

CHILD MORTALITY IN CROATIA DUE TO GENERAL EXTERNAL CAUSES AND TRAFFIC INJURIES BETWEEN 1995 AND 2014

MISLAV MARTINIĆ, MILAN MILOŠEVIĆ¹, URELIJA RODIN² and AIDA MUJKIĆ¹

University of Zagreb, School of Medicine, ¹University of Zagreb, School of Medicine, Andrija Štampar School of Public Health and ²Croatian Institute of Public Health, Zagreb, Croatia

In Croatia, injuries are the leading cause of death after first year of life throughout childhood. Therefore, *the aim* is to present trends in total mortality caused by injuries, and specifically traffic injuries, in the 0-19 age group in Croatia between 1995 and 2014, and to standardize data using the Eurostat European Standard Population for 2013. *Methods:* The population and mortality data used in this study were obtained from the Croatian Bureau of Statistics and prepared by the Croatian Institute of Public Health. Data on population and mortality were divided into five age groups and four 5-year periods, and all analyses were performed with the Statistica version 12 software. *The results* of this study showed a statistically significant decline in injuries, as well as in traffic injury death rates in Croatia in the 1-19 age group from 10.9 *per* 100,000 to 5.7 *per* 100,000 for boys and from 5.2 *per* 100,000 to 2.1 *per* 100,000 for girls in the 1995-2014 period. *Conclusion:* Although progress has been made in the child safety measures, additional education of parents and children, preventive actions and traffic safety promotion measures are needed to provide a safe environment for children.

Key words: children, mortality, injuries, traffic injuries, trends, Croatia

Address for correspondence: Professor Aida Mujkić, MD, PhD
University of Zagreb School of Medicine
Andrija Štampar School of Public Health
Rockefellerova 4
10 000 Zagreb, Croatia
Phone: +385915978790
E-mail: aida.mujkic@snz.hr

INTRODUCTION

Injuries are a major cause of death in childhood and adolescence throughout the world, and the World Health Organization (WHO) estimates that injuries are responsible for over 875,000 deaths in children and young people under the age of 18 each year (1). Of all fatal injuries, traffic accidents are the leading cause of fatal injuries in children and adolescents (2). Moreover, the World Health Statistics 2008 report predicted that traffic injuries would be one of the fastest growing public health concerns in the next 25 years (3).

The majority of child and adolescent injury deaths occur in low- and middle-income countries, and the largest growth in mortality due to traffic injuries is expected in these countries because of unequal development of road traffic and road traffic safety measures (2,4). Additionally, at the world level, child injury and fatal injuries are largely associated with gender, with

25% more injury deaths occurring among boys than among girls in the 1-14 age group (2). However, the majority of injuries are considered preventable (1,5). In the European Union, it is estimated that nearly half of the unintentional injury deaths could be avoided (6). Having that in mind, visible progress has been made since the injury mortality rates have decreased in recent years in developed countries (4,7-11). Nevertheless, injuries are still the leading cause of death in the EU among children aged 1-14, and are responsible for 38% of all deaths in this age group, and in high-income countries, injuries are still considered 'the last major plague of the young' as they are identified as the leading cause of long-term disability in children (12,13).

The burden of injuries is not only found in mortality and disability, but also in the increasing need for medical help, increasing costs for individuals, families and society as a whole, especially health service, de-

creasing the overall quality of life, causing demographic loss and immeasurable suffering. In Croatia, as in all industrialized countries, injuries are the leading cause of death in the 1-19 age group, surpassing all other causes of death in this age group, while traffic injuries account for the greatest proportion of all injuries (14-16). Similar to other high- and middle-income countries, Croatia has shown substantial progress in lowering childhood mortality in general (17). In such countries, the childhood death rates from infectious diseases and malnutrition have decreased steadily and are the leading contributor to the overall decline in child mortality rates (18,19). Although childhood mortality from injuries has also decreased, injuries remain the leading cause of death among children after infancy in Croatia (20). Therefore, the aim of this study was to present trends in total mortality caused by traffic injuries in the 0-19 age group in the Republic of Croatia during the 1995-2014 period, with an overview of total mortality due to violent causes in these age groups in the given period.

