SEMINARE

The Issue of Children's Safety in Road Traffic in Poland in 2022–2024 Based on Police Statistical Data

Problematyka bezpieczeństwa dzieci w ruchu drogowym w Polsce na podstawie danych statystycznych Policji w latach 2022-2024

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Abstract: The safety of children participating in road traffic in Poland has, for many years, been a significant social problem, generating substantial costs for the state in both economic and health dimensions. A detailed analysis of statistical data on the number of road accident causalities among the youngest road users over the past three years, combined with an examination of the causes and circumstances of these incidents, provides valuable research material. The result of the author's analytical considerations, in their practical dimension, is the identification of the psychophysical limitations faced by children participating in road traffic. This, in turn, serves as the basis for the development of appropriately targeted preventive measures with a high level of effectiveness. Such analytical and prognostic analyses are essential in the process of developing effective preventive and corrective programs by institutions responsible for safety. The processes undertaken within the scope of this publication allowed for the identification of the problem, the determination of correlations, and the recommendation of solutions to the issue based on logical inference.

Keywords: internal security, public safety, road safety, road traffic, children's safety in road traffic, causes of road accidents involving children, psychophysical limitations of children in road traffic

Abstrakt: Bezpieczeństwo dzieci, uczestniczących w ruchu drogowym na terenie Polski jest od lat problemem społecznym, generującym dla państwa ogromne koszty zarówno w ekonomicznym, jak i zdrowotnym wymiarze. Szczegółowa analiza danych statystycznych, określających liczbę ofiar wypadków drogowych wśród najmłodszych uczestników ruchu za ostatnie trzy lata w zestawieniu ze wskazaniem przyczyn i okoliczności tych zdarzeń stanowi cenny materiał badawczy. Głównym celem niniejszego opracowania jest ukazanie skali omawianego zjawiska w Polsce w przyjętym do celów badawczych okresie oraz wskazanie psychofizycznych ograniczeń, z jakimi mierzy się dziecko, uczestnicząc w ruchu drogowym. Stanowić to będzie bazę do tworzenia, planowania i wdrażania działań zaradczych. Do przeprowadzenia przedmiotowych badań wykorzystano metodę analizy. Poddano analizie wiodące opracowania naukowe, dokumenty oraz wartości liczbowe z policyjnych baz danych. Zaprezentowana skala przedmiotowego zjawiska w Polsce na przestrzeni ostatnich trzech lat uwypukla powagę problemu bezpieczeństwa najmłodszych uczestników ruchu drogowego. Przeprowadzone analizy i wysnute wnioski wskazują obszary, które wymagają zainteresowania badawczego ze strony nauk o bezpieczeństwie oraz praktycznego ze strony instytucji działających na rzecz poprawy tego bezpieczeństwa.

Słowa kluczowe: bezpieczeństwo wewnętrzne, bezpieczeństwo publiczne, bezpieczeństwo ruchu drogowego, ruch drogowy, bezpieczeństwo dzieci w ruchu drogowym, przyczyny wypadków drogowych z udziałem dzieci, ograniczenia psychofizyczne dzieci w ruchu drogowym

INTRODUCTION

To determine the level of safety for children and adolescents in road traffic and the degree of control over the associated hazards, it is necessary to conduct a comprehensive analysis of the

road safety system. Available statistical data, collected by state entities institutionally responsible for road safety, accurately describe the level of protection afforded to the youngest road users. This road safety system is defined in specialist literature as a correlation between the human (child), the vehicle, and the road. As in any interdependent system, undesirable processes and events may occur, resulting in social, material, and health-related losses. The risk of such adverse circumstances is referred to as system failure and results from its complexity (Karbowniczek and Lejda 2013, 134).

