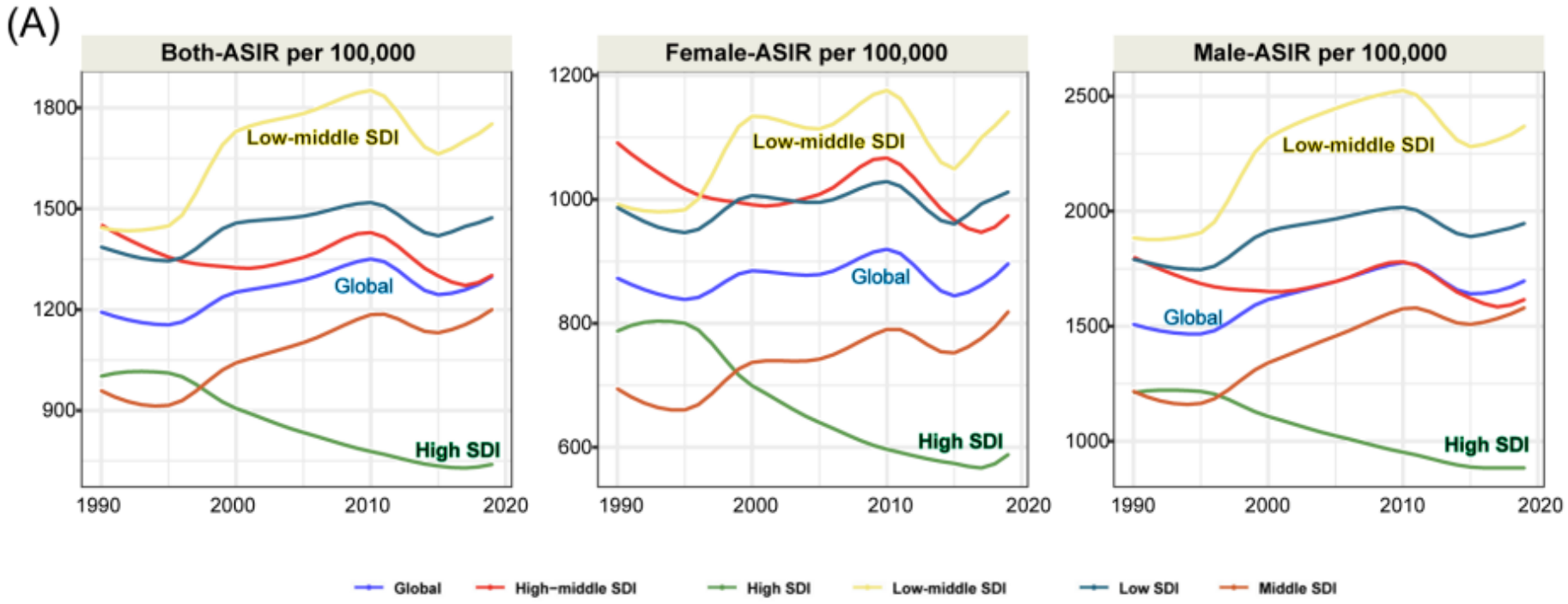


Global, Regional, and National Burden of Road Injuries from 1990 to 2019

Table 1. Incidence case, ASIR, and temporal trends of RIs in 1990 and 2019.

	1990		2019		1990–2019
	Incidence Cases No. $\times 10^2$(95%UI)	**ASIR per 100,000 No. (95%UI)**	**Incidence Cases No. $\times 10^2$(95%UI)**	**ASIR per 100,000 No. (95%UI)**	**EAPC No. (95%CI)**
Global	632,111.48 [534,279.84–738,477.05]	1,192.7 [1,017.76–1,389.27]	1,032,196 [868,741.7–1,212,732.78]	1,298.55 [1,092.23–1,529.42]	0.4 [0.26 to 0.55]
Gender					
Female	227,723 [193,850.64–266,947.98]	872.97 [750.27–1,016.94]	355,983.71 [302,250.53–417,143.88]	896.32 [759.59–1,050.35]	0.11 [0 to 0.21]
Male	404,388.49 [338,821.93–472,587.08]	1,507.91 [1,285.08–1,755.44]	676,212.28 [567,121.62–796,660.96]	1,697 [1,418.87–1,996.22]	0.57 [0.39 to 0.74]
SDI region					
High SDI	83,420.3 [73,261.69–94,943.33]	1,002.16 [879.75–1,145.59]	74,520.51 [64,333.9–86,089.78]	739.88 [629.42–865.09]	−1.37 [−1.47 to −1.27]
High-middle SDI	172,153.71 [145,735.49–201,179.03]	1,451.94 [1,237.87–1,693.16]	198,445.66 [168,498.82–233,544.11]	1,301.8 [1,095.24–1,533.14]	−0.19 [−0.33 to −0.05]
Middle SDI	163,427.1 [136,804.4–192,338.55]	958.7 [812.76–1,115.91]	302,824.2 [256,388.68–355,815]	1,200.4 [1,020.29–1,408.07]	0.99 [0.83 to 1.15]
Low-middle SDI	150,368.13 [124,535.41–178,961.84]	1,443.53 [1,216.45–1,694.36]	311,099.29 [258,062.91–370,624.82]	1,752.61 [1,464.86–2,079.37]	0.73 [0.46 to 1.01]
Low SDI	62,463.85 [52,539.49–73,608.15]	1,386.14 [1,191.35–1,604.27]	144,936.04 [120,963.11–171,604]	1,473.35 [1,263.76–1,711.09]	0.29 [0.16 to 0.41]

Global, Regional, and National Burden of Road Injuries from 1990 to 2019

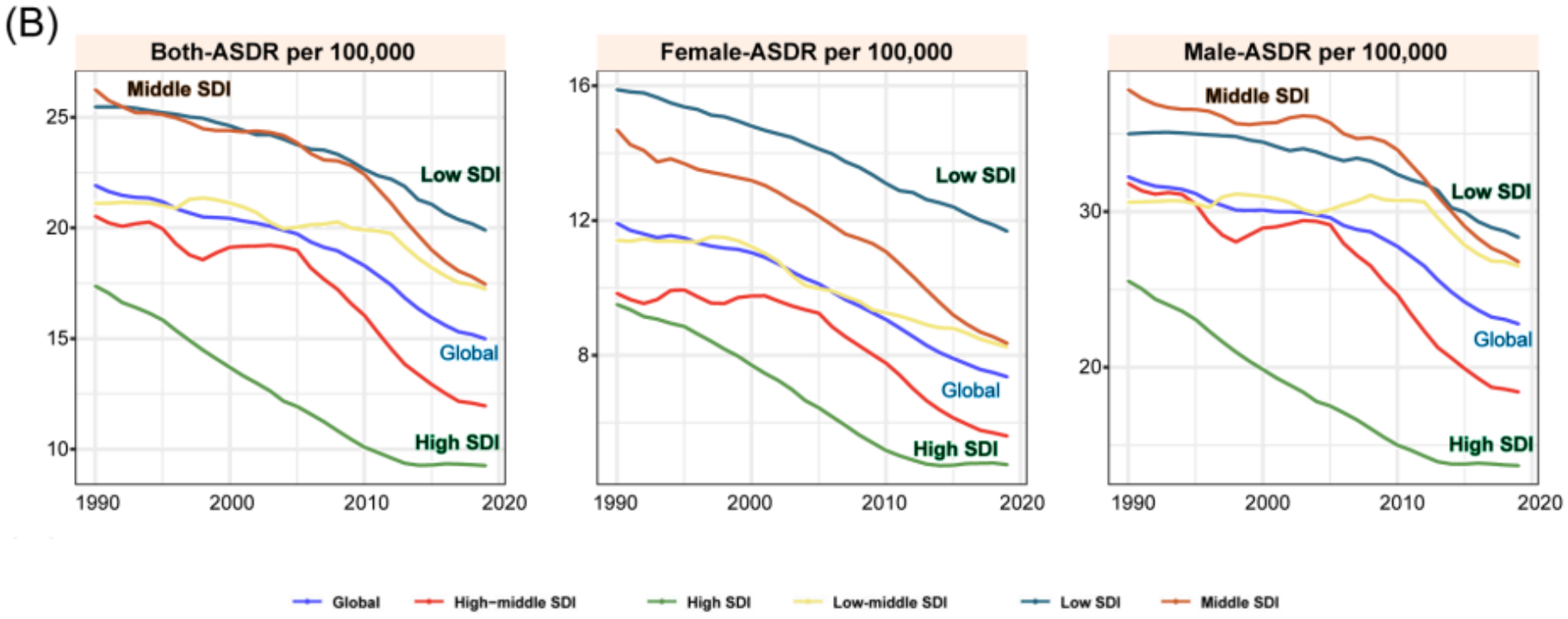


Global, Regional, and National Burden of Road Injuries from 1990 to 2019

Table 2. Deaths, ASDR, and temporal trends for RI in 1990 and 2019.

	1990		2019		1990–2019
	Deaths Cases No. $\times 10^2$ (95% UI)	**ASDR per 100,000 No. (95% UI)**	**Deaths Cases No. $\times 10^2$ (95% UI)**	**ASDR per 100,000 No.(95% UI)**	**EAPC No. (95% CI)**
Overall	11,134.11 [10,470.07–12,096.11]	21.92 [20.65–23.86]	11,982.89 [10,600.41–13,048.31]	14.99 [13.29–16.32]	−1.29 [−1.44 to −1.14]
Gender					
Female	3,049.17 [2,841.52–3,274.21]	11.92 [11.16–12.71]	2,976.31 [2,709.96–3,265.94]	7.36 [6.7–8.06]	−1.73 [−1.88 to −1.58]
Male	8,084.94 [7,565.01–9,072.09]	32.23 [30.14–36.22]	9,006.59 [7,639.42–9,906.22]	22.79 [19.37–25.11]	−1.14 [−1.29 to −0.98]
SDI region					
High SDI	1,518.09 [1,488.69–1,546.7]	17.37 [17.04–17.7]	1,095.11 [1,017.34–1,184.18]	9.26 [8.59–10.08]	−2.47 [−2.61 to −2.33]
High-middle SDI	2,373.83 [2,247.55–2,646.26]	20.53 [19.43–22.87]	1,970.78 [1,762.01–2,152.88]	11.96 [10.77–12.98]	−1.91 [−2.21 to −1.6]
Middle SDI	4,120.39 [3,838.79–4,590.16]	26.25 [24.42–29.36]	4,380.76 [3,820.35–4,807.44]	17.45 [15.32–19.13]	−1.28 [−1.48 to −1.08]
Low-middle SDI	2,018.53 [1,835.67–2,255.58]	21.11 [19.25–23.4]	2,837.15 [2,419.48–3,162.24]	17.24 [14.69–19.14]	−0.67 [−0.79 to −0.54]
Low SDI	1,096.89 [918.07–1,274.98]	25.47 [21.84–28.65]	1,691.9 [1,403.31–2,013.27]	19.9 [16.76–23.22]	−0.85 [−0.95 to −0.76]

