DOI: 10.7251/JTTTP2601013A
UDC: 656.1.08:656.11.021(497.6RS)

ORIGINAL SCIENTIFIC PAPER

Impact of traffic safety law amendments on fatal road traffic injuries in the Republic of Srpska: a before–after analysis

Darijana Antonić
PhD, BSc. Management in healthcare, Public Health Institute of the Republic of Srpksa, Banja Luka, Pan-European University "Apeiron", Faculty of Health Science, Banja Luka, Bosnia and Herzegovina darijana.a@gmail.com, darijana.b.antonic@apeiron-edu.eu;
ORCID ID: 0000-0002-6656-1885

Imran Aslan
PhD, Head of Health Management Department, Faculty of Health Science, Health Management Department, Bingöl, Türkiye, imranaslan@gmail.com, iaslan@bingol.edu.tr

Slobodan Stanić
PhD, MD specialist in general surgery, Public Health Institute of the Republic of Srpksa, Banja Luka, University of Travnik, Faculty of Pharmacy and Health, Travnik, Bosnia and Herzegovina, slobodanstanic63@yahoo.com; ORCID ID: 0009-0007-7118-6833

Petković Vesna
PHI Public Health Institute, Republic of Srpska, Banja Luka; Pan-Europan University APEIRON, Banja Luka, Bosnia and Herzegovina, Faculty of Health Sciences, vesna.petkovic@phi.rs.ba; ORCID ID: 0009-0008-1109-8791

Recived: April 20, 2026
Revised: June 7, 2026
Accepted: June 26, 2026

Abstract: Road traffic injuries remain a major contributor to premature mortality, especially in low- and middle-income countries. This study quantified the burden of premature mortality attributable to road traffic injuries in the Republic of Srpska by calculating Years of Life Lost (YLL) and Potential Years of Life Lost (PYLL), and assessed changes following the 2021 amendments to traffic safety legislation. A quasi-experimental before–after design compared the periods 2011–2020 and 2021–2024. Mortality data were sourced from official demographic statistics and analysed using descriptive and inferential statistical methods. The results indicate a substantial decline in premature mortality. The mean number of road traffic deaths decreased by 27.9%, while YLL and PYLL were reduced by approximately 70%. Reductions occurred across all age groups, with the most pronounced decline among individuals aged 15-24 years and among vulnerable road users, particularly pedestrians and bicyclists. The Haddon matrix was used as the primary analytical framework, organizing findings across pre-crash, crash, and post-crash phases. The observed changes were primarily associated with system-level interventions in the pre-crash phase, particularly legislative and enforcement measures. Improvements in crash and post-crash determinants also likely contributed to reduced mortality. In conclusion, the reduction in premature mortality observed after 2021 is temporally associated with legislative amendments and aligns with a broader system-based road safety framework rather than isolated policy measures. Further research is warranted to quantify the contribution of individual interventions and to assess long-term trends.

Keywords: Road traffic injuries; premature mortality; Years of Life Lost (YLL); Potential Years of Life Lost (PYLL; Haddon matrix

INTRODUCTION

Road traffic injuries represent a leading cause of premature mortality and disability worldwide, posing a significant challenge to public health and development. According to the World Health Organization, approximately 1.19 million individuals die each year as a result of road traffic crashes. Additionally, tens of millions experience non-fatal injuries that frequently result in long-term disability (WHO, 2023). These injuries disproportionately affect low- and middle-income countries and predominantly occur among younger, economically active populations, resulting in considerable social and economic consequences (WHO, 2023; Murray et al., 2020). Beyond immediate human suffering, road traffic crashes impose a substantial burden on health systems, families, and national economies. Injuries frequently require extended medical treatment and rehabilitation, leading to reduced productivity and enduring social costs. As a result, traffic injuries are increasingly analysed using population health metrics that encompass both mortality counts and the broader effects of premature mortality (GBD, 2019; Collaborators, 2020).