Road user safety has, for many years, been the subject of research and corrective measures initiated by the state. Governmental and non-governmental organisations operating within the road safety system strive to ensure the protection of road users. Road safety also constitutes a crucial element of citizens' lives, as reflected in the role this dimension of social reality plays in overall well-being. Statistical data based on road accidents recorded by, among others, the Police, when properly organised and catalogued, reflect the actual level of road safety in Poland. They also serve as an indicator of the effectiveness of state actions aimed at improving road safety. According to data from the Police Headquarters, Road Traffic Bureau, in 2024, 26,678 people were involved in road accidents, including 1,896 fatalities and 24,782 injured persons (7,796 seriously injured). Compared to 2023, this represents an increase of 660 casualties, 3 additional fatalities, and 657 more injuries by (Police Headquarters, Road Traffic Bureau 2025, 37)

However, to fully understand the scale of the problem and accurately assess the effectiveness of the solutions adopted within existing road safety systems, it is necessary to categorise road users by age. Careful observation of behavioural patterns of in road traffic situations associated with specific age groups will allow for the identification of shortcomings in current programmes, the modification of adopted systemic solutions, and the simultaneous introduction of new, more appropriately selected, and therefore more effective, safety measures.

The author of this paper has conducted a statistical analysis of one of the social groups requiring particular attention and care from organisations concerned with road safety in its broadest sense. This group consists of the youngest road users, who participate in road traffic both in large numbers and in high intensity. To ensure the consistency and clarity of the presented statistical data, the age of road users referred to as "children" has been defined as up

to 14 years. The analysis of available statistical data, demonstrating the scope, effects, and circumstances of road accidents involving children and adolescents, fully illustrates the true scale of the problem and also serves as an indication of the need for immediate state intervention to improve this level of safety. An examination of available numerical data defining the safety status of the youngest road users indicates the need for continuous monitoring of preventive and remedial measures undertaken by the state, in terms of their appropriateness and practical effectiveness. The statistical analysis of road incidents involving preschool-age children, who, are not permitted to participate independently in road traffic (Act of 20 June 1997); and, separately, early school-age and secondary school students, who begin to fulfil the statutory obligation to attend school according to (Act of December 2016), and thus become full participants in road traffic, constitutes reliable and valuable analytical and research material. Determining the pattern of road accidents involving children will allow for the formulation of conclusions that may contribute to improving the safety of this social group.

1. Analysis of Statistical Reports on Road Accidents Involving Children Aged 0–14 Years

The author of this publication performed demographic calculations, categorising children by age in order to ensure accurate statistical analysis. These calculations were based on population data for Poland for 2024, as provided by the Central Statistical Office [GUS]. The results indicate that the number of children aged 0 to 14 in Poland in 2024 was approximately 6 million, representing around 15% of the country's total population. For the purposes of the analysis, and in order to obtain a detailed and thus reliable result, it was specified that in 2024 the number of children aged 0–6 was approximately 2.7 million, while the number of children aged 7–14 was approximately 3.1 million.

The adopted division distinguishes two age groups of the youngest road users: children aged 0 to 6 and older children aged 7 to 14. This categorisation enhances the analytical value of the presented statistical data. Therefore, it appears justified to conduct separate analyses on road safety for children aged 0 to 14, divided into two subcategories: children up to 6 years of age and those aged 7 to 14.

The data on the frequency and consequences of accidents involving the youngest road users are alarming and illustrate the gravity of the problem. In 2024, 1,741 road accidents involving children aged 0 to 14 were recorded. In these accidents, 50 children were killed, and 1,838 were injured. These figures are confirmed by statistical data collected by institutions responsible for road safety in Poland. However, compared to 2023, the number of such accidents decreased by 37 (-2.1%), while the number of fatalities increased by 2 (+4.2%) and the number of injured children increased by 6 (+0.3%). In 2022, however, the highest number of road accident casualties involving children was recorded: 53 children were killed, and 1,635 were injured (National Road Safety Council 2025, 15). The data cited above demonstrate the lack of any noticeable progress in improving child safety – figures from the last three years have remained at a comparably high level.