Global, Regional, and National Burden of Road Injuries from 1990 to 2019

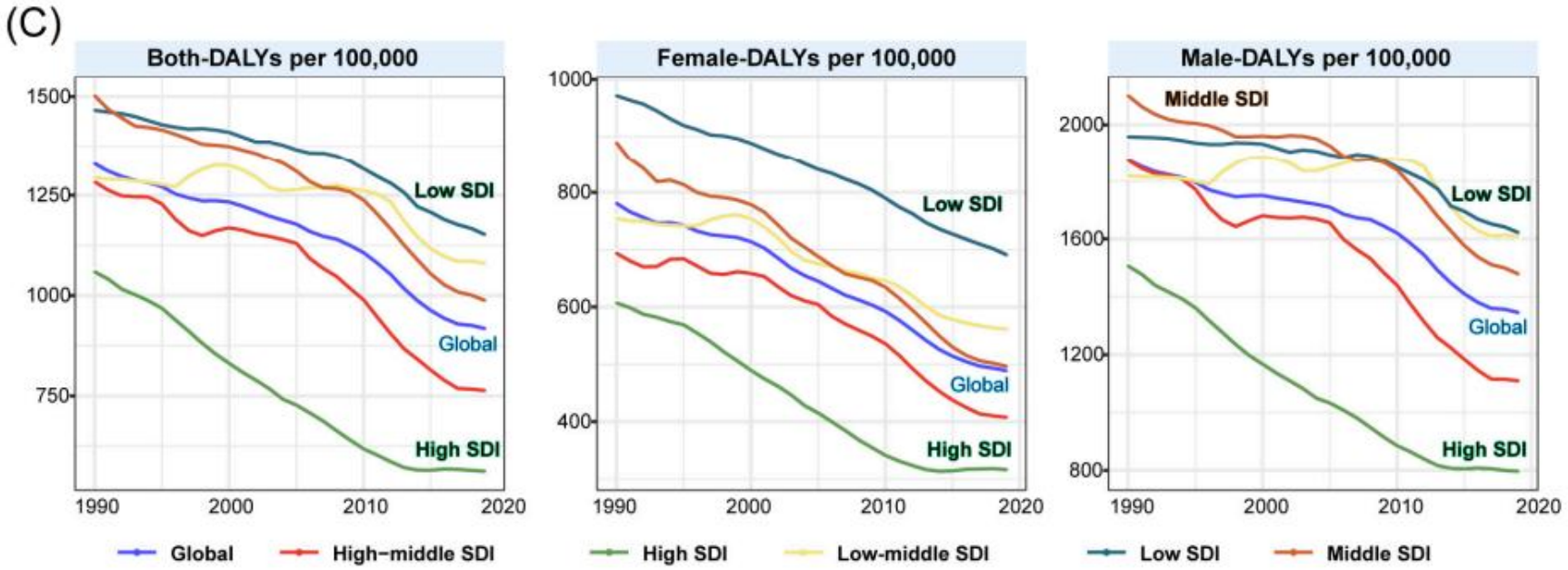


Global, Regional, and National Burden of Road Injuries from 1990 to 2019

Table 3. DALYs, AS-DALYs, and temporal trends of RIs in 1990 and 2019.

	1990		2019		1990–2019
	DALYs No. $\times 10^2$ (95% UI)	**Age-Standardized DALYs No. (95% UI)**	**DALYs No. $\times 10^2$ (95% UI)**	**Age-Standardized DALYs No.(95% UI)**	**EAPC No. (95% CI)**
Global	712,122.4 [664,087.2–770,347.5]	1,329.47 [1,235.48–1,435.89]	729,013.26 [648,308.81–801,937.02]	917.94 [814.15–1,011.37]	−1.26 [−1.4 to −1.13]
Gender					
Female	208,098.7 [190,562.05–228,247.96]	780.8 [714.59–856.57]	193,677.15 [172,363.89–215,808.81]	489.05 [437.25–543.19]	−1.69 [−1.81 to −1.57]
Male	504,023.7 [467,699.93–557,320.25]	1,874.15 [1,733.5–2,062.01]	535,336.11 [463,562.97–586,867.1]	1,345.5 [1,166.1–1,474.81]	−1.09 [−1.24 to −0.94]
SDI region					
High SDI	88,858.35 [84,488.89–93,738.76]	1,059.2 [1,011.15–1,111.18]	60,335.63 [54,810.99–66,720.78]	562.11 [515.83–617.59]	−2.48 [−2.61 to −2.34]
High-middle SDI	150,385.15 [139,162.78–163,847.98]	1,283.56 [1,186.67–1,397.77]	120,707.72 [107,606.11–134,968.91]	763.36 [684.32–843.56]	−1.84 [−2.06 to −1.61]
Middle SDI	259579.77 [241133.39–283157.94]	1,502.58 [1,397.76–1,641.83]	248,621.98 [220,698.37–27,3031.33]	987.99 [880.75–1081.77]	−1.36 [−1.52 to −1.2]
Low-middle SDI	137,322.64 [124,626.91–152,489.3]	1,294.6 [1,171.71–1,430.64]	185,509.65 [162,145.8–207,601.08]	1,080.25 [943.53–1,209.33]	−0.59 [−0.76 to −0.43]
Low SDI	75,574.85 [62,708.46–89,015.91]	1,466.02 [1,258.01–1,680.21]	113,421.72 [95,173.88–134,008.85]	1,152.15 [977.14–1,331.52]	−0.8 [−0.9 to −0.71]

Global, Regional, and National Burden of Road Injuries from 1990 to 2019



مقدمه (ایران)

- جراحات ناشی از تصادفات جاده ای دومین عامل مرگ و میر و سال های زندگی تعدیل شده با ناتوانی (DALY) در ایران است و اولین علت مصدومیت و سال‌های از دست‌رفته به علت مرگ زودرس (YLL) محسوب می شود.
- **بر اساس اطلاعات سازمان پزشکی قانونی کشور، تعداد فوتی ها ناشی از حوادث رانندگی :**
- در سال ۱۳۸۵ حدود ۲۷۶۰۰ نفر
- در سال ۱۳۹۸حدود ۲۱۱۲۰ نفر
- در سال ۱۳۹۹ حدود ۱۵۴۰۰ نفر (نسبت به سال ۱۳۸۵حدود ٤٤٪ کاهش)
- در سال ۱٤۰۰ حدود ۱٦۸۰۰ نفر
- در سال ۱٤۰۱ حدود ۱۹۵۰۰ نفر (نسبت به سال ۱۳۹۹ حدود ۲٦٪ افزایش)
- در نیمه نخست سال ۱٤۰۲ حدود ۱۰۷۰۰ نفر، این رقم در مقایسه با مدت مشابه سال قبل حدود ۸٪ افزایش یافته است.

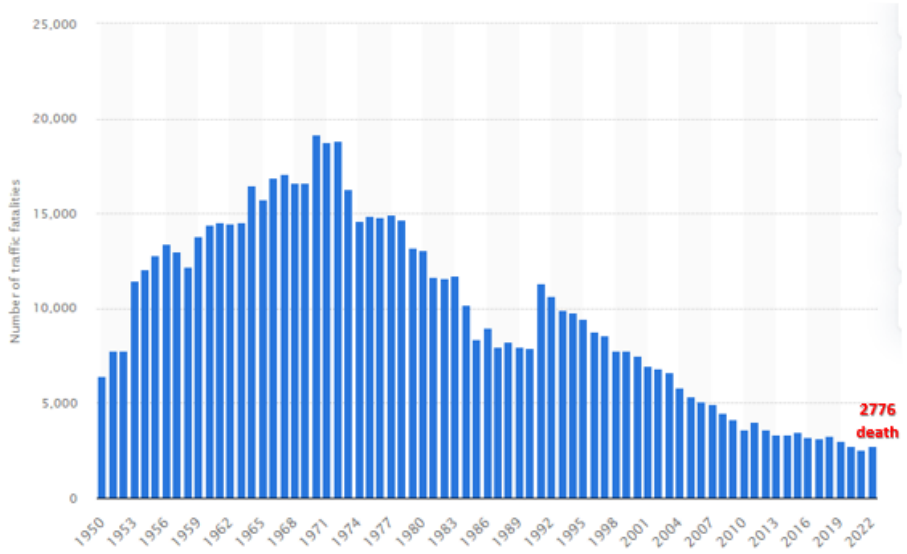
مقدمه (ایران)

- در ایران سالانه قریب به **۸۰۰ هزار نفر** بدلیل حوادث ترافیکی مجروح می‌شوند که تقریبا نیمی از این موارد را می‌توان به عنوان مصدومیت‌های شدید تلقی نمود.
- بر اساس مطالعه بار جهانی بیماری‌ها در سال ۲۰۱۶، شاخص بار بیماری (شاخص دالی) برای حوادث ترافیکی در ایران معادل **۱۷۳۸ دالی به ازای هر ۱۰۰ هزار نفر** جمعیت است که با تعمیم آن به جمعیت فعلی کشور می‌توان گفت سالانه **۱.۵ میلیون سال زندگی با کیفیت** مردم ایران بدلیل حوادث ترافیکی از بین می‌رود.
- در سال ۱۴۰۰ قریب به **۲۶ هزار میلیارد تومان**، هزینه برآورد شده ارجاعی حوادث ترافیکی به بیمه‌ها در کشور بوده است. حال اینکه کل هزینه‌های مستقیم و غیر مستقیم تحمیل شده از حوادث ترافیکی **بیش از ۵ درصد از سهم تولید ناخالص داخلی** کشور خواهد بود. بدین معنی که سهم هزینه‌های حوادث ترافیکی از تولید ناخالص داخلی را می‌توان **معادل کل سهم بخش سلامت** از این ماخذ (متوسط ۱۰ ساله) تلقی نمود.

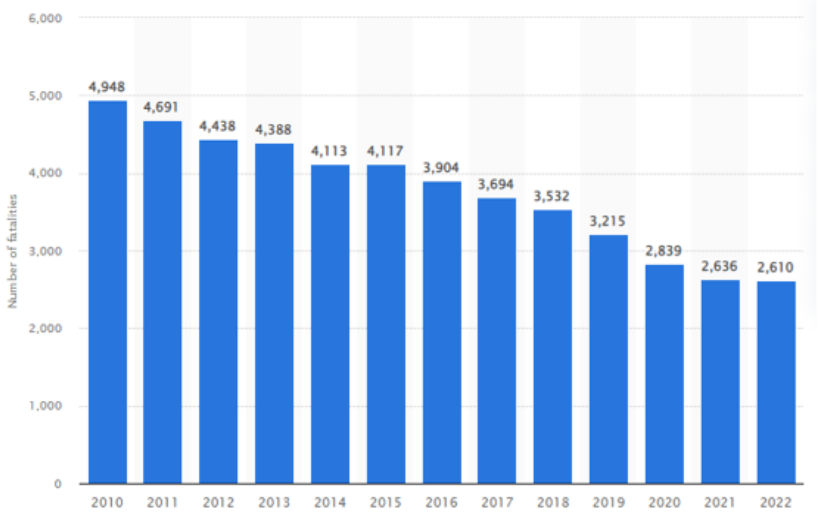
مقدمه (ایران)

در سال ۱۴۰۱ (۲۰۲۲ میلادی)، تعداد فوتی های ایران (جمعیت ۸۸ میلیون نفر) در تصادفات جاده ای، ۷.۰۲ برابر تعداد فوتی های **کشور آلمان** (۲۷۷۶ مرگ با جمعیت ۸۳ میلیون نفر) و ۷.۴ برابر **کشور ژاپن** (۲۶۱۰ مرگ با جمعیت ۱۲۵ میلیون نفر) می باشد.