Traditional mortality indicators quantify the number of deaths but fail to consider the age at death or the potential years of life lost due to premature mortality. To address this limitation, epidemiological research frequently utilises measures such as Potential Years of Life Lost (PYLL) and Years of Life Lost (YLL). PYLL estimates premature mortality using a predefined age threshold, such as 65 or 75 years. In contrast, YLL is calculated using standard life expectancy, representing the total number of years individuals would have lived had they reached the expected lifespan (Gardner & Sanborn, 1990; Romeder & McWhinnie, 1977; WHO, 2010; Murray et al., 2012). The YLL indicator is a core component of the Global Burden of Disease (GBD) framework and the World Health Organization Global Health Estimates methodology. In this approach, YLL is determined by multiplying the number of deaths by the standard life expectancy remaining at the age of death. This method places greater emphasis on deaths at younger ages, providing a more comprehensive assessment of the societal burden of premature mortality (Murray et al., 2012; WHO, 2023).

Road traffic deaths constitute a leading cause of mortality worldwide, particularly in low- and middle-income countries (LMICs), where more than 90% of fatalities occur. The burden is especially pronounced among vulnerable road users and young adults, notably those aged 15–29 years (WHO, 2023; Karkee & Lee, 2016; Konlan & Hayford, 2022). Given the disproportionate impact on adolescents and young adults, the use of YLL and PYLL indicators is highly pertinent in traffic safety research. These measures facilitate the identification of age groups most affected by premature mortality and inform the development of targeted prevention strategies and policy interventions (Elvik & Vaa, 2004; GBD 2019 Injuries Collaborators, 2020; World Health Organization, 2023).

Although global road safety has improved, the burden of road traffic injuries remains unevenly distributed across regions. In Europe, road traffic mortality has decreased significantly in recent decades, attributable to enhanced road infrastructure, vehicle safety standards, and comprehensive prevention policies. Nevertheless, countries in South-Eastern Europe and the Western Balkans continue to report higher mortality rates than the European Union average (European Commission, 2023; World Health Organization, 2023; European Transport Safety Council, 2022). Multiple studies have identified persistent challenges in these regions, including disparities in road safety policies, infrastructure quality, enforcement of traffic regulations, and emergency response systems (World Health Organization, 2023; European Transport Safety Council, 2022; European Commission, 2023).

In Bosnia and Herzegovina, particularly within the Republic of Srpska, road traffic injuries continue to be a significant cause of premature mortality and constitute a major public health concern (World Health Organization, 2023). While official statistics consistently report the number of traffic-related deaths and injuries, comprehensive analyses of premature mortality, using indicators such as PYLL and YLL, remain limited (Romeder & McWhinnie, 1977; GBD, 2019; Injuries Collaborators, 2020). Employing these indicators enables a more thorough understanding of the societal impact of traffic-related deaths by quantifying the loss of potential life years, especially among youth. Assessing premature mortality through YLL and PYLL can provide valuable insights for public health planning and road safety policy development in the Republic of Srpska, while also enhancing understanding of the burden of traffic injuries in the Western Balkan region (World Health Organization, 2023; European Commission, 2023; European Transport Safety Council, 2022; WHO Regional Office for Europe, 2019). This study aimed to evaluate the burden of premature mortality attributable to road traffic injuries in the Republic of Srpska using PYLL and YLL indicators. and YLL indicators.

Road traffic safety in Bosnia and Herzegovina is governed by a multi-level legal framework. At the state level, the Law on the Basics of Road Traffic Safety in Bosnia and Herzegovina establishes general rules for road user behaviour and specifies key safety measures, including seat belt use, helmet requirements, speed limits, and alcohol restrictions (Parlamentarna skupština Bosne i Hercegovine).

At the entity level, the Law on Traffic Safety of the Republic of Srpska regulates the implementation, enforcement, and organisation of the road safety system. This includes defining institutional responsibilities, monitoring mechanisms, and inspection procedures (Narodna skupština Republike Srpske, 2011, 2021).

The 2021 amendments to the entity-level law introduced stricter enforcement measures, enhanced monitoring of safety indicators, and improved coordination of road safety activities. These legislative changes establish a critical policy context for evaluating subsequent changes in road traffic mortality in the Republic of Srpska.

The analysis examines two distinct periods, 2011–2020 and 2021–2024, to assess temporal trends. This division corresponds to the 2021 amendments, which serve as the primary intervention of interest. The pre-intervention period reflects the regulatory framework established by the original 2011 law, facilitating a contextual interpretation of changes in mortality patterns (Narodna skupština Republike Srpske, 2011; Narodna skupština Republike Srpske, 2021). Accordingly, this study aims to assess changes in road traffic mortality following the implementation of legislative amendments, situating these changes within a broader system-level context.