A detailed analysis of the statistical data, taking into account the distribution of the youngest road accident participants by age group, indicates a clear predominance of casualties among older children (aged 7–14), both in terms of fatalities and injuries. The figures indicating casualties in road accidents involving children aged 7–14 – amounting to several dozen fatalities and nearly one and a half thousand injuries – leave no doubt, revealing the stark reality of the effectiveness of the road safety system. They clearly point to the insufficient effectiveness of the measures currently in place to ensure children's safety in road traffic. By contrast, among children younger than 6 years, the rates are significantly lower (nearly three times lower). Such disparities between children aged 0 to 6 and 7 to 14, as reflected in statistical data on road accident casualties, are also observable in previous years. The persistent disparity of approximately 200% in the number of casualties between older and younger children should prompt a more in-depth analysis of the problem of protecting the youngest road users.

Despite the significant improvement in the safety of children participating in road traffic observed over the last 10 years (compared to 2015, the number of accidents involving children decreased by 38.3%, the number of fatalities among the youngest road users decreased by 28.6%, and the number of injured children in 2024 was lower by 40.3 (Police Headquarters, Road Traffic Bureau 2025, 40), the fact that statistical indicators have remained at a comparable (and still high) level over the last three years remains a cause for concern. The persistent stability of statistical reports presenting the number of road accidents involving children

suggests that the potential for improvement within the currently existing solutions for the safe participation of the youngest in road traffic may have been exhausted. The observable lack of progress in improving children's safety within the framework of existing programmes indicates the need to undertake efforts to modernise existing measures or to develop new solutions adapted to the dynamics of the contemporary societal and technological change.

A crucial factor to consider when determining children's road safety is the nature of their participation, and, consequently, the data-based level of risk associated with their participation in road traffic in a specific role. The adopted – statistically justified – categorisation, according to which the youngest road users may act as drivers, passengers, pedestrians, or users of assistive devices, accurately illustrates the levels of risk and negligence in specific areas of the child safety system. In accordance with the adopted criteria, a detailed analysis of road accidents was conducted, taking into account the nature of children's participation in road traffic.

It was found that the highest number of casualties in the adopted age groups occurred among children participating in road traffic as vehicle passengers. In 2024, nearly a thousand accidents were recorded in which children – in most cases through no fault of their own – became casualties of the high incidence of road accidents in Poland. Fatalities among passengers under 14 years of age occurred in several (nearly ten) cases, while approximately twice as many children sustained injuries resulting in health problems lasting more than seven days. A disturbing trend, concerning the high number of road accidents involving children as vehicle passengers is also observed in previous years. In 2023, for example, of the nearly five hundred accidents involving children aged 0 to 14, the vast majority were vehicle passengers. Several dozen children were killed and several hundred were injured. Statistical data collected and published by state institutions statutorily responsible for ensuring road safety in the analysed area remain high. This may point to the unreliability of the safety systems currently in place to protect the youngest vehicle passengers.

During the analysis of the statistical data presented in the literature, the author's attention was also drawn to the clear predominance of casualties in the "vehicle passenger" category among younger children aged 0 to 6. Approximately 70% of road accidents involving children under 6 years of age involve passengers. Furthermore, 60.0% of all fatal road accidents involving the youngest road users concern child passengers. This fact is surprising to the author,

as children of this age generally do not participate in road traffic independently, without the supervision of older persons. The decision to transport a child as a passenger is made by older, usually adult road users. The combination of these circumstances may indicate the shortcomings in the safety systems currently implemented to protect the youngest vehicle passengers or errors made by those responsible for the safe transport of children. These elements of the safety system for the youngest vehicle passengers should be the subject of in-depth analysis by entities responsible for road safety in order to identify the underlying causes of the problem.

Pedestrian road users aged 0 to 14 constitute another category identified in statistical studies with a high accident rate. In 2024, nearly 500 accidents involving children in the above-mentioned age group were recorded (including approximately 100 involving younger children and nearly four times as many involving older children, i.e., those aged 7–14). In these accidents, more than a dozen young road users were killed and several hundred were injured. In previous years, a similarly high incidence of accidents involving children participating in road traffic as pedestrians was observed. At the same time, a concerning trend of a significant number of accidents involving older children (aged 7–14), who already travel independently on public roads, persists. This is largely due to the fact that from the age of 7, the youngest road users are permitted to travel independently on public roads, which results in their increased activity in road traffic without adult supervision.