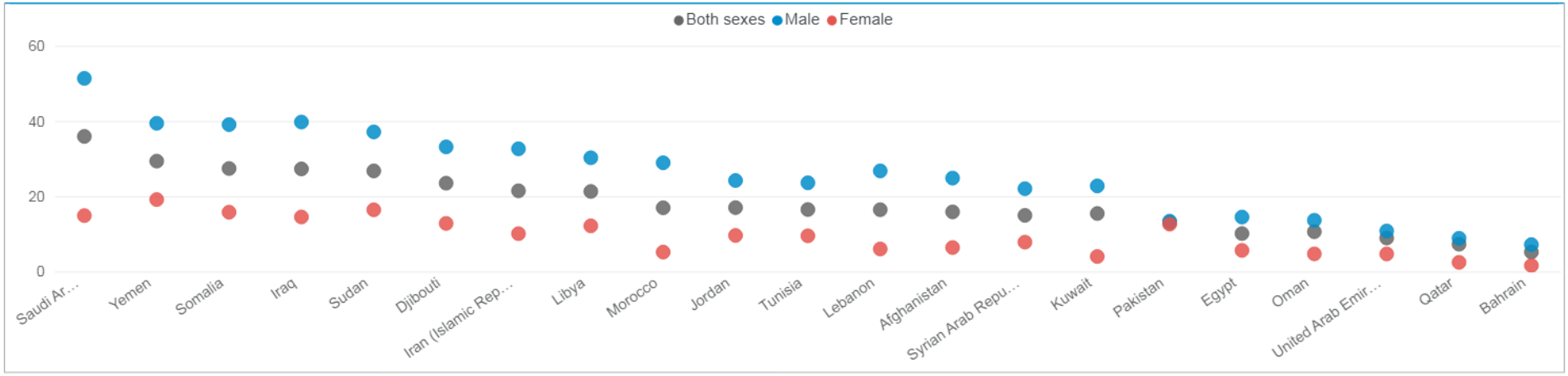
Number of deaths in road traffic accidents in Germany from 1950 to 2022



Number of fatalities caused by road traffic accidents in Japan from 2010 to 2022



Estimated road traffic death rate per 100000 population



World Health Organization

Health Topics | Countries | Newsroom

THE GLOBAL HEALTH OBSERVATORY

Explore a world of health data

Burden of road traffic injuries in Iran: a national and subnational perspective, 1990–2019

- In 2019, RTIs in Iran accounted 21122.0 (95% UI: 18110.0 to 24648.3) deaths, of which 77.2% and 22.8% occurred in males and females, respectively.
- Age-standardised incidence, prevalence, death and DALY rates of RTIs decreased by 31.7% (95% uncertainty interval (UI): 29.4 to 33.9), 34.9% (33.8 to 36.0), 57.7% (48.1 to 62.3) and 60.1% (51.7 to 65.2), respectively between 1990 and 2019.
- The 2019 age-standardised DALY rates varied from smallest value in Tehran 303.8 (216.9 to 667.2) per 100 000 to largest value in Sistan-Baluchistan 2286.8 (1978.1 to 2627.9) per 100 000.
- **Burden of RTIs in Iran showed 60.1% decrease from 1990 to 2019.**
- Mostly affected males aged 15–29 years.
- In 2019, RTI was the third leading cause of death (**5.4% of all deaths**; 95% UI: 4.62% to 6.27%) in Iran.

Age-standardised **incidence**, **prevalence** and **burden** of road traffic injuries per 100 000 and per cent change, by sex from 1990 to 2019, Iran

	Age-standardised rate (per 100 000)						
	1990			2019			% Change
	Both	Female	Male	Both	Female	Male	Both
Incidence	1173.2 (985.6 to 1394.6)	888.2 (753.4 to 1056.5)	1452.9 (1217.4 to 1724.8)	801.8 (670.1 to 961.1)	584.1 (492.9 to 702.3)	1011.3 (845.6 to 1215.5)	−31.7 (−33.9 to −29.4)
Prevalence	3305.2 (3056.7 to 3518.1)	2517.7 (2327.1 to 2676.3)	4058.7 (3752.1 to 4348)	2152.9 (1982.5 to 2303.7)	1570.8 (1447.7 to 1672.7)	2724.9 (2511.8 to 2929.6)	−34.9 (−36 to −33.8)
Deaths	60.2 (51.2 to 65.9)	32.2 (27.7 to 36)	87 (71 to 95.7)	25.4 (21.9 to 29.9)	12 (10.3 to 13)	38.5 (32.8 to 46.8)	−57.7 (−62.3 to −48.1)
DALYs	3262.5 (2815.5 to 3635.4)	1926.1 (1625.3 to 2230.4)	4538.7 (3813.6 to 5026.1)	1302.1 (1147.4 to 1488.3)	630.8 (557.5 to 689.5)	1953.3 (1712.5 to 2284.3)	−60.1 (−65.2 to −51.7)
YLLs	3063.5 (2615.8 to 3419.8)	1772.1 (1478.4 to 2067.1)	4296.6 (3605 to 4773.9)	1184.7 (1031.7 to 1370.1)	546.3 (474.7 to 596.4)	1803.7 (1562.5 to 2136.1)	−61.3 (−66.5 to −52.4)
YLDs	199.1 (144.6 to 264.1)	154 (111.8 to 202.7)	242 (175.9 to 324)	117.4 (83.5 to 157.9)	84.5 (60.3 to 112.4)	149.6 (106 to 201.9)	−41 (−43 to −39.2)

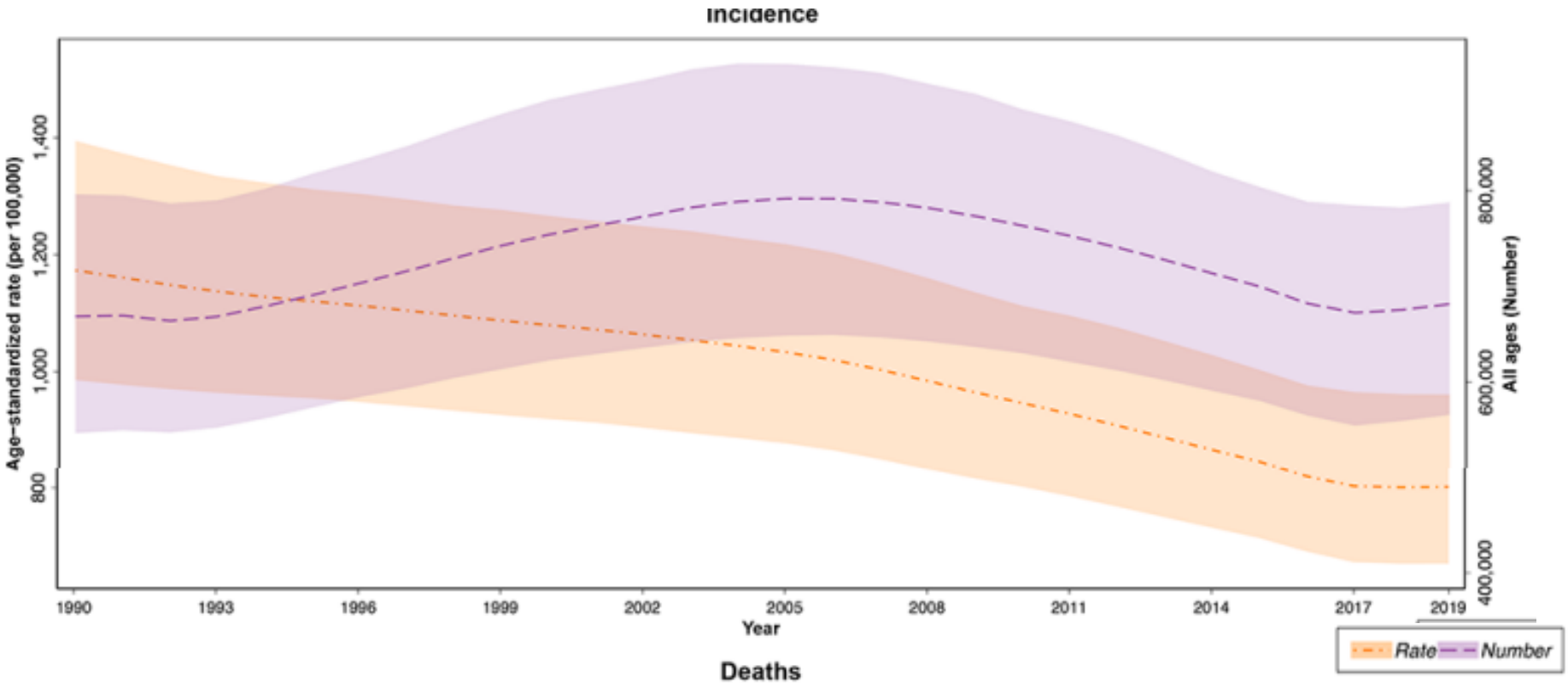
Age-standardised **incidence**, **prevalence** and **burden** of road traffic injuries per 100 000 and per cent change, by sex from 1990 to 2019, Iran

	Age-standardised rate (per 100 000)						
	1990			2019			% Change
	Both	Female	Male	Both	Female	Male	Both
Incidence	1173.2 (985.6 to 1394.6)	888.2 (753.4 to 1056.5)	1452.9 (1217.4 to 1724.8)	801.8 (670.1 to 961.1)	584.1 (492.9 to 702.3)	1011.3 (845.6 to 1215.5)	−31.7 (−33.9 to −29.4)
Prevalence	3305.2 (3056.7 to 3518.1)	2517.7 (2327.1 to 2676.3)	4058.7 (3752.1 to 4348)	2152.9 (1982.5 to 2303.7)	1570.8 (1447.7 to 1672.7)	2724.9 (2511.8 to 2929.6)	−34.9 (−36 to −33.8)
Deaths	60.2 (51.2 to 65.9)	32.2 (27.7 to 36)	87 (71 to 95.7)	25.4 (21.9 to 29.9)	12 (10.3 to 13)	38.5 (32.8 to 46.8)	−57.7 (−62.3 to −48.1)
DALYs	3262.5 (2815.5 to 3635.4)	1926.1 (1625.3 to 2230.4)	4538.7 (3813.6 to 5026.1)	1302.1 (1147.4 to 1488.3)	630.8 (557.5 to 689.5)	1953.3 (1712.5 to 2284.3)	−60.1 (−65.2 to −51.7)
						1803.7 (1562.5 to 2136.1)	−61.3 (−66.5 to −52.4)
						149.6 (106 to 201.9)	−41 (−43 to −39.2)