METHODS

The data used in this study were obtained from the Croatian Bureau of Statistics and prepared by the Croatian Institute of Public Health. The data contained information on the estimated population in Croatia in the 1995-2014 period, as well as data on violent death outcomes among children in the same period. Data were divided into four 5-year periods (1995-1999, 2000-2004, 2005-2009 and 2010-2014). Additionally, data were separated according to gender and age groups (years): 0, 1-4, 5-9, 10-14 and 15-19 age groups.

Data on 1996, 2005-2007, 2009-2012 and 2014 did not contain estimates on the population of children aged 0, therefore birth rate data for the respective years were used instead. The underlying causes of death were coded using a three-character code according to the intent and mechanism, as specified by the International Classification of Diseases, 10th Revision (ICD-10) (21). Death outcomes due to traffic injuries were recognized as deaths that occurred as the consequence of events and conditions classified by ICD-10 as transport accidents (V01-V99).

All analyses were performed with the Statistica, version 12 software. The total Croatian population figures, according to the Croatian Central Bureau of Statistics data from 1995 to 2014, were used as the standard. Crude age-specific rates were determined in five-year periods for both genders and for total sample. Direct standardization using the European Standard Population (ESP) from 2013 was performed for all crude rates, and

appropriate rate ratios were found (22). The European Standard Population (ESP) is an artificial population structure which is used on weighing the mortality or incidence data to produce age-standardized rates, adding up to a total of 100,000 persons. In our calculations, we used data from the 2013 ESP for <19 age groups: 0 years – 1600 ESP, 1-4 years – 6400 ESP, 5-9 years – 7000 ESP, 10-14 years – 7000 ESP and 15-19 years – 7000 ESP. Confidence intervals (CI) were used to present between-group differences. The age-standardized rate for a particular condition (violent death outcomes and violent death outcomes due to traffic accidents) was obtained by applying the observed age-specific rates for the condition to a given standard population. The ESP has become an accepted methodological standard in health statistics in Europe. The 2013 ESP considers changes in the EU population, providing a more current, methodologically sound and widely acceptable basis for calculation of age-standardized rates. Age standardization is one of the key methods of control for different age distributions among populations, or over time. Comparing crude rates can be misleading in terms of trends when the age composition in a population changes over time, or when comparing groups or regions with different age structures.

Ethical considerations

This study used secondary data with no personal identifiers.

RESULTS

Study results are presented in Tables 1 to 8. The data on fatal outcomes, as well as population estimates for the given periods were separated into gender groups and age groups: 0, 1-4, 5-9, 10-14 and 15-19 age groups.

In the 1995-1999 period, there were a total of 495 fatal traffic injuries in the child age groups, with 341 fatal outcomes in the male group and 154 in the female group. The age-standardized incidence of traffic injury deaths in the 1995-1999 period was 10.9 *per* 100,000 ($p=0.05$; CI: 9.7-12.1) for boys and 5.2 *per* 100,000 ($p=0.05$; CI: 4.3-6.0) for girls (Table 1).

Table 1
Violent death outcomes due to traffic accidents in the child age groups in the 1995-1999 period

Violent death outcomes due to traffic accidents		1995-1999			
		Outcomes	Population	Age - specific	Age - standardised
Boys	0 yrs	6	130137	5	4611
	1-4 yrs	27	573075	5	18846
	5-9 yrs	43	789011	5	29974
	10-14 yrs	35	822562	4	23402
	15-19 yrs	230	802326	29	157667
	Age-standardised incidence*	10.9 (95% CI: 9.7-12.1)			
Girls	0 yrs	2	123299	2	1622
	1-4 yrs	20	545564	4	14664
	5-9 yrs	24	750574	3	17587
	10-14 yrs	22	786165	3	15391
	15-19 yrs	86	766214	11	61732
	Age-standardised incidence*	5.2 (95% CI: 4.3-6.0)			

Age-standardised rates per 100,000 population for specific age groups using the European Standard Population (ESP, 2013)

In the 1995-1999 period, there were a total of 1373 violent death outcomes in the child age groups, with 974 fatal outcomes in the male group and 399 in the female group. The age-standardized incidence of violent deaths in the 1995-1999 period was 31.1 *per* 100,000 ($p=0.05$; CI: 29.1-33.0) for boys and 13.4 *per* 100,000 ($p=0.05$; CI: 12.1-14.8) for girls (Table 2).