The number of accidents involving child drivers is also noteworthy. While the number and consequences of accidents among younger children (0–6 years old) have not been high in recent years nationwide (around a dozen accidents per year, with no fatalities), the figures for older children (7–14 years old) are significantly higher. Accident rates in this older age group amount to several hundred accidents per year (nearly five hundred accidents annually involving child drivers aged 7–14), and their consequences are significantly more severe than those among younger children. Several children are killed in these types of road accidents, and several hundred are injured. These statistics have remained consistent over the past three years, clearly indicating to organisations responsible for road safety the need to undertake remedial measures.

A similar disparity in the number of accidents between younger and older age groups among the youngest road users can also be observed in incidents involving users of assistive

devices. While the number of accidents involving road users aged 0 to 6 has fluctuated at a few cases per year nationwide over the past three years, the number of road accidents in the 7–14 age group has reached several dozen annually. Although statistics for the past three years do not record fatalities in this category of road users, several dozen children using assistive devices have been injured. According to the author, the possibility for children from the age of 7 to participate independently in road traffic, in accordance with legal regulations, constitutes a statistically significant risk factor. This is confirmed by the number of road accidents involving this social group. Similarly, an increased accident rate is observed when children, from the age of 7, begin to travel independently on public roads. This constitutes a clear indication for entities responsible for road safety, broadly defined, of the need to take action to improve the level of safety for children.

2. The Most Common Causes of Road Accidents Involving Children and The Circumstances Accompanying Them

Road traffic is governed by the principles of caution (including heightened caution), which all road users are obligated to observe. Children constitute a specific category of road users requiring extreme vigilance from others. Their behaviour, particularly during play, imposes additional responsibilities on other road users. This obliges them to anticipate potential sudden and dangerous situations that may arise as a result of the spontaneous behaviour of the youngest participants in road traffic.

The most common causes of road accidents involving children include:

- sudden entry into the roadway,
- playing on the roadway or roadside,
- lack of adequate supervision of a child on the road,
- falling out of a vehicle,
- emerging from behind fixed obstacles (e.g. a stationary vehicle),
- entering and exiting a vehicle while it is in motion (Wojdyło 2002).

A child's safe participation in road traffic depends on their mental and physical development. Despite the declared, and in many cases observable, commitment of various state institutions to the educational and preventive efforts aimed at the youngest road users, the

practical application of acquired knowledge by children remains problematic. This is due to several psychophysical factors associated with their stage of development. Their level of perception influences both the identification and accurate assessment of road hazards, as well as reaction time in emergency situations. Children perceive dangerous situations in a manner appropriate to their developmental stage and do not assess such risks in the same way as adults. It should be noted that reaction time to hazardous situations depends on factors such as the level of concentration and attention, field of vision and perspective, auditory perception, as well as the ability to anticipate the consequences of one's behaviour. These are among the factors that directly affect road user safety. The aforementioned determinants of safe participation in road traffic, in conjunction with the limitations resulting from children's ongoing development and acquisition of psychophysical abilities, illustrate the complexity of the issue of children's exposure to road traffic hazards.

The dynamics and multiplicity of traffic situations significantly affect children's ability to maintain concentration while ensuring road safety. High traffic density may overstimulate a child's cognitive processes, which can, in turn, delay reactions to potentially dangerous situations. A limited ability to differentiate situations according to their level of risk is another factor that may negatively affect safety. As imagination and hypothetical thinking develop progressively with age, deficits in this area may impair a child's ability to assess situations realistically and respond appropriately to hazards.