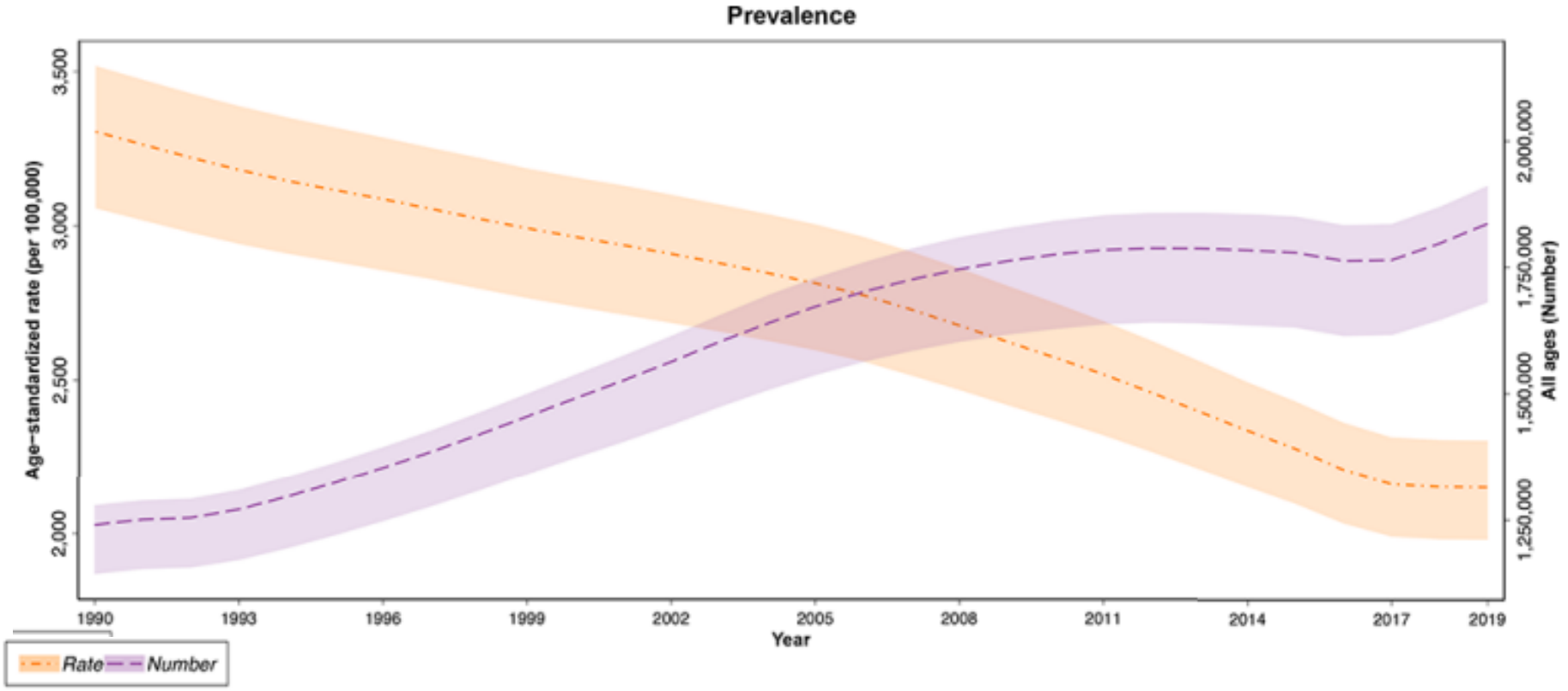
Table 3. DALYs, AS-DALYs, and temporal trends of RIs in 1990 and 2019.

	1990		2019		1990–2019
	DALYs No. $\times 10^2$ (95% UI)	Age-Standardized DALYs No. (95% UI)	DALYs No. $\times 10^2$ (95% UI)	Age-Standardized DALYs No.(95% UI)	EAPC No. (95% CI)
Global	712,122.4 [664,087.2–770,347.5]	1,329.47 [1,235.48–1,435.89]	729,013.26 [648,308.81–801,937.02]	917.94 [814.15–1,011.37]	−1.26 [−1.4 to −1.13]
Gender					
Female	208,098.7 [190,562.05–228,247.96]	780.8 [714.59–856.57]	193,677.15 [172,363.89–215,808.81]	489.05 [437.25–543.19]	−1.69 [−1.81 to −1.57]
Male	504,023.7 [467,699.93–557,320.25]	1,874.15 [1,733.5–2,062.01]	535,336.11 [463,562.97–586,867.1]	1,345.5 [1,166.1–1,474.81]	−1.09 [−1.24 to −0.94]

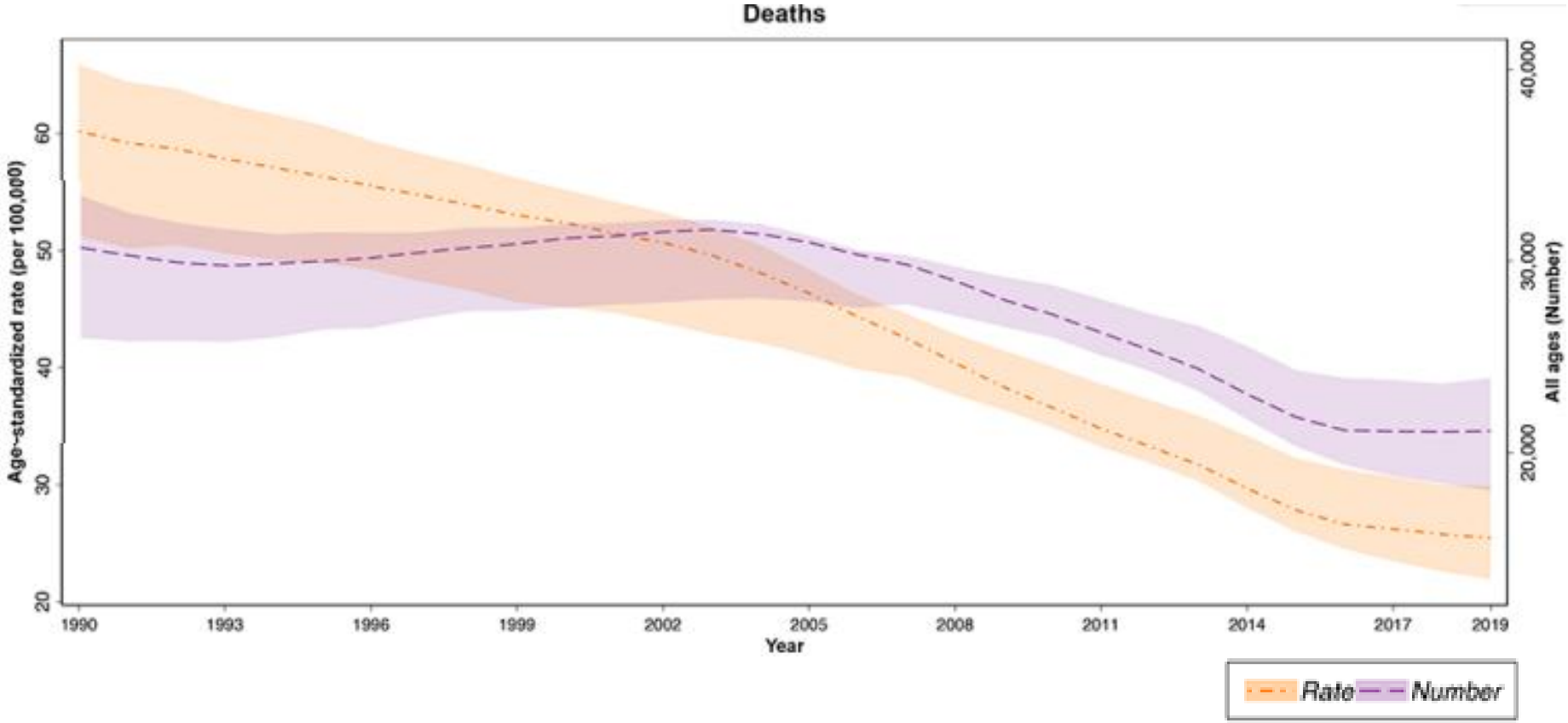
Time trend of all ages number and age-standardised rate of road traffic injuries incidence, prevalence, deaths and DALYs for both sexes, 1990–2019, Iran



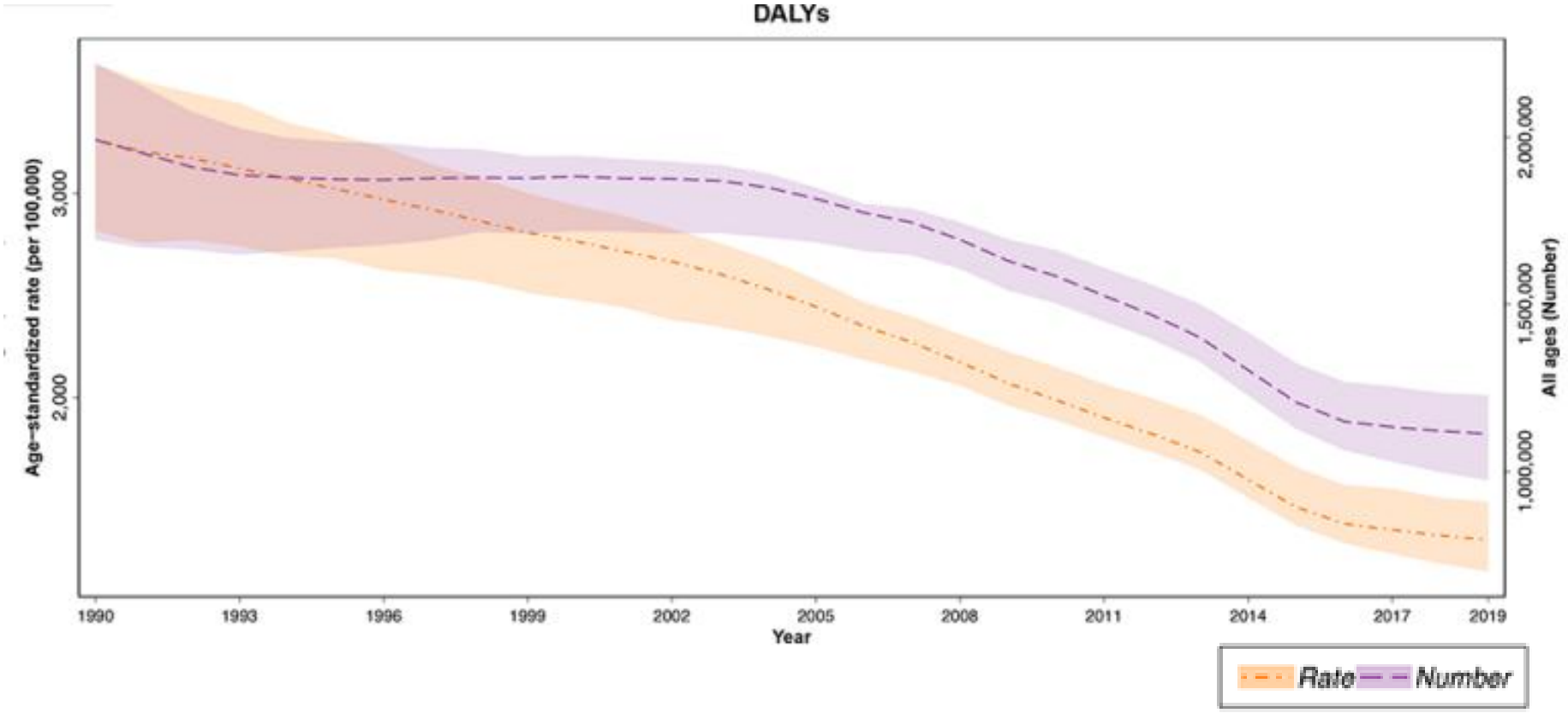
Time trend of all ages number and age-standardised rate of road traffic injuries incidence, prevalence, deaths and DALYs for both sexes, 1990–2019, Iran