METHODOLOGY

Study design and data sources

A retrospective, quasi-experimental (before–and–after) epidemiological study design was employed to assess changes in road traffic mortality and premature mortality in the Republic of Srpska.

Mortality data were obtained from official demographic statistics published by the Statistical Office of the Republic of Srpska for the period 2011–2024. Road traffic deaths were classified according to the International Classification of Diseases, Tenth Revision (ICD-10), within the transport accidents category (codes V00–V99). The study period was divided into two intervals: a pre-intervention period (2011–2020) and a post-intervention period (2021–2024), corresponding to the implementation of traffic safety policy measures. Mortality data were analysed by age group. Population data required to calculate mortality rates were also obtained from official demographic sources. This design enabled both a descriptive analysis of mortality trends over time and a comparative assessment of changes between the pre- and post-intervention periods.

Age-specific analysis

Mortality data were stratified into the following age groups: 0–4, 5–14, 15–24, 25–34, 35–44, and 45 years and older. Age-specific mortality rates were calculated per 100,000 population based on available demographic data. For grouped data, midpoint values were applied to estimate the average age at death within each category.

Potential Years of Life Lost (PYLL)

Potential Years of Life Lost (PYLL) were calculated using a fixed cut-off age of 75 years. For each age group, the midpoint of the interval was used to approximate the average age at death because individual-level data were unavailable. The total PYLL was determined as follows:

$$PYLL = \sum_{i=1}^{n}(L - a_i) \cdot d_i \quad (1)$$

where L represents the cut-off age (75 years), a_i is the midpoint of the age group, and d_i is the number of deaths in each age group. For the open-ended age group (45+ years), a midpoint of 65 years was assumed to approximate the average age at death. This approach was adopted to ensure consistent estimation of PYLL given the lack of more detailed age-specific data.

Years of Life Lost (YLL)

Years of Life Lost (YLL) were calculated according to the Global Burden of Disease (GBD) methodology, applying a standard life expectancy of 86.02 years. The midpoint of each age group served to estimate the average age at death. The total YLL was determined as follows:

$$YLL = \sum_{i=1}^{n}(LE - a_i) \cdot d_i \quad (2)$$

where LE represents the standard life expectancy (86.02 years), a_i is the midpoint of the age group, and d_i is the number of deaths in each age group. For the open-ended age group (45+ years), a midpoint of 65 years was assumed to approximate the average age at death.

Haddon matrix

The Haddon matrix served as a conceptual framework for interpreting injury prevention across temporal phases and system components. The matrix integrates the epidemiological triad of host, agent, and environment with the temporal sequence of pre-event, event, and post-event phases, thereby enabling a structured analysis of risk factors and intervention points (Sommers, 2006; Bonilla-Escobar & Gutiérrez, 2014; Hosking et al., 2011). The framework enables the classification of preventive strategies into primary, secondary, and tertiary levels and has been widely adopted in public health due to its systematic and adaptable approach to injury prevention (Sommers, 2006; Cabral et al., 2021). In this study, the Haddon matrix was used to interpret changes in road traffic mortality and premature mortality burden, as measured by years of life lost (YLL) and potential years of life lost (PYLL), by classifying findings into pre-crash, crash, and post-crash phases.

Data analysis

Data analysis was performed using Microsoft Excel (Microsoft Corporation, Redmond, WA, USA). Descriptive statistics, mortality rate calculations, and the estimation of potential years of life lost (PYLL) and years of life lost (YLL) indicators were conducted using standard spreadsheet functions. A linear trend for the 2011–2019 period was estimated using the FORECAST.LINEAR function in Excel to generate expected values, which were compared with observed mortality data for the period 2020–2024. Deviations from the projected trend were used to assess changes in mortality patterns over time. Differences between study periods were assessed using independent samples t-tests. Statistical significance was defined as $p < 0.05$, with $p < 0.001$ indicating a high level of statistical significance. Effect size was evaluated using Cohen's d, with values of 0.2, 0.5, and 0.8 interpreted as small, medium, and large, respectively.

Ethical considerations

This study was based on aggregated, publicly available data and did not involve individual-level information. Therefore, ethical approval was not required.

RESULTS

The mean number of road traffic deaths declined from 103.6 (SD = 15.0) in 2011–2020 to 74.8 (SD = 4.1) in 2021–

2024, representing a reduction of approximately 27.9%. This difference was statistically significant (t = 5.57, p < 0.001), indicating a very large effect size (Cohen's d = 2.18) (Table 1).