Table 2
Fatal outcomes due to all violent causes in the child age groups in the 1995-1999 period

Violent death outcomes		1995-1999			
		Outcomes	Population	Age - specific	Age - standardised
Boys	0 yrs	27	130137	21	20747
	1-4 yrs	69	573075	12	48161
	5-9 yrs	91	789011	12	63434
	10-14 yrs	194	822562	24	129717
	15-19 yrs	593	802326	74	406506
	Age-standardised incidence*	31.1 (95% CI: 29.1-33.0)			
Girls	0 yrs	26	123299	21	21087
	1-4 yrs	50	545564	9	36659
	5-9 yrs	48	750574	6	35173
	10-14 yrs	72	786165	9	50371
	15-19 yrs	203	766214	26	145716
	Age-standardised incidence*	13.4 (95% CI: 12.1-14.8)			

Age-standardised rates per 100,000 population for specific age groups using the European Standard Population (ESP, 2013)

In the 2000-2004 period, there were a total of 453 fatal traffic injuries in the child age groups, with 331 fatal outcomes in the male group and 122 in the female group. The age-standardized incidence of traffic injury deaths in the 2000-2004 period was 11.7 *per* 100,000 ($p=0.05$; CI: 10.5-13.0) for boys and 4.6 *per* 100,000 ($p=0.05$; CI: 3.8-5.4) for girls (Table 3).

Table 3
Violent death outcomes due to traffic accidents in the child age groups in 2000-2004 period

Violent death outcomes due to traffic accidents		2000-2004			
		Outcomes	Population	Age - specific	Age - standardised
Boys	0 yrs	4	108878	4	3674
	1-4 yrs	24	459947	5	20872
	5-9 yrs	33	665208	5	27285
	10-14 yrs	41	696291	6	32386
	15-19 yrs	229	748291	31	168317
	Age-standardised incidence*	11.7 (95% CI: 10.5-13.0)			
Girls	0 yrs	5	99681	5	5016
	1-4 yrs	10	445072	2	8987
	5-9 yrs	21	634253	3	18210
	10-14 yrs	8	665367	1	6613
	15-19 yrs	78	716924	11	59839
	Age-standardised incidence*	4.6 (95% CI: 3.8-5.4)			

Age-standardised rates per 100,000 population for specific age groups using the European Standard Population (ESP, 2013)

In the 2000-2004 period, there were a total of 844 violent death outcomes in the child age groups, with 625 fatal outcomes in the male group and 219 in the female group. The age-standardized incidence of violent deaths in the 2000-2004 period was 22.4 *per* 100,000 ($p=0.05$; CI: 20.6-24.1) for boys and 8.3 *per* 100,000 ($p=0.05$; CI: 7.2-9.4) for girls (Table 4).

Table 4
Fatal outcomes due to all violent causes in the child age groups in 2000-2004 period

Violent death outcomes		2000-2004			
		Outcomes	Population	Age - specific	Age - standardised
Boys	0 yrs	19	108878	17	17451
	1-4 yrs	58	459947	13	50441
	5-9 yrs	57	665208	9	47128
	10-14 yrs	85	696291	12	67141
	15-19 yrs	406	748291	54	298413
	Age-standardised incidence*	22.4 (95% CI: 20.6-24.1)			

Table 4 - cont

Violent death outcomes		2000-2004			
		Outcomes	Population	Age - specific	Age - standardised
Girls	0 yrs	15	99681	15	15048
	1-4 yrs	20	445072	4	17975
	5-9 yrs	33	634253	5	28616
	10-14 yrs	25	665367	4	20665
	15-19 yrs	126	716924	18	96663
Age-standardised incidence*		8.3 (95% CI: 7.2-9.4)			

Age-standardised rates per 100,000 population for specific age groups using the European Standard Population (ESP, 2013)

In the 2005-2009 period, there were a total of 355 fatal traffic injuries in the child age groups, with 273 fatal outcomes in the male group and 82 in the female group. The age-standardized incidence of traffic injury deaths in the 2005-2009 period was 10.5 *per* 100,000 ($p=0.05$; CI: 9.3-11.8) for boys and 3.4 *per* 100,000 ($p=0.05$; CI: 2.7-4.1) for girls (Table 5).