Time trend of all ages number and age-standardised rate of road traffic injuries incidence, prevalence, deaths and DALYs for both sexes, 1990–2019, Iran



Time trend of all ages number and age-standardised rate of road traffic injuries incidence, prevalence, deaths and DALYs for both sexes, 1990–2019, Iran



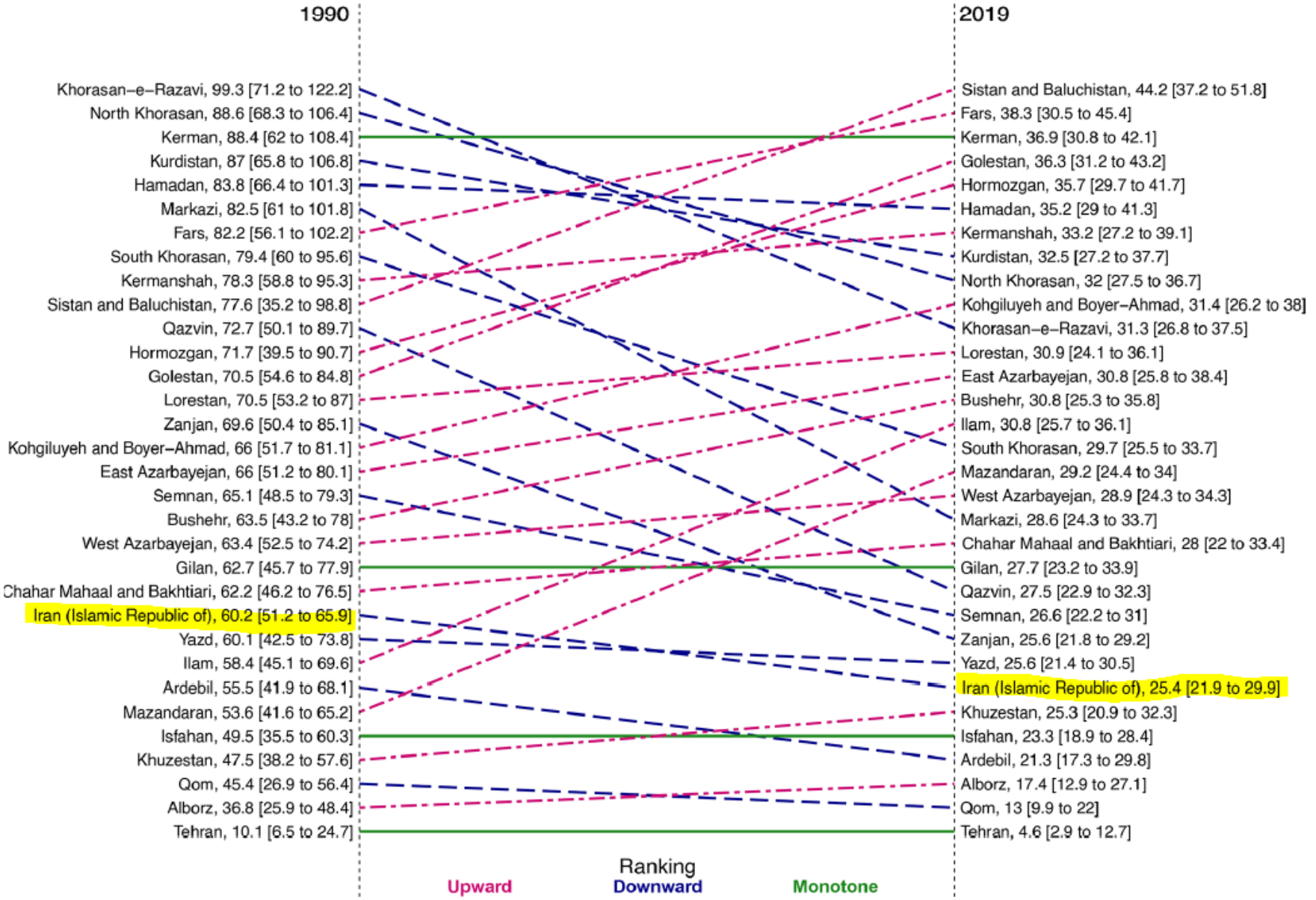
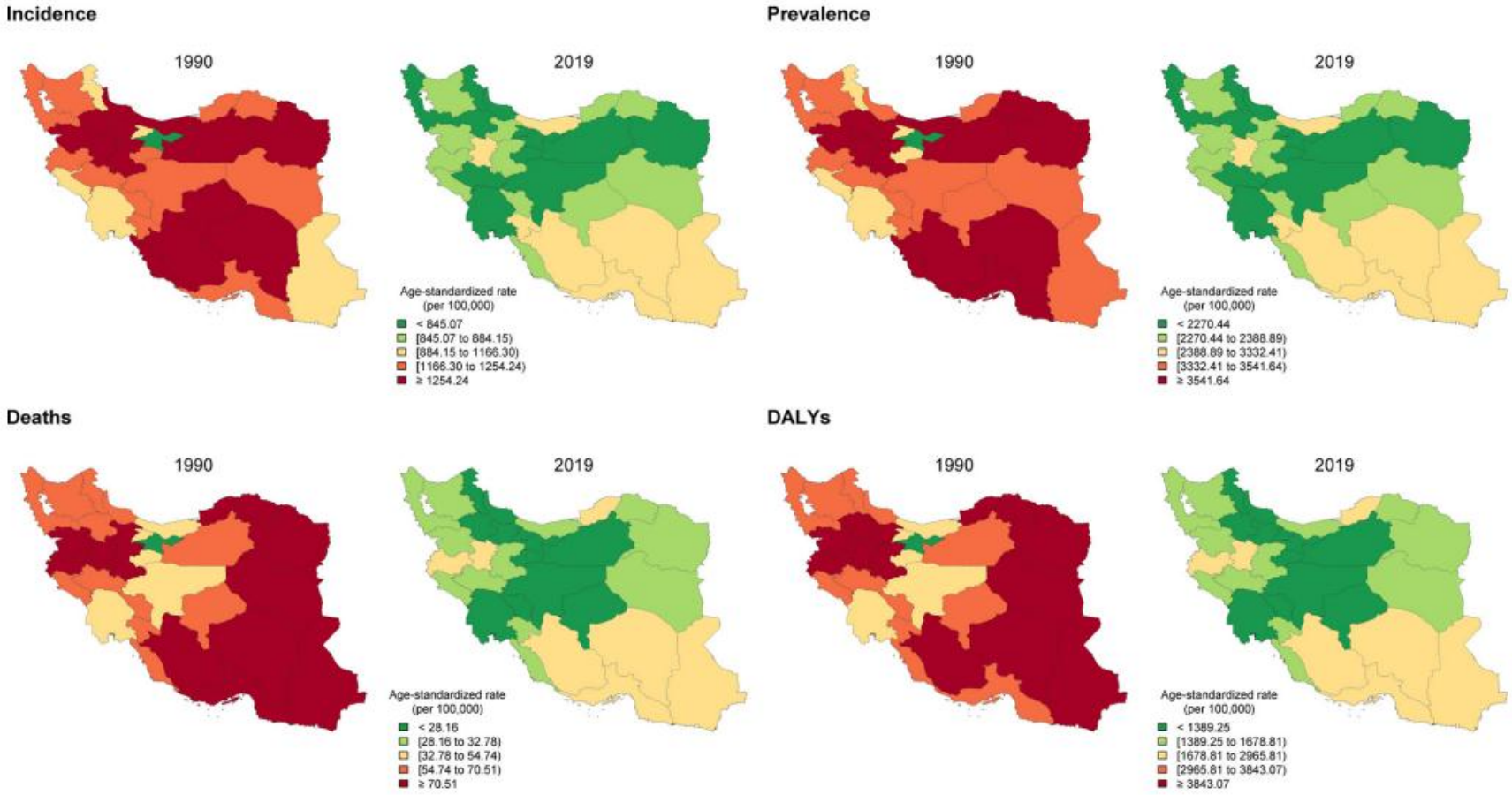


Figure 4 Ranking of age-standardised death rates due to road traffic injuries per 100 000, by province, Iran, 1990 vs 2019.

Provincial distribution of age-standardised incidence, prevalence, death and disability-adjusted life-years (DALYs) rate due to road traffic injuries per 100 000 in Iran, both sexes, 1990 vs 2019.



Burden of road traffic injuries in Iran: a national and subnational perspective, 1990–2019

- The age-standardised mortality rate due to RTIs is expected to reach 17.95 (95% UI: 9.98 to 30.82) per 100000 in 2030 in Iran.
- On the other hand, years of life lost (YLLs) due to premature mortality of RTIs are **higher** in Iran compared with most parts of the world.
- The reducing trend in the burden of RTIs in Iran possibly reflects the effectiveness of the intervention programmes. However, with regard to the Sustainable Development Goals the burden is still at an alarming level.

Decade of Action on Road Safety

- موضوع « دهه اقدام برای ایمنی راه ها» در نخستین کنفرانس بین المللی ایمنی راه ها که در نوامبر سال ۲۰۱۰ در مسکو برگزار شد مطرح گردید سازمان ملل متحد، سالهای ۲۰۲۰- ۲۰۱۱ را به عنوان دهه اقدام برای ایمنی راهها اعلام کرد. شعار دهه ایمنی راه ها، **Time for Action** انتخاب شد. هدف این دهه عبارت است از: نجات میلیونها زندگی با بهبود ایمنی راهها، وسایل نقلیه، بهبود رفتار کاربران راهها و خدمات امداد و نجات و همچنین معکوس یا متوقف کردن روند رو به رشد مرگ ناشی از حوادث ترافیکی.
- با توجه به خاتمه یافتن اولین دهه ایمنی راه ها (۲۰۲۰-۲۰۱۱)، سازمان ملل متحد، یک دهه دیگر را برای تحقق هدف کاهش مرگ های حوادث ترافیکی لازم می داند. بر این اساس، سازمان ملل سال های ۲۰۳۰-۲۰۲۱ را به عنوان دومین دهه ایمنی راه ها درنظر گرفته و هدف این دهه را کاهش ۵۰ درصد مرگ ها و آسیب های ناشی از حوادث ترافیکی تا سال ۲۰۳۰ قرار داده است و از کشورهای جهان درخواست نموده تا اقدامات پیشگیری از حوادث ترافیکی را در این دهه نیز به طور مستمر اجرا نمایند.

Box 1.1

Road safety-related SDGs and targets

SDG Goal 3: Ensure healthy lives and promote well-being for all at all ages

Target 3.6: By 2020, halve the number of global deaths and injuries from road traffic accidents

SDG Goal 11: Make cities and human settlements inclusive, safe, resilient and sustainable

Target 11.2: By 2030, provide access to safe, affordable, accessible and sustainable transport systems for all, improving road safety, notably by expanding public transport, with special attention to the needs of those in vulnerable situations, women, children, persons with disabilities and older persons

SUSTAINABLE DEVELOPMENT GOALS

Home | About | Goals | Take Action | Partnerships | News And Media

Goal 3: Ensure healthy lives and promote well-being for all at all ages

Target 3.6: By 2020, halve the number of global deaths and injuries from road traffic accidents.