Table 1. Road traffic deaths across the study period

Period	Mean number of deaths	SD
2011-2020	103.6	15.0
2021-2024	74.8	4.1

Note: t = 5.57, p < 0.001; Cohen's d = 2.18

Figure 1 presents the trend in road traffic deaths from 2021 to 2024, compared with the expected linear trend derived from the 2011–2020 period. Observed mortality closely aligned with the expected trend prior to 2020; however, a marked divergence became evident thereafter. From 2020 onward, the number of deaths consistently remained below projected values, indicating a substantial reduction in mortality beyond the expected trend. The most pronounced decline occurred between 2020 and 2022, followed by stabilisation at a lower level through 2024.

From 2011 to 2020, individuals aged 15–24 years had the highest age-specific mortality rate (15.2 per 100,000 population). Mortality rates among individuals aged ≥25 years remained relatively stable, ranging from 8.9 to 9.7 per 100,000. The overall mortality rate during this period was 8.9 per 100,000, while rates in younger age groups consistently remained below 2 per 100,000. Between 2021 and 2024, the highest mortality rate was observed in the 25–34 age group, at approximately 10 per 100,000. Mortality rates in other age groups ranged from 6 to 8 per 100,000, with an overall rate of approximately 7 per 100,000. No road deaths were recorded among individuals aged 0–4 years.

Figure 2. Shows that mortality rates declined across all age groups between the two periods. The largest reductions were observed in the 15–24 age group (approximately 50%) and the 35–44 age group (approximately 30%). Moderate decreases of around 20% were observed in the 5–14 and 45+ age groups, as well as in the total population. The 25–34 age group experienced the smallest change, with a reduction of approximately 2%.

Road traffic deaths declined across all categories of road users, as indicated by mean values over the study period. The most substantial relative decreases occurred among bicyclists (−54.5%) and pedestrians (−48.4%). Passengers experienced moderate reductions (−24.4%), whereas drivers (−17.2%) and motorcyclists (−12.8%) saw smaller decreases. However, drivers continue to represent the largest group affected in absolute numbers.

Figure 3 presents the distribution of potential years of life lost (PYLL) across age groups for the periods 2011–2020 and 2021–2024. PYLL decreased substantially in all age groups. Individuals aged 15–24 years consistently experienced the highest burden of premature mortality,

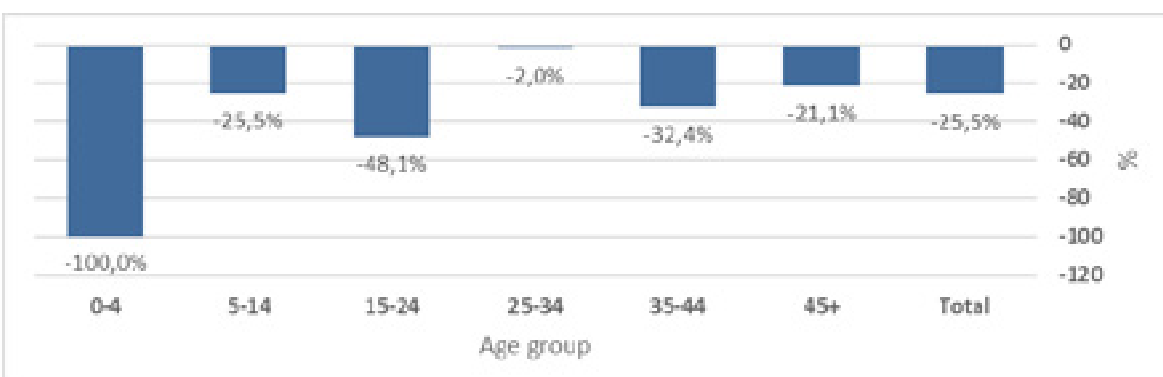

Figure 1. Percentage change in mortality rate by age group (2011-2020 vs 2021-2024)