Table 5

Violent death outcomes due to traffic accidents in the child age groups in the 2005-2009 period

Violent death outcomes due to traffic accidents		2005-2009			
		Outcomes	Population	Age - specific	Age - standardised
Boys	0 yrs	3	112443	3	2668
	1-4 yrs	18	416743	4	17277
	5-9 yrs	18	587724	3	16845
	10-14 yrs	22	648982	3	18645
	15-19 yrs	212	682440	31	170858
	Age-standardised incidence*		10.5 (95% CI: 9.3-11.8)		
Girls	0 yrs	5	101735	5	4915
	1-4 yrs	9	399032	2	9022
	5-9 yrs	12	559310	2	11800
	10-14 yrs	7	620245	1	6207
	15-19 yrs	49	653413	7	41245
	Age-standardised incidence*		3.4 (95% CI: 2.7-4.1)		

Age-standardised rates per 100,000 population for specific age groups using the European Standard Population (ESP, 2013)

In the 2005-2009 period, there were a total of 643 violent death outcomes in the child age groups, with 483 fatal outcomes in the male group and 160 in the female group. The age-standardized incidence of violent deaths in the 2000-2004 period was 18.7 *per* 100,000 ($p=0.05$; CI: 17.1-20.4) for boys and 6.7 *per* 100,000 ($p=0.05$; CI: 5.6-7.7) for girls (Table 6).

Table 6

Fatal outcomes due to all violent causes in the child age groups in the 2005-2009 period

Violent death outcomes		2005-2009			
		Outcomes	Population	Age - specific	Age - standardised
Boys	0 yrs	14	112443	12	12451
	1-4 yrs	37	416743	9	35513
	5-9 yrs	34	587724	6	31818
	10-14 yrs	57	648982	9	48306
	15-19 yrs	341	682440	50	274823
	Age-standardised incidence*		18.7 (95% CI: 17.1-20.4)		
Girls	0 yrs	11	101735	11	10812
	1-4 yrs	21	399032	5	21051
	5-9 yrs	19	559310	3	18684
	10-14 yrs	23	620245	4	20395
	15-19 yrs	86	653413	13	72389
	Age-standardised incidence*		6.7 (95% CI: 5.6-7.7)		

Age-standardised rates per 100,000 population for specific age groups using the European Standard Population (ESP, 2013)

In the 2010-2014 period, there were a total of 186 fatal traffic injuries in the child age groups, with 138 fatal outcomes in the male group and 48 in the female group. The age-standardized incidence of traffic injury deaths in the 2010-2014 period was 5.7 *per* 100,000 ($p=0.05$; CI: 4.8-6.7) for boys and 2.1 *per* 100,000 ($p=0.05$; CI: 1.5-2.7) for girls (Table 7).

Table 7

Violent death outcomes due to traffic accidents in the child age groups in the 2010-2014 period

Violent death outcomes due to traffic accidents		2010-2014			
		Outcomes	Population	Age - specific	Age - standardised
Boys	0 yrs	2	107917	2	1853
	1-4 yrs	9	436235	2	8252
	5-9 yrs	10	530889	2	10360
	10-14 yrs	17	580339	3	16111
	15-19 yrs	100	635720	16	86516
	Age-standardised incidence*		5.7 (95% CI: 4.8-6.7)		
Girls	0 yrs	1	100866	1	991
	1-4 yrs	3	413222	1	2904
	5-9 yrs	8	502316	2	8759
	10-14 yrs	7	552058	1	6974
	15-19 yrs	29	607461	5	26257
	Age-standardised incidence*		2.1 (95% CI: 1.5-2.7)		

Age-standardised rates per 100,000 population for specific age groups using the European Standard Population (ESP, 2013)

In the 2009-2014 period, there were a total of 386 violent death outcomes in the child age groups, with 277 fatal outcomes in the male group and 109 in the female group. The age-standardized incidence of violent deaths in the 2000-2004 period was 11.5 *per* 100,000 ($p=0.05$; CI: 10.2-12.9) for boys and 4.8 *per* 100,000 ($p=0.05$; CI: 3.9-5.7) for girls (Table 8).