SUSTAINABLE DEVELOPMENT GOALS

Home | About | Goals | Take Action | Partnerships | News And Media

Goal 11: Make cities inclusive, safe, resilient and sustainable

Target 11.2: By 2030, provide access to safe, affordable, accessible and sustainable transport systems for all, improving road safety, notably by expanding public transport, with special attention to the needs of those in vulnerable situations, women, children, persons with disabilities and older persons

اهداف

- با روند کنونی، اهداف تعیین شده جهانی توسعه پایدار جهت کاهش ۵۰ درصدی مرگ و میر ناشی از تصادفات جاده‌ای تا سال ۲۰۲۰ حاصل نگردیده است.
- مجمع عمومی سازمان ملل متحد یک هدف بلندپروازانه را تعیین کرده است که تا سال ۲۰۳۰ تعداد مرگ و میر و جراحات جهانی ناشی از تصادفات جاده ای را به نصف کاهش دهد.
- می‌توان از صدمات ترافیکی جاده‌ای جلوگیری کرد. دولت‌ها باید برای رسیدگی به ایمنی جاده‌ها به شیوه‌ای جامع اقدام کنند. این امر مستلزم مشارکت بخش‌های مختلف مانند حمل‌ونقل، پلیس، بهداشت، آموزش، و اقداماتی است که به ایمنی جاده‌ها، وسایل نقلیه و کاربران جاده می پردازد.
- مداخلات مؤثر شامل طراحی زیرساخت‌های ایمن‌تر و توجه به ایمنی راه در برنامه‌ریزی و حمل‌ونقل، بهبود ایمنی وسایل نقلیه، بهبود مراقبت‌های پس از تصادف برای قربانیان تصادفات جاده‌ای، تنظیم و اجرای قوانین مرتبط با خطرات کلیدی، و ارتقای سطح آگاهی عمومی است.

مهمترین عوامل خطر حوادث ترافیکی

- سرعت بالا
- نپوشیدن کلاه ایمنی (موتور سیکلت، دوچرخه)
- نبستن کمربند ایمنی
- استفاده نکردن از صندلی مخصوص کودک در خودرو
- رانندگی بعد از مصرف الکل، مواد روان گردان و داروهای خواب آور
- رانندگی با خستگی و خواب آلودگی
- حواس پرتی (استفاده از تلفن همراه حین رانندگی)
- زیرساخت های جاده ای ناایمن
- وسیله نقلیه ناایمن
- مراقبت های ناکافی یا با تاخیر بعد از حادثه (مراقبت های پیش بیمارستانی)
- اجرای ناکافی قوانین راهنمایی و رانندگی

Save LIVES

A road safety technical package

World Health Organization

Save LIVES

- ***A road safety technical package*** is an evidence-based inventory of priority interventions with a focus on **S**peed management, **L**eadership, **I**nfrastructure design and improvement, **V**ehicle safety standards, **E**nforcement of traffic laws and post-crash **S**urvival.
- The 6 strategies and 22 interventions recommended in the package are interrelated and should be implemented in an integrated manner to effectively address road traffic deaths and injuries.
- Since countries are at varying stages of addressing this problem, this road safety policy package should not be seen as a one-size-fits-all solution, but rather as a guide to support decisions for scaling up road safety efforts.

Save LIVES: six components and 22 interventions

Acronym	Component	Interventions
	**Speed management**	Establish and enforce speed limit laws nationwide, locally and in cities
		Build or modify roads which calm traffic, e.g. roundabouts, road narrowing, speed bumps, chicanes and rumble strips
		Require car makers to install new technologies, such as intelligent speed adaptation, to help drivers keep to speed limits
	**Leadership on road safety**	Create an agency to spearhead road safety
		Develop and fund a road safety strategy
		Evaluate the impact of road safety strategies
		Monitor road safety by strengthening data systems
		Raise awareness and public support through education and campaigns
	**Infrastructure design and improvement**	Provide safe infrastructure for all road users including sidewalks, safe crossings, refuges, overpasses and underpasses
		Put in place bicycle and motorcycle lanes
		Make the sides of roads safer by using clear zones, collapsible structures or barriers
		Design safer intersections
		Separate access roads from through-roads
		Prioritize people by putting in place vehicle-free zones
		Restrict traffic and speed in residential, commercial and school zones
		Provide better, safer routes for public transport
	**Vehicle safety standards**	Establish and enforce motor vehicle safety standard regulations related to: • seat-belts; • seat-belt anchorages; • frontal impact; • side impact; • electronic stability control; • pedestrian protection; and • ISOFIX child restraint points
		Establish and enforce regulations on motorcycle anti-lock braking and daytime running lights
	**Enforcement of traffic laws**	Establish and enforce laws at national, local and city levels on: • drinking and driving; • motorcycle helmets; • seat-belts; and • child restraints
	**Survival after a crash**	Develop organized and integrated prehospital and facility-based emergency care systems
		Train those who respond to crashes in basic emergency care
		Promote community first responder training

Thank You

Human Factors Contributing to the Unsafe Behavior of Drivers in Road Traffic Accidents: A Systematic Review

Dr. Ali Sahebi

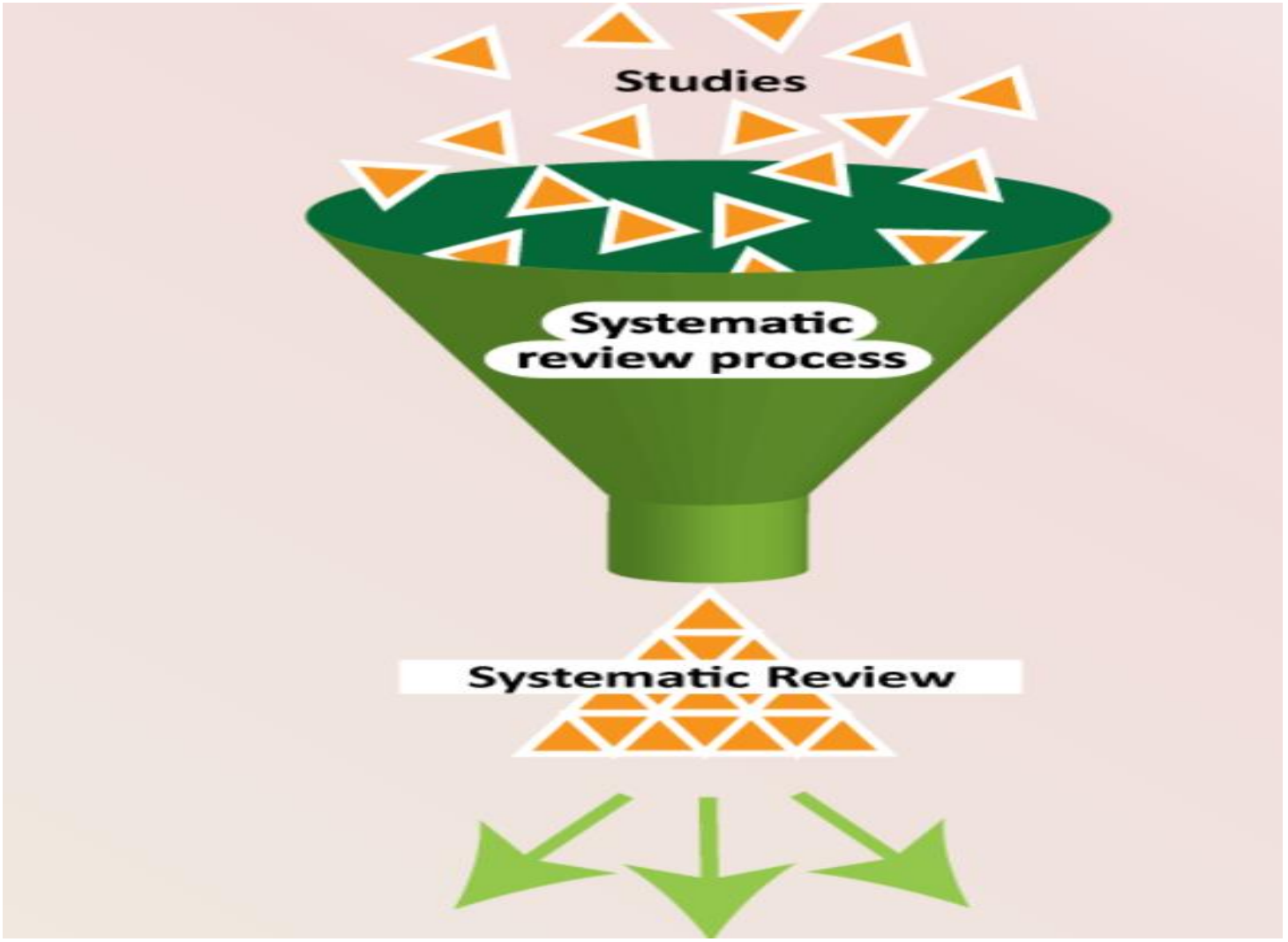
PhD in Health in Emergencies and Disasters

Subject Importance

- Data analysis shows that the human factor is an important element in the incidence of RTAs.
- According to studies on the transportation system, the unsafe behavior of the driver caused by human factors has a key place in these events.

- Although several studies have investigated various human factors involved in the occurrence of unsafe behaviors and RTAs, no comprehensive review has yet been conducted on these factors.
- The purpose of this systematic review was to explore the human factors influencing the unsafe behaviors of drivers leading to RTAs.

The Concept of a Systematic Review



Avoid duplication:

- Register your Scoping, Rapid, Umbrella or Systematic Review protocol.
- *Where to prospectively register?*

Registrars of reviews protocol

- PROSPERO: International Prospective Register Of Systematic Reviews by the University of York

- www.crd.york.ac.uk/prospero

The present study included two phases:

1) Systematic review

2) Thematic Content Analysis

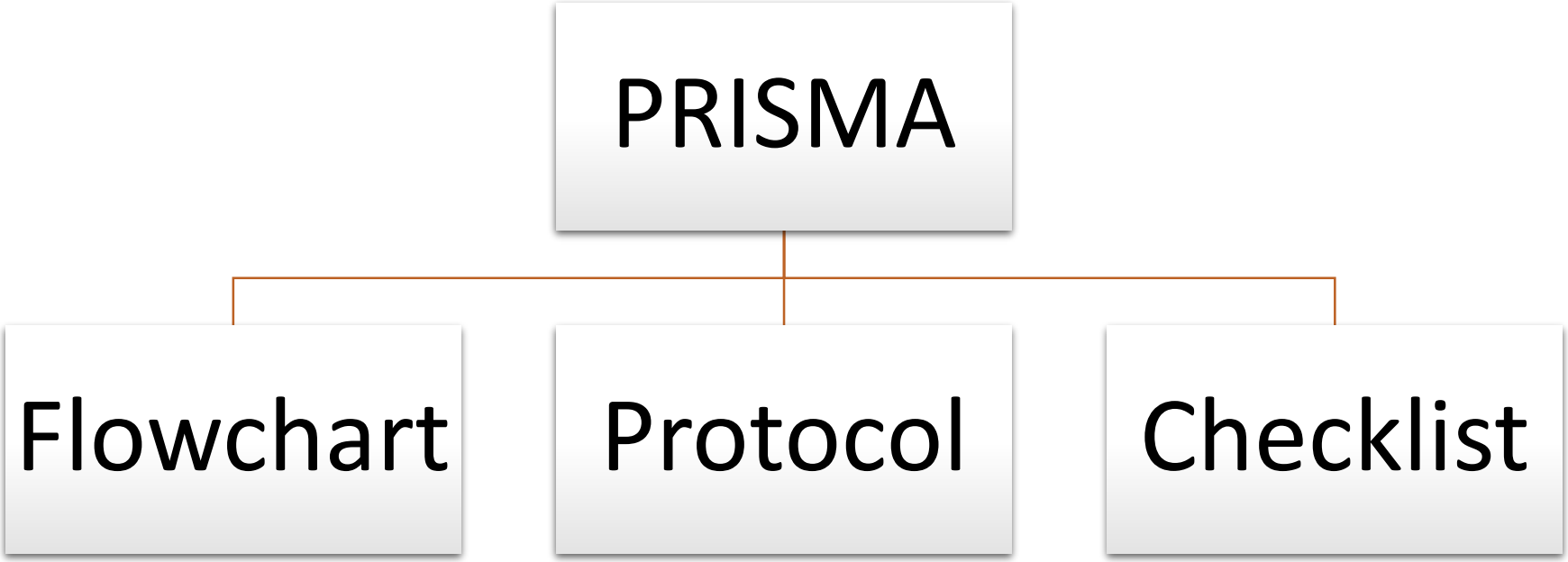
Standard Guides for a Systematic Review

1- Cochrane Handbook for Systematic Reviews of Interventions

2- PRISMA Statement (Preferred Reporting Items for Systematic reviews and Meta-Analyses)

3- JBI Manual for Evidence Synthesis

4-…


PRISMA
Flowchart
Protocol
Checklist

PRISMA Checklist

PRISMA 2020 Checklist

Section and Topic	Item #	Checklist item	Location where item is reported
TITLE			
Title	1	Identify the report as a systematic review.	
ABSTRACT			
Abstract	2	See the PRISMA 2020 for Abstracts checklist.	
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of existing knowledge.	
Objectives	4	Provide an explicit statement of the objective(s) or question(s) the review addresses.	
METHODS			
Eligibility criteria	5	Specify the inclusion and exclusion criteria for the review and how studies were grouped for the syntheses.	
Information sources	6	Specify all databases, registers, websites, organisations, reference lists and other sources searched or consulted to identify studies. Specify the date when each source was last searched or consulted.	
Search strategy	7	Present the full search strategies for all databases, registers and websites, including any filters and limits used.	
Selection process	8	Specify the methods used to decide whether a study met the inclusion criteria of the review, including how many reviewers screened each record and each report retrieved, whether they worked independently, and if applicable, details of automation tools used in the process.	
Data collection process	9	Specify the methods used to collect data from reports, including how many reviewers collected data from each report, whether they worked independently, any processes for obtaining or confirming data from study investigators, and if applicable, details of automation tools used in the process.	
Data items	10a	List and define all outcomes for which data were sought. Specify whether all results that were compatible with each outcome domain in each study were sought (e.g. for all measures, time points, analyses), and if not, the methods used to decide which results to collect.	
	10b	List and define all other variables for which data were sought (e.g. participant and intervention characteristics, funding sources). Describe any assumptions made about any missing or unclear information.	

PRISMA Protocol

- ✓**Data resources and Search strategy**
- ✓**Study Screening**
- ✓**study selection**
- ✓**Quality Assessment**
- ✓**Data Extraction**

Thematic Content Analysis (Maguire)

6-phase thematic analysis included:

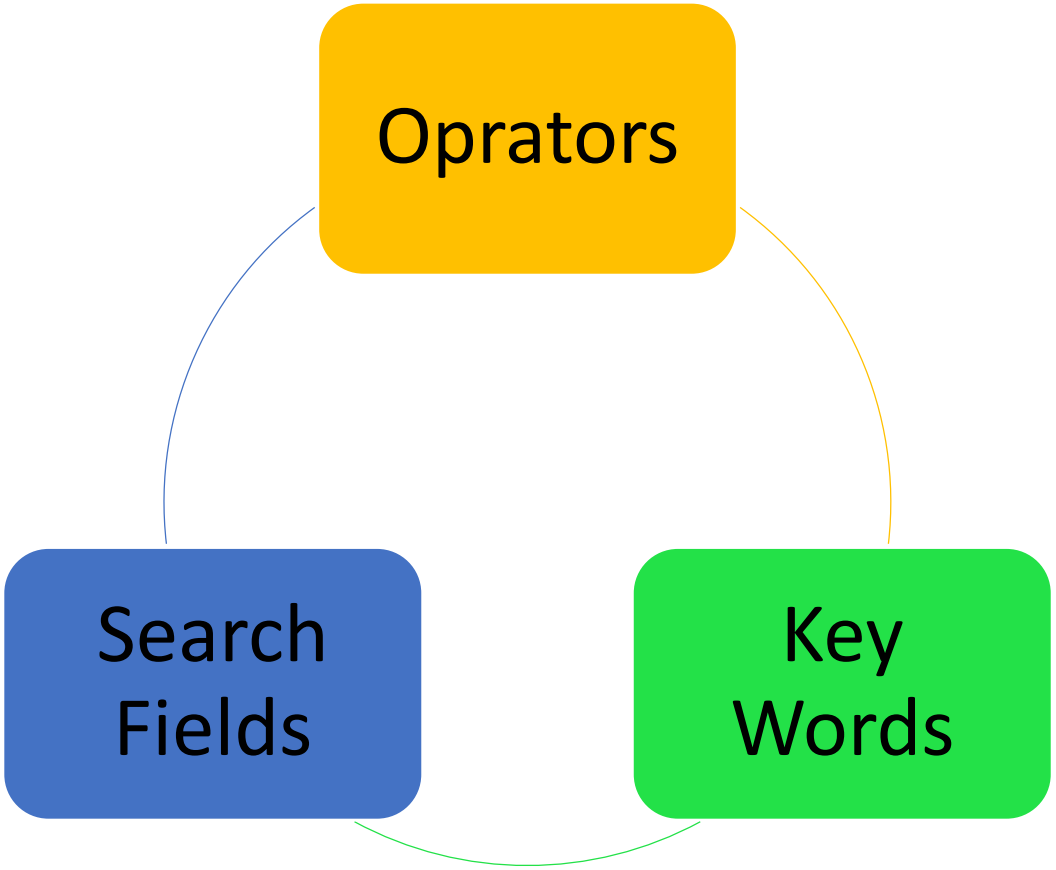
- Familiarization with the data
- Extracting primary codes
- Searching for topics (Themes)
- Reviewing topics
- Defining topics
- Writing the draft

Data resources

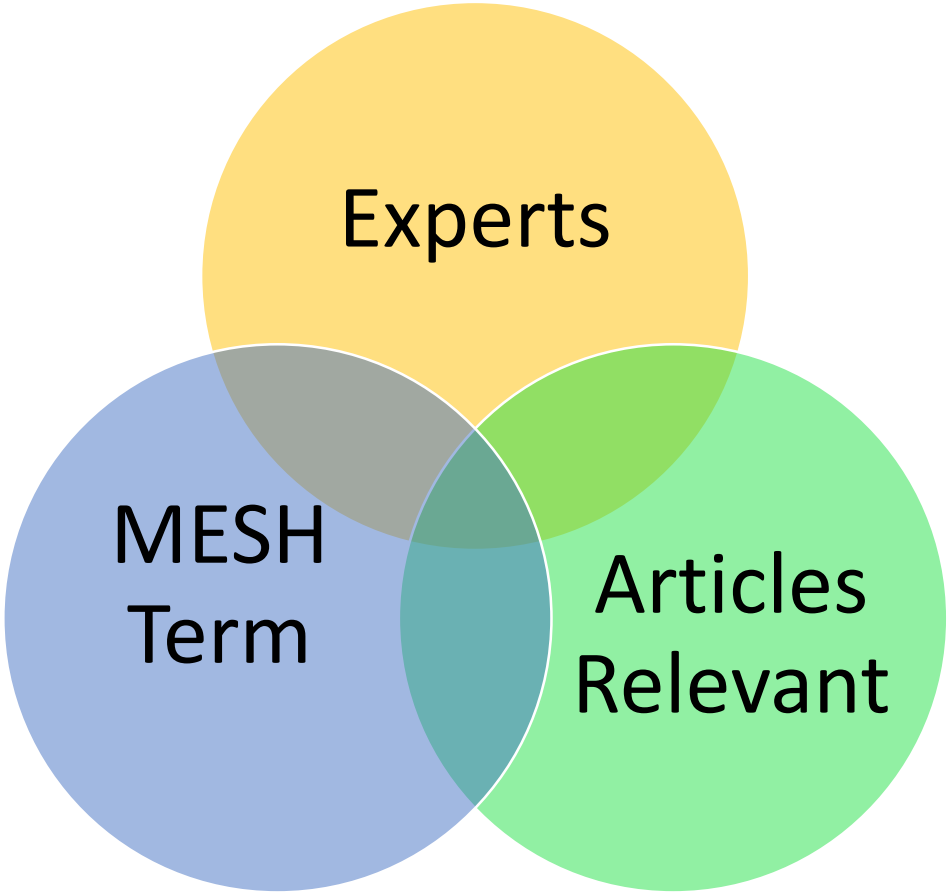
- **Bibliographic databases**
  - ***MEDLINE & EMBASE***
- **Citation databases**
  - ***Web of Science & Scopus***
- **Reference lists of the selected articles**
- **Conference and congress proceedings**
- **Other Data resources (Google scholar)**

Conducting a search strategy

Search Strategy



Keywords



Search fields

Status	PubMed	SCOPUS	WOS
Most inclusive	Without tag / OR / [tw] “fatty liver” / “fatty liver”[tw]	ALL() ALL(“fatty liver”)	- Don’t use without tag
Borderline	[tiab] “fatty liver”[tiab]	TITLE-ABS() TITLE-ABS(“fatty liver”)	TS=() TS=(“fatty liver”)
Most Exclusive	[ti] “fatty liver”[ti]	TITLE() TITLE(“fatty liver”)	TI=() TI=(“fatty liver”)

operators

"Road traffic accident*") OR ("road traffic injury*") OR

("traffic road safety*") AND

Search Syntax

Initially, a search syntax was compiled for PubMed, and according to which, the search syntax for other databases was then formulated.

Data bases	Syntax	Records Number
PubMed	(“Road traffic accident*”[tiab] OR “road traffic injury*”[tiab] OR “traffic road safety*”[tiab] OR driver*[tiab]) AND (“Unsafe behavior*”[tiab] OR “Human factors*”[tiab] OR Ergonomics[tiab])	440
Scopus	(TITLE-ABS ("Road traffic accident*") OR TITLE-ABS ("road traffic injury*") OR TITLE-ABS ("traffic road safety*") OR TITLE-ABS (driver*)) AND (TITLE-ABS ("Unsafe behavior*") OR TITLE-ABS ("Human factors*") OR TITLE-ABS (Ergonomics))	2736
Web Of science	(TS= ("Road traffic accident*") OR TS= ("road traffic injury*") OR TS= ("traffic road safety*") OR TI= (driver*)) AND (TS= ("Unsafe behavior*") OR TS= ("Human factors*") OR TS= (Ergonomics))	774

Time period

No time limitation

Until the end of July 2022.