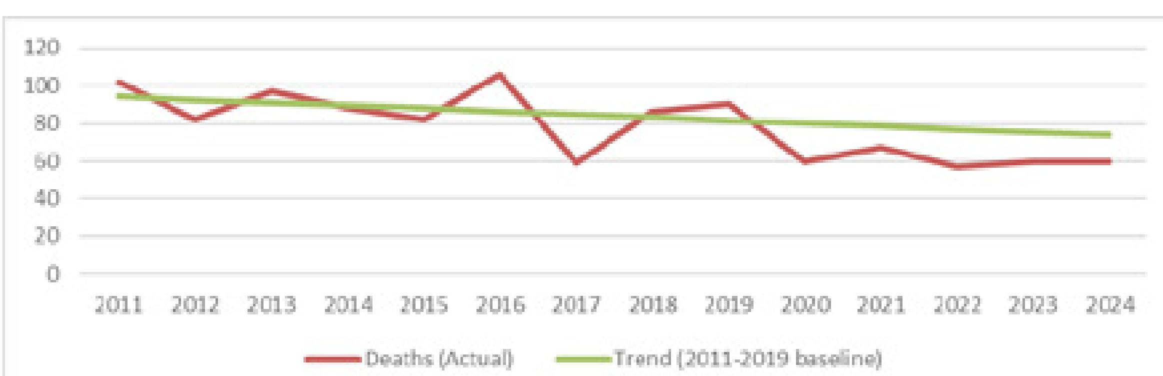

Figure 2. Trend in road traffic deaths and expected linear trend based on the 2011–2019 baseline

Table 2. Change in the mean number of road traffic deaths by road user categories across the study period

Road users	Period		% Change
	2021-2024	2011-2020	
Drivers	33.3	40.2	-17.2
Passengers	15.5	20.5	-24.4
Bicyclists	3.0	6.6	-54.5
Motorcyclists and moped drivers	7.5	8.6	-12.8
Pedestrians	11.3	21.9	-48.4
Others	4.0	5.8	-31.0

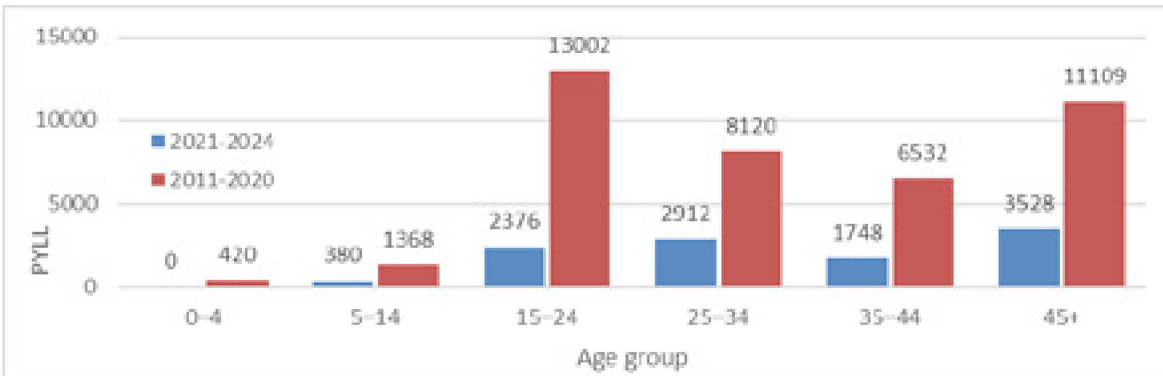

Figure 3. PYLL by age group in two periods (2011–2020 vs 2021–2024)

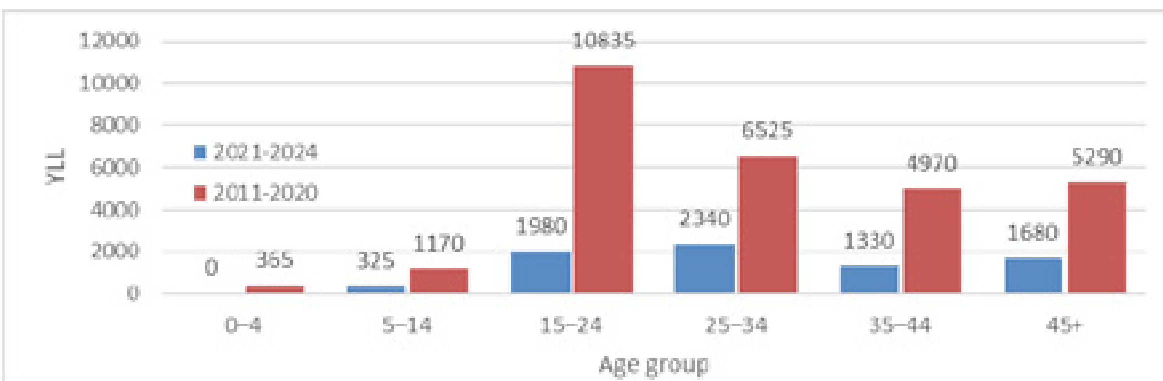

Figure 4. YLL by age group in two periods (2011–2020 vs 2021–2024)

followed by those aged 25–34 years and individuals aged 45 years and older.