Table 8
 Fatal outcomes due to all violent causes in the child age groups in the 2010-2014 period

Violent death outcomes		2010-2014			
		Outcomes	Population	Age-specific	Age-standardised
Boys	0 yrs	8	107917	7	7413
	1-4 yrs	16	436235	4	14671
	5-9 yrs	22	530889	4	22792
	10-14 yrs	35	580339	6	33170
	15-19 yrs	196	635720	31	169572
	Age-standardised incidence*	11.5 (95% CI: 10.2-12.9)			
Girls	0 yrs	6	100866	6	5948
	1-4 yrs	11	413222	3	10648
	5-9 yrs	13	502316	3	14234
	10-14 yrs	17	552058	3	16937
	15-19 yrs	62	607461	10	56135
	Age-standardised incidence*	4.8 (95% CI: 3.9-5.7)			

Age-standardised rates per 100,000 population for specific age groups using the European Standard Population (ESP, 2013)

DISCUSSION

This analysis has made it clear that in Croatia, as in the majority of Central European countries, progress has been made in the field of child road traffic safety (23). This progress is seen especially when interpreting results in the female group, showing gradual decrease in the standardized death rates due to traffic injuries in the study period. When comparing the 5-year periods, the most significant decline is seen when comparing the 1995-1999 and 2010-2014 periods, from 5.2 *per* 100,000 to 2.1 *per* 100,000.

In the male group, progress has been made, but it has taken more time, as in the 1995-1999, 2000-2004 and 2005-2009 periods there was no statistically significant decline in death rates due to traffic injuries. However, when comparing the 2010-2014 period with previous periods, a substantial statistically significant decline is seen, from 11.7 *per* 100,000 in the 2000-2004 period to 5.7 *per* 100,000 in the 2010-2014 period.

In all four 5-year periods, a statistically significant difference was found between death rates according to gender, with boys being victims of traffic injuries more often than girls, especially in the 14-19 age group. However, the difference was decreasing, most prominently in the 2010-2014 period.

The largest decline in child death rates due to traffic injuries occurred in the 2010-2014 period, which could signify that the 2008 Road Traffic Safety Act and preventive measures implemented by the Croatian Ministry of Interior in recent years had been successful.

Our results also showed gradual decline in the overall violent death outcomes in both gender groups, from 31.1 *per* 100,000 in the 1995-1999 period to 11.5 *per* 100,000 in the 2010-2014 period in the male group and from 13.4 *per* 100,000 in the 1995-1999 period to 4.8 *per* 100,000 in the 2010-2014 period in the female group. These results suggest that, in the female group, traffic injury death rates followed the trends of the overall violent death rates, with gradual declines over the periods analyzed. Traffic injuries accounted for about half of all violent deaths in the 0-19 year age group in the female group in the periods analyzed. However, in the male group, there was no statistically significant change in death rates due to traffic injuries until the 2010-2014 period, while a gradual decline in the overall violent death rates is seen throughout the study period. While in the 1995-1999 period, traffic accidents accounted for roughly one-third of all violent death outcomes, in the subsequent periods traffic accidents accounted for around half of all violent death outcomes. Additionally, the results showed that the overall violent death rates were statistically significantly higher in the male group than in the female group throughout the study period. In this period, many activities were undertaken aimed at decreasing the number of casualties among children, especially those caused by traffic accidents. In 1994, the Croatian Ministry of Interior launched the National Road Safety Program, the goal of which was to decrease the rates of traffic injuries, traffic injury related deaths and long-term disabilities over years (23-25). Since 1995, the best known preventive action regarding traffic safety known as *Poštujte naše znakove* (Respect Our Signs) has been implemented in Croatia every September at the beginning of academic year (26). In 2008, the Road Traffic Safety Act 27 introduced repressive measures, such as prohibiting young drivers aged 16-24 from driving while under influence of any detectable level of alcohol or drugs, and driving vehicles with engine power exceeding 75 kW, but the same act additionally opened the possibility of other preventive campaigns, and in the same year the preventive campaign Child Car Seats was launched (27,28). In the following years, many preventive campaigns for child traffic safety

have been conducted, such as Safe Cycling in Traffic in 2008, Child Car Seats in 2009, Use a 'Glow Worm' (reflector for pedestrians) – Be Safer in the Dark in 2009, My Friend the Policeman and I in Traffic in 2009, and Children – Friends in Traffic in 2009 (29-33). As part of the National Road Safety Program, Croatia joined the UN preventive movement Decade of Action for Road Safety in 2011 (34-36). To evaluate the progress made by legislative changes and prevention programs, and to provide deeper insight into the problem of traffic injury death rates in Croatia, a more detailed trend analysis of total mortality due to traffic injuries would be helpful. This study could show whether the child safety programs have been successful over the past 20 years, but could also facilitate public health policy development and program planning.