Eligibility Criteria

❖Inclusion criteria:

Addressing the human factors involved in drivers' unsafe behavior leading to RTAs and publication.

❖Exclusion:

The studies investigating the factors associated with RTAs other than drivers' unsafe behaviors and those addressing general issues related to RTAs.

Study Selection

- All the articles retrieved were included to EndNote X7 software.
- After removing duplicates, the titles and abstracts of remaining articles were screened based on the eligibility criteria to primarily identify possibly relevant articles.
- Next, two researchers independently read the full text of these articles to finally choose the eligible ones.

Quality Assessment

- The Appraisal tool for Cross-Sectional Studies (AXIS) was the instrument of choice for evaluating the quality of the cross-sectional studies selected
- The Modified STROBE (Appendix No. 1) checklist was also used to assess the quality of the studies that could not be qualified by available standard tools

Data extraction

- Data extraction from the final studies was separately carried out by two researchers using a pre-prepared checklist to gather the information required, including:
- The first author's name, year of publication, place of study, study design, type of study, and **outcomes**.

Data Analysis

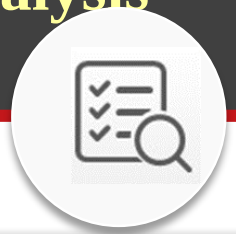
- We were reviewed several times, and initial codes were identified.
- In the next step, two researchers the identified codes in terms of similarities and differences, and similar codes were placed under the same category, forming a sub-theme.
- The sub-themes that were conceptually close to each other were merged and formed a theme.
- All the researchers participated in group discussions on the final draft summarizing the organized findings of the studies
- The final draft was read and agreed by all researchers.


Thank you for your attention

HUMAN FACTORS CONTRIBUTING TO THE UNSAFE BEHAVIOR OF DRIVERS AND ROAD TRAFFIC ACCIDENTS

نتایج جستجو

- the primary literature search in the databases resulted in the retrieval of 3950 articles.
- After removing duplicates, the titles and abstracts of 2890 studies were screened, leading to the removal of irrelevant articles.
- The full texts of 112 possibly-related articles were examined, and finally, 44 articles were selected for final analysis



نتایج جستجو

- Among the final studies included, 39 were research articles; four were conference papers, and one item was a book chapter.
- Six studies had been conducted in China, five in USA, four in Iran, three in India, three in England, two in Sweden, two in Malaysia, two in Poland, two in Australia, two in Nigeria, and one study in Spain, Zambia, Thailand, Italy, the Netherlands, South Africa, Czech Republic, Ukraine, Kenya, South Korea, Finland, Greece, and Israel each.
- Most of the studies reviewed had a cross-sectional design.

Table 2. The Summary of the Articles Included in the Systematic Review of the Human Factors Involved in the Unsafe Behaviors of Drivers Leading to Road Traffic Accidents.

First Author/ Year of Publication	Country	Study type	Study design	Human factors affecting drivers' behaviors
(Fisa et al., 2022)	Zambia	Journal article	Overview	Alcohol consumption, unauthorized speed
(Zhou et al., 2022)	China	Journal article	Cross-sectional	Unauthorized speed, high mental workload, unauthorized overtaking, sleepiness, alcohol consumption, sudden illness, negative emotions, poor safety knowledge
(Kongcharoen et al., 2022)	Thailand	Journal article	Cross-sectional	Close proximity to the vehicle in front, driving against the flow of traffic, sudden change of direction, alcohol consumption, sleepiness, exhaustion, using a mobile phone during driving, sudden brakes on a slippery road, unauthorized speed, unauthorized overtaking, ignoring traffic signs, not having a driver's license, violation of traffic rules, poorly equipped vehicle, improper use of the vehicle, high mental workload, not wearing a seat belt, not having a child seat, malfunctioning lights, fuel leakage, out of date cars, poor brakes, flat or rotten tires, lack of traffic lights, lack of road signs, lack of traffic control devices, inadequate lighting conditions, lack of guard rail installation, rainfall, excessive heat, wind speed, uneven road surfaces, broken concrete, road cracks, exposed rebar

Thematic Content Analysis

Based on our systematic review of the literature and thematic content analysis, the factors contributing to the unsafe behaviors of drivers leading to RTAs were divided into seven main themes and 15 sub-themes.

Cognitive factors (i.e., factors affecting the information processing cycle)	Sensory processor	Visual limitations Missing guide signs Hearing limitations Restrictions in data perception
	Cognitive processor	High mental workload Low alertness due to sleepiness Inattention due to using mobile phones Misjudgment of distance/speed
Skill factors	Motor processor	Impulsiveness Emergency response Long reaction time Defects in safe driving
	Skill performance	Driving experience Driving skills Driving style Performing first aid

Organizational factors	Educational	General training of driving Lack of sufficient training Road safety training Poor safety awareness
	Legislation	Unauthorized speed Unauthorized overtaking Close distance to the car in front Driving against the traffic flow
	Reliability	People's trust in the police Trust in other drivers
Sociocultural factors	Cultural	Conventional clothing Choice of behavior Habits Driving position
	Social	Alcohol consumption Drug abuse Social violence

Physical and environmental factors (aspects of car and road human factors)	Lack of attention to human factors in designing car components (non-ergonomic)	Vehicle design Malfunctional lights Doors' not opening without rescue tools Flat or rotten tires
	Environmental factors compromising human capabilities on the road	Unclear road signs Insufficient lighting conditions Uneven road surfaces Improper weather conditions

Discussion

- The present systematic review showed that the demographic characteristics of the deriver, such as gender, age, occupation, and educational level, influenced their unsafe behaviors on the road.
- The results of the studies reviewed suggested that gender and age were significant contributors to the risk of RTAs among motorcyclists. Thus, these factors, as features integrated with the personal lifestyle of motorcyclists, along with other risky behaviors can increase the risk of RTAs (Stanojević et al., 2020).
- The results of a study in the UK, investigating the risk factors associated with cycling accidents-related injuries, showed that the most of these injuries occurred among men and those older than 40 years of age (Hollingworth et al., 2015).

Discussion

- Other studies assessing the link between the driver's gender and age and the risk of accidents have indicated that females drove safer than males, while older individuals had the riskiest driving behaviors (Regev et al., 2018).

- The results of the present review agree with that of other studies, indicating that drivers' demographic specifications can influence their risky and unsafe behaviors under all circumstances, resulting in the occurrence of all types of RTAs. Therefore, it seems necessary to focus on the role of the driver's age and gender, as prominent factors contributing to the risk of RTAs, and enact the requisite guidelines and laws to minimize the burden of mortality and morbidity caused by these events.

Discussion

- Based on the findings of the present review, drivers' skills greatly affect the risk of RTAs. In fact, drivers' experience, skills, and driving style are among the factors influencing the possibility of perpetrating unsafe behaviors by drivers.
- The results of studies indicate that driving experience influences the perception of risky driving behaviors and the likelihood of RTAs (Tao et al., 2017).
- Other studies have suggested a role for the level of skills and experience of drivers in motor vehicle accidents among young drivers compared to their counterparts in other age groups (Rolison et al., 2018).

Discussion

- Other studies have confirmed a role for factors such as age, gender, past history of accidents, and injuries inflicted by past accidents in determining the level of the perceived risk of accidents by drivers, noting that older drivers have inadequate perception of the risk factors of RTAs compared to the drivers recovered from accident-caused high-degree injuries (Xue and Wen, 2021).

- According to the findings the present review and prior studies, the levels of expertise and skills of drivers largely influence their perception of the risk of RTAs and their consequences. Generally, drivers amend their driving behaviors based on previous experiences and the risk perception obtained during driving and, accordingly, minimize the risks faced during driving via enhancing safe behaviors.

Discussion

- In this review, we specified that physical and psychological factors, such as tiredness, frustration, anxiety, and a history of suicidal behaviors, can elevate the risk of unsafe behaviors by drivers, leading to RTAs. Scientific evidence reveals that professional drivers are highly exposed to job-related stress, which plays a role in their exhaustion and unsafe driving behaviors. In addition, job-related stress influences the tendency for behaviors such as smoking, alcohol abuse, and adherence to unhealthy dietary regimens, predisposing to RTAs (Useche et al., 2017).

- The results of a study in Singapore showed that the driver's exhaustion was associated with poor or extremely poor sleep quality, working at a second part-time job, drinking caffeinated beverages, and driving more than 10 hours per day (Lim and Chia, 2015).

Discussion

- Driving while the driver is exhausted is one of the main causes of RTAs, known as a silent killer.

- Also, driving during the middle of the night until dawn and during the morning time where the traffic is dense are among the most important risk factors of exhaustion-related accidents.

- Also, driving-related exhaustion has been associated with age, noting that younger drivers are more probably to become exhausted in the morning, while older drivers most probably become tired in the afternoon (Zhang et al., 2016).

The results of these studies are consistent with the findings of the present review, highlighting the role of fatigue and stress in the occurrence of unsafe behaviors and risk of RTAs.

- Overall, it is possible to mitigate the risk of RTAs to some extent by more careful monitoring of drivers' behaviors during the night and morning rush hours, limiting the traffic of high-risk vehicles, and improving roads' lighting condition.

Discussion

- The results of this review study showed that organizational factors, such as training about safe driving, allowed speed, and overtaking restrictions, could have an impact on the risk of RTAs.

- The results of a study in Oman showed that young people were the main victims of RTAs, with over-speeding and driving at night being the two main risk factors for this phenomenon (Al Reesi et al., 2016).

- A linear regression model revealed that the driving speed significantly correlated with the intensity of the injuries caused by traffic accidents and the rate of related mortality (Abu-Zidan and Eid, 2015).

- A study in Kenya, analyzing the injuries caused by RTAs among motorcyclists, revealed that negligence, not using protective equipment, slippery roads, and over-speeding, respectively, had the greatest impact on the incidence of RTA-related injuries, and the risk of physical injuries was reported to be 1.3-fold higher among non-trained vs. trained drivers (Matheka et al., 2015).

Discussion

- The results of these studies are consistent with our observations in the present systematic review, supporting a role for appropriate education and legislation in reducing unsafe behaviors among drivers and the risk of RTAs.

- Therefore, training drivers on safety measures, such as wearing helmets or seat belts and traffic rules, along with the strict implementation of traffic regulations, especially regarding prohibited over-speeding and overtaking, can effectively reduce the rate of RTAs.

Conclusion

- The findings of this systematic review revealed that numerous human risk factors can contribute to the incidence of RTAs, including organizational and sociocultural factors as the main determinants predisposing drivers to perpetrate risky behaviors on the road, an issue that was addressed by most of the studies explored.

- Therefore, upgrading the level of training and adjusting traffic rules according to human's physical, cognitive, and psychological capabilities and limitations, can probably improve drivers' behaviors.

- In this regard, authorities are expected to pay attention to our findings, upgrade their knowledge and skills, and manage RTAs by developing and implementing appropriate plans and effectively correcting the unsafe behaviors of drivers. On the other hand, more studies can help provide officials with solutions to eliminate the risk factors of unsafe behaviors and largely reduce the occurrence and burden of RTAs.

ازحسن توجه شما سپاسگزارم