Despite the overall decline, younger populations continued to account for a disproportionate share of total PYLL. The 15–24 age group experienced the most pronounced reduction, indicating a significant decrease in early deaths. Nevertheless, this group remained the largest contributor to premature mortality in both periods. Figure 4 illustrates the distribution of years of life lost (YLL) across age groups for the periods 2011–2020 and 2021–2024. In the more recent period, YLL decreased markedly across all age groups. The greatest burden of premature mortality was consistently observed among individuals aged 15–24 years, followed by the 25–34 and 45+ age groups.

Although older age groups experienced the highest number of deaths, younger populations contributed more substantially to total YLL because each death resulted in more years lost. The most pronounced decline in YLL occurred in the 15–24 age group, reflecting a significant reduction in early mortality. Nevertheless, this group continues to represent the largest contributor to the overall burden of premature mortality. These findings, based on PYLL, are consistent with the YLL analysis, which further confirms the substantial burden of premature mortality among younger populations.

DISCUSSION

The results of this study offer significant insights into the mechanisms responsible for the reduction in road traffic mortality in the Republic of Srpska. Road traffic injuries are recognised as preventable events arising from the interplay of human, vehicle, environmental, and system-level factors (WHO, 2023). Following the 2021 amendments to traffic safety legislation, a substantial reduction

Table 3. Haddon matrix of road traffic injury determinants across pre-crash, crash, and post-crash phases

Phase	Human (host)	Vehicle / Equipment (Agent)	Physical Environment	System / Social Environment
Pre-crash	Speeding, alcohol/drug use, fatigue, distraction, risky pedestrian behaviour	Vehicle roadworthiness, brakes, tyres, lights, high-visibility equipment (e.g., reflective vests), and regulation of e-scooters and similar vehicles	Black spots, lighting, road surface conditions, traffic signage, pedestrian crossings, “Zone 30”, hazardous road locations	Amendments to the 2021 law; mandatory monitoring of safety indicators; reporting to the Government; annual road inspection plans; road safety audits and inspections; local road safety councils; police enforcement and sanctions
Crash	Use of seat belts/helmets, body positioning, driver and passenger behaviour at the moment of impact	Passive vehicle safety, vehicle structure, airbags, fire risk	Guardrails, crash barriers, forgiving roadsides, road geometry, intersection design features influencing impact severity	Safe System approach, design standards, crash investigation and identification of corrective measures
Post-crash	Age distribution of victims, post-trauma survival	Vehicle extrication conditions, risk of fuel leakage or fire, accessibility for rescue teams	Access to the crash site, distance to the hospital, response time, and rural accessibility	Police, fire services, and emergency medical services; “golden hour” concept; the 2025–2034 strategy notes that helicopter emergency medical service is not yet established as a regular service; planned strengthening of emergency response capacity (Vlada Republike Srpske, 2023)

in both road traffic mortality and premature mortality burden was observed. The mean number of deaths declined by 27.9%, and both years of life lost (YLL) and potential years of life lost (PYLL) decreased by approximately 70%, demonstrating a notable reduction in premature mortality.

Within the Haddon matrix framework, the most pronounced effects were identified in the pre-crash phase, particularly within the system and social environment domains. The 2021 legislative amendments resulted in strengthened enforcement, enhanced monitoring, and improved institutional coordination.

The largest reductions were observed among individuals aged 15–24 years, a demographic typically associated with higher risk behaviours. These findings indicate that system-level interventions, such as stricter enforcement and regulatory measures, may have influenced road user behaviour and contributed to a reduction in the number of crashes. This interpretation aligns with previous evidence demonstrating that legislative and enforcement strategies are among the most effective approaches to reducing traffic injuries (WHO, 2023; Goel et al., 2024).