In conclusion, the decline in the death rates due to traffic injuries and due to violent causes in general is an encouraging result, but we believe that there is still much to be done in the prevention of child injuries, especially in traffic injury prevention, since the goal of every society should be creating a safe environment and safe traffic for all children, without injuries causing death or disability.

For further investigation, we suggest studies analyzing the reasons for unequal proportion of traffic injury deaths relative to total violent death outcomes in the 1995-1999 period between gender groups, and studies analyzing the reasons for the unequal trends in death rates due to traffic injuries between gender groups in the 1995-2009 period.

LIMITATIONS

Our study limitations resulted from limitations of the estimates of the Croatian population made by the Croatian Bureau of Statistics, which do not take migration into consideration when estimating the population. Furthermore, data for the years 1996, 2005-2007, 2009-2012 and 2014 do not contain estimates of the population of children aged 0 years, therefore data on birth rate were used instead.

ACKNOWLEDGMENTS

This study was supported by the Zagreb University project entitled Causes of Child and Youth Injuries between 1995 and 2016.

The authors would like to express acknowledgment to Ms Martina Čuljak for her technical help.

R E F E R E N C E S

1. World Health Organization. Child and adolescent injury prevention: a WHO plan of action 2006-2015. Geneva: World Health Organization, 2006. Available from: http://apps.who.int/iris/bitstream/10665/43267/1/9241593385_eng.pdf
2. World Health Organization. Child and adolescent injury prevention: a global call to action. Geneva: World Health Organization, 2005. Available from: http://apps.who.int/iris/bitstream/10665/43279/1/9241593415_eng.pdf
3. World Health Organization. World Health Statistics 2008. Geneva: World Health Organization, 2008. Available from: http://www.who.int/gho/publications/world_health_statistics/EN_WHS08_Full.pdf
4. World Health Organization, UNICEF. World report on child injury prevention. Geneva: World Health Organization; 2008. Available from: https://books.google.hr/books?hl=hr&lr=&id=UeXwoNh8sbwC&oi=fnd&pg=PR7&dq=child+injury+prevention&ots=hH_BZP-hu0E&sig=otV7WykTN4KNR82AEfCACJcvMhw&redir_esc=y#v=onepage&q=child%20injury%20prevention&f=false
5. Pan SY, Ugnat A, Semenciw R, Desmeules M, Mao Y, MacLeod M. Trends in childhood injury mortality in Canada, 1979-2002. *Injury Prevention* 2006; 12: 155-60. doi: 10.1136/ip.2005.010561
6. Petridou ET, Killekidis S, Jeffrey S, Chishti P, Dessypris N, Stone DH. Unintentional injury mortality in the European Union: how many more lives could be saved?. *Scand J Public Health* 2007; 35: 278-87. doi: 10.1080/14034940600996662
7. Parkkari J, Mattila V, Niemi S, Kannus P. Injury-related deaths among Finnish children, 1971-2001. *JAMA* 2003; 289: 702-3. doi:10.1001/jama.289.6.702
8. Morrison A, Stone DH, Redpath A, Campbell H, Norrie J. Trend analysis of socioeconomic differentials in deaths from injury in childhood in Scotland, 1981-95. *BMJ* 1999; 318: 567-8. doi: 10.1136/bmj.318.7183.567
9. Morrison A, Stone DH. Unintentional childhood injury mortality in Europe 1984-93: a report from the EURORISC Working Group. *Injury Prevention* 1999; 5: 171-6. doi: 10.1136/ip.5.3.171
10. Tomashek KM, Hsia J, Ivasu S. Trends in postneonatal mortality attributable to injury, United States, 1988-1998. *Pediatrics* 2003; 111: 1219-25. Available from: http://pediatrics.aappublications.org/content/111/Supplement_1/1219.
11. Ekman R, Svanström L, Långberg B. Temporal trends, gender, and geographic distributions in child and youth injury rates in Sweden. *Injury Prevention* 2005; 11: 29-32. doi: 10.1136/ip.2003.005074.
12. European Association for Injury Prevention and Safety Promotion (EuroSafe). Injuries in the European Union – summary of the injury statistics for the years 2008-2010. Amsterdam: EuroSafe; 2013. Available from: https://ec.europa.eu/health/sites/health/files/data_collection/docs/idb-report_2013_en.pdf

13. Committee on Trauma Research, Commission on Life Sciences, National Research Council, Institute of Medicine. Injury in America: a continuing public health problem. Washington DC: National Academy Press, 1985. Available from: <https://www.nap.edu/read/609/chapter/1>.
14. Mujkić A, Ivčević U, Rodin U, Meštrović J, Gereš N. Mortality of children aged 0-19 years in Croatia during 1995-2012 period. In: Gagro A *et al.*, eds. Proceedings of the 11th Congress of Croatian Paediatric Society; 2014 Oct 16-19; Dubrovnik, Croatia. Zagreb: Children's Hospital Zagreb, 2014. p. 99.
15. McKee M, Orešković S. Childhood injury: call for action [editorial]. *CMJ* 2002;43:375-8. Available from: <http://neuron.mefst.hr/docs/CMJ/issues/2002/43/4/12187512.pdf>.
16. Karlo R, Škarica R, Bukvić N, Zekanović D. Child injuries in traffic accidents. *Med Jadertina* 2011; 41: 143-6.
17. World Development Indicators [Internet]. Washington: World Bank. c2017 [cited 2017 Nov 26]. Available from: <http://data.worldbank.org/country/croatia>
18. Garzon DL. Contributing factors to preschool unintentional injury. *J Pediatr Nursing* 2005; 20: 441-7. doi: 10.1016/J.PEDN.2005.03.014
19. Sidebotham P, Fraser J, Covington T *et al.* Understanding why children die in high-income countries. *Lancet* 2014; 384: 915-24. doi: 10.1016/S0140-6736(14)60581-X
20. Ćorić T, Miler Knežević A, Ćukelj P. The report about causes of death in Croatia in 2016. Zagreb: Croatian National Institute of Public Health; 2017. Available from: https://www.hzjz.hr/wp-content/uploads/2017/08/Bilten__Umrli-_2016-3.pdf
21. World Health Organization. International statistical classification of disease and health related problems. 10th revision. Geneva: WHO; 1993. Available from: <https://scholar.google.com/scholar?q=World+Health+Organization.+International+statistical+classification+of+disease+and+health+related+problems.+10th+revision.+Geneva%2C+Switzerland%3A+World+Health+Organization%2C+1993>.
22. Eurostat. Revision of the European standard population: report of Eurostat's task force. Luxembourg: Publications Office of the European Union; 2013. Available from: <http://ec.europa.eu/eurostat/documents/3859598/5926869/KS-RA-13-028-EN.PDF>
23. Armour-Marshall J, Wolfe I, Richardson E, Karanikolos M, McKee M. Childhood deaths from injuries: trends and inequalities in Europe. *Eur J Public Health* 2012; 22: 61-5. doi: 10.1093/eurpub/ckr004
24. National Road Safety Programme of the Republic of Croatia 2011-2020. *Narodne novine* 59/2011. Available from: https://narodne-novine.nn.hr/clanci/sluzbeni/2011_05_59_1321.html
25. Orlović B, Mataija J, Huljak M. National Road Safety Programme of the Republic of Croatia 2011-2020. Zagreb: Ministry of Interior of the Republic of Croatia, Police Academy; 2011. Available from: https://www.mup.hr/UserDocsImages/engleska%20verzija/2015/14_Prilog4_NPSCPen-g_16_02_15GracDarko.pdf.
26. Republic of Croatia Ministry of Interior [Internet]. Respect our signs! [cited 2017 Nov 26]. Available from: <http://www.forenzika.hr/166881.aspx>
27. Road Traffic Safety Act. *Narodne novine* 67/2008. Available from: https://narodne-novine.nn.hr/clanci/sluzbeni/2008_06_67_2224.html
28. Republic of Croatia Ministry of Interior [Internet]. Preventative action: Child seat for vehicles [cited 2017 Nov 26]. Available from: <http://www.zagrebacka.policija.hr/11688/528.aspx>
29. Republic of Croatia Ministry of Interior [Internet]. Preventative action: Safety cycling in traffic [cited 2017 Nov 26]. Available from: <http://www.zagrebacka.policija.hr/8884/236.aspx>
30. Republic of Croatia Ministry of Interior [Internet]. Preventative action: Child seat [cited 2017 Nov 26]. Available from: <http://zagrebacka.policija.hr/25895/499.aspx>
31. Republic of Croatia Ministry of Interior [Internet]. Glowworm [cited 2017 Nov 26]. Available from: <http://sisacko-moslavacka.policija.hr/MainPu.aspx?id=30176>
32. Republic of Croatia Ministry of Interior [Internet]. My friend policeman and I, in traffic [cited 2017 Nov 26]. Available from: <http://www.forenzika.hr/13920.aspx>
33. Republic of Croatia Ministry of Interior [Internet]. Children – friends in traffic [cited 2017 Nov 26]. Available from: <http://www.forenzika.hr/MainPu.aspx?id=21751>
34. UNRSC. Global plan for the Decade of Action for Road Safety 2011-2020. Available from: http://www.who.int/road-safety/decade_of_action/plan/en/.
35. World Health Organization. Decade of action for road safety 2011-2020: saving millions of lives [Internet]. Available from: http://www.who.int/roadsafety/decade_of_action
36. World Health Organization. Global status on road safety 2013: supporting a decade of action. Geneva: World Health Organization, 2013. Available from: https://books.google.hr/books?hl=hr&lr=&id=rrMXDAAAQBAJ&oi=fnd&pg=PP1&dq=world+report+on+child+injury+prevention&ots=MEMQ9F6jak&sig=MIDgMgHEiDcbK7AextenHGmH4cA&redir_esc=y#v=onepage&q=croatia&f=false