Improvements in crash-phase determinants may have contributed to a reduction in injury severity. The substantial decline in YLL observed in this study indicates improved survivability. These findings suggest that factors such as increased use of protective equipment, advancements in vehicle safety, and improvements in road infrastructure may have reduced the severity of injuries. Although these variables were not directly measured, the magnitude of YLL reduction supports the interpretation that crash outcomes became less fatal over time. In the post-crash phase, survival outcomes depend on the responsiveness of emergency medical services, access to trauma care, and the overall capacity of the healthcare system.

The continued decline and stabilisation of mortality in the later period suggest that improvements in emergency response and trauma care may have contributed to increased survival following road traffic injuries. The concept of the “golden hour” further underscores the importance of timely medical intervention in reducing fatal outcomes (WHO, 2023). The observed reduction in premature mortality is most appropriately interpreted as the result of coordinated improvements across all phases of the Haddon matrix (Table 3).

These findings indicate that the 2021 legislative amendments may have catalysed broader system-level changes, particularly in the pre-crash phase, while further improvements in crash- and post-crash determinants contributed to the overall decline in mortality. From a systems perspective, these results are consistent with the Safe System approach, which emphasises that road safety outcomes result from interactions among multiple components, including legislation, enforcement, infrastructure, vehicle safety, and post-crash care.

Official mortality statistics may underestimate the true burden of road traffic injuries. Previous research has demonstrated that reliance on a single data source can lead to underreporting, underscoring the importance of integrated and triangulated data systems (Mitra et al., 2021; Gutierrez et al., 2022). Additionally, this study relied on aggregated data, which limited the assessment of individual-level risk factors and causal relationships. The Haddon matrix was used as a conceptual framework for interpretation and does not establish causality. Overall, the findings support a comprehensive, system-based approach to road safety, in which coordinated interventions across multiple domains are essential for achieving sustained reductions in mortality. These results have significant implications for policy development, particularly in middle-income settings, where strengthening legislative frameworks and enforcement mechanisms may yield substantial public health benefits.

CONCLUSION

This study demonstrates a substantial reduction in road traffic mortality and premature mortality burden in the Republic of Srpska following the 2021 amendments to traffic safety legislation. Significant declines in years of life lost (YLL) and potential years of life lost (PYLL) across all age groups indicate that these improvements reflect broader system-level changes rather than effects limited to specific populations. The findings support a multifactorial interpretation of road safety, consistent with a system-based approach in which legislative measures, enforcement, infrastructure improvements, and post-crash care collectively contribute to reducing mortality. The application of the Haddon matrix further emphasises the importance of coordinated interventions across the pre-crash, crash, and post-crash phases.

Overall, the observed reduction in premature mortality is epidemiologically consistent with a comprehensive road safety framework rather than isolated policy measures, highlighting the importance of sustained, system-wide interventions. However, as the Haddon matrix was applied as a conceptual framework, causal relationships cannot be established. Future research using more robust analytical designs is needed to quantify the contribution of specific interventions and to assess long-term trends in road traffic mortality.

BIBLIOGRAPHY

[1] Bonilla-Escobar, F. and Gutiérrez, M. (2014). Injuries are not accidents: Towards a culture of prevention. Colombia Medica, 45(3), 132-135. https://doi.org/10.25100/cm.v45i3.1462

[2] Cabral, A., Bezerra, M., & Novo, J. (2021). Controls at the starting point for preventing accidents in the road transport of dangerous products / Controles no ponto de partida para prevenção de acidentes no transporte rodoviário de produtos perigosos. Brazilian Journal of Development, 7(4), 35560-35574. https://doi.org/10.34117/bjdv7n4-154

[3] Elvik, R., & Vaa, T. (2004). *The handbook of road safety measures*. Amsterdam: Elsevier.

[4] European Transport Safety Council. (2022). *PIN Annual Report 2022: Road deaths in the European Union*. Brussels: ETSC.

[5] European Commission. (2023). *Road safety in the European Union: Trends, statistics and main challenges*. Brussels: European Commission.

[6] Gardner, J. W., & Sanborn, J. S. (1990). Years of potential life lost (YPLL)—what does it measure? *Epidemiology, 1*(4), 322–329. https://doi.org/10.1097/00001648-199007000-00012.