SAŽETAK

SMRTNOST DJECE U HRVATSKOJ ZBOG UKUPNIH OZLJEDA I PROMETNIH OZLJEDA U RAZDOBLJU 1995. I 2014. GODINE

M. MARTINIĆ, M. MILOŠEVIĆ¹, U. RODIN² i A. MUJKIĆ¹

*Sveučilište u Zagrebu, Medicinski fakultet, ¹Škola narodnog zdravlja „Andrija Štampar“ i
²Hrvatski zavod za javno zdravstvo, Zagreb, Croatia*

Ozljede su u Hrvatskoj vodeći uzrok smrti djece nakon navršene prve godine života. Stoga je cilj ovog rada prikazati kretanje smrtnosti djece u dobi 0-19 godina zbog ukupnih ozljeda i ozljeda zadobivenih u prometu u Hrvatskoj u razdoblju od 1995. do 2014. godine te provesti standardizaciju koristeći se podacima Eurostata za Europsku Standardnu Populaciju za 2013. godinu. U istraživanju su korišteni podatci Državnog zavoda za statistiku o vanjskim uzrocima smrti od ozljeda te podatci o procjeni broja stanovnika prema petogodišnjim dobnim skupinama i spolu. Šifriranje uzroka smrti prema Međunarodnoj klasifikaciji bolesti i srodnih zdravstvenih problema, 10. revizija (MKB-10), provedeno je u Hrvatskom zavodu za javno zdravstvo temeljem podataka iz liječničkih potvrda o smrti. Razdoblje od 1995. do 2014. podijeljeno je u četiri petogodišnja razdoblja. Sve statističke analize provedene su statističkim paketom Statistica, 12. verzija. Rezultati pokazuju statistički značajan pad smrtnosti zbog ukupnih ozljeda i prometnih ozljeda u dobnim skupinama 0-19: od 10,9 na 100.000 na 5,7 na 100.000 za dječake te od 5,2 na 100.000 na 2,1 na 100.000 za djevojčice u razdoblju od 1995. do 2014. godine. Iako je napredak postignut, potrebno je nastaviti provoditi postojeće programe izobrazbe djece i roditelja te programe prevencije nesreća i unaprjeđenja sigurnosti u prometu.

Ključne riječi: djeca, smrtnost, ozljede, prometne nesreće, kretanje, Hrvatska