[7] GBD 2019 Injuries Collaborators. (2020). Global burden of 369 diseases and injuries in 204 countries and territories, 1990–2019. *The Lancet*, 396(10258), 1204–1222. https://doi.org/10.1016/S0140-6736(20)30925-9

[8] Goel, R., Tiwari, G., Varghese, M., Bhalla, K., Agrawal, G., Saini, G., & Mohan, D. (2024). Effectiveness of road safety interventions: An evidence and gap map. Campbell Systematic Reviews, 20(1). https://doi.org/10.1002/cl2.1367

[9] Gutierrez, H., Mitra, S., Neki, K., Mbugua, L., Balasubramaniyan, R., Winer, M., & Bhalla, K. (2022). Comparing estimates of road traffic deaths and non-fatal road traffic injuries in Cambodia. *Injury Prevention, 28*(4), 340–346. https://doi.org/10.1136/injuryprev-2021-044504

[10] Hosking, J., Ameratunga, S., Morton, S., & Blank, D. (2011). A life course approach to injury prevention: a "lens and telescope" conceptual model. BMC Public Health, 11(1). https://doi.org/10.1186/1471-2458-11-695

[11] Karkee, R., & Lee, A. H. (2016). Epidemiology of road traffic injuries in Nepal. *International Journal of Environmental Research and Public Health*, 13(10), 1004. https://doi.org/10.1136/bmjopen-2015-010757

[12] Konlan, K. D., & Hayford, J. T. (2022). Factors associated with road traffic injuries in low- and middle-income countries. *BMC Public Health*, 22, 1234. https://doi.org/10.1186/s12889-022-13075-2

[13] Mitra, S., Neki, K., Mbugua, L., Gutierrez, H., Bakdash, L., Winer, M., & Bhalla, K. (2021). Availability of population-level data sources for tracking the incidence of deaths and injuries from road traffic crashes in low-income and middle-income countries. *BMJ Global Health, 6*(11), e007296. https://doi.org/10.1136/bmjgh-2021-007296

[14] Murray, C. J. L., Vos, T., Lozano, R., Naghavi, M., Flaxman, A. D., Michaud, C., & Lopez, A. D. (2012). Disability-adjusted life years (DALYs) for 291 diseases and injuries in 21 regions, 1990–2010: A systematic analysis for the Global Burden of Disease Study 2010. The Lancet, 380(9859), 2197–2223. https://doi.org/10.1016/S0140-6736(12)61689-4

[15] Murray, C. J. L., Abbafati, C., Abbas, K. M., Abbasi, M., Abbasi-Kangevari, M., Abd-Allah, F., & GBD 2019 Diseases and Injuries Collaborators. (2020). *Global burden of 369 diseases and injuries in 204 countries and territories, 1990–2019: A systematic analysis for the Global Burden of Disease Study 2019*. The Lancet, 396(10258), 1204–1222. https://doi.org/10.1016/S0140-6736(20)30925-9

[16] Narodna skupština Republike Srpske. (2021). *Zakona o bezbjednosti saobraćaja na putevima Republike Srpske*. Službeni glasnik Republike Srpske, br. 63/11, 89/21.

[17] Parlamentarna skupština Bosne i Hercegovine. (2006). *Zakon o osnovama bezbjednosti saobraćaja na putevima u Bosni i Hercegovini*. Službeni glasnik Bosne i Hercegovine, br. 6/06, 75/06, 44/07, 84/09, 48/10, 18/13, 8/17, 89/17, 9/18.

[18] Romeder, J. M., & McWhinnie, J. R. (1977). Potential years of life lost between ages 1 and 70: An indicator of premature mortality for health planning. International Journal of Epidemiology, 6(2), 143–151. https://doi.org/10.1093/ije/6.2.143

[19] Sommers, M. (2006). Injury as a Global Phenomenon of Concern in Nursing Science. Journal of Nursing Scholarship, 38(4), 314-320. https://doi.org/10.1111/j.1547-5069.2006.00121.x

[20] Vlada Republike Srpske. (2023). *Strategija bezbjednosti saobraćaja Republike Srpske 2025–2034*. Banja Luka.

[21] World Health Organization. (2010). Global burden of disease 2010: Methods and results. Geneva: World Health Organization.

[22] World Health Organization (WHO). (2023). *Global status report on road safety 2023*. Geneva: WHO.

[23] World Health Organization Regional Office for Europe. (2019). *European status report on road safety*. WHO Regional Office for Europe.