Another equally important factor influencing the safety of the youngest road users within the road safety system is the set of limitations children face, stemming from their perception of the surrounding environment. Young children have a narrower field of vision, a different perspective from adults, and lack the ability to accurately assess the speed and distance of approaching vehicles. The limitations resulting from the "fragmented" perception of the environment in young children constitute a significant risk factor. The lack of a broader perspective when observing the surroundings may result in the failure to notice potential dangers in time. Sensory impressions, especially visual and auditory, are among the fundamental cognitive elements. A certain amount of time usually elapses between perceiving a vehicle (visually or acoustically) and making a decision, followed by a motor response. This is referred to as reaction time. It should be noted that this time depends on many individually

determined psychophysical characteristics of the child participating in road traffic. These include, for example, accurate distance estimation, the ability to perceive and distinguish colours, and the previously discussed ability to maintain a clear and focused perception of the surroundings (which, in turn, also depends on factors such as visual strain or divided attentional). When combined with limitations resulting from short stature, for example, when passing parked vehicles, the scale of potential danger becomes apparent, potentially leading to very serious consequences. Possible deficits associated with a child's age and stage of development in the previously identified elements of the child safety system automatically determine the level of risk of a road accident occurring. Children's ability to correctly estimate the distance and speed of approaching vehicles develops with age, which indicates a high likelihood of misjudgement in early childhood. Deficiencies in this area, resulting from a child's developmental stage, may lead to dangerous situations on the road. A child's inaccurate assessment of their own abilities in this respect may result in stepping onto the road in front of oncoming vehicles, which can have very serious consequences for all road users.

Other factors within the road risk domain include skills related to a child's perceptual assessment of the traffic situation and their motor abilities. Perception is the process of integrating sensory input with cognitive processes, occurring as soon as sensory information is received. It involves the active interpretation of sensory stimuli while simultaneously drawing on context, attitudes, knowledge, and experience. Auditory stimuli reaching a young child are not yet filtered quickly and accurately enough. Sounds must first be correctly identified, interpreted, and assessed as potential risk factors. This process takes more time for a child than for an adult, which correspondingly prolongs the child's reaction time to hazards while effectively shortening the time available for response by other road users. A child's instinctive reactions in sudden situations constitute another difficult-to-predict element of road traffic that must be taken into account by other road users. Such behaviour is manifested in the tendency of young children to react spontaneously and immediately in situations that capture their attention or curiosity. This type of spontaneous activity, combined with motor skills that are still developing, entails a high risk of dangerous situations on the road with potentially unpredictable consequences.

CONCLUSION

Road safety is a key social issue of interest to safety sciences and other social sciences. However, it constitutes a complex research domain encompassing many areas, including the issue of road hazards affecting the youngest road users. The materials, numerical data, and analyses conducted as part of this study allowed for the formulation of the following conclusions:

- Over the past three years, a persistent trend of a high incidence of accidents involving the youngest road users has been observed.
- The higher number of road accidents observed among older children (7–14 years) compared to younger children (0–6 years old), as indicated by the analysis of statistical data, is related to the legally permitted possibility of this group to participate independently in road traffic.
- An examination of the circumstances of road accidents involving children under 6 years of age indicates that, in the vast majority of cases (approximately 70% in 2024), they were vehicle passengers at the time of the incident.
- An in-depth analysis of children's psychophysical characteristics and an assessment of their perceptual capabilities reveal significant deficits among the youngest road users in areas related to the perception of traffic situations and reaction time to potential hazards.
- Deficiencies resulting from the developmental level of the youngest road users in the areas of concentration and sustained attention, spatial perception, motor skills, and auditory perception, as well as difficulties in anticipating the consequences of one's actions, constitute significant risk factors affecting road safety.

To improve children's road safety, a change in the attitudes of all road users is necessary. It is particularly important for adults to assume responsibility for children's (sometimes irrational) behaviour on the road. Awareness that children perceive road traffic and its hazards differently from adults may help prevent many dangerous situations. Children's still-developing mechanisms for rapid and accurate situational assessment in dynamic traffic conditions result in slower or unpredictable reactions in critical situations. Therefore, it is essential for adults to

recognise and understand the psychophysical limitations faced by children when participating in road traffic. Both theoretical and practical understanding of this issue by adults will enable children to participate in road traffic safely, within an environment characterised by informed acceptance of all road users, despite their limitations. The need for comprehensive and coordinated cooperation among adults to improve the safety of the youngest road users should not be overlooked. This cooperation should involve consistent educational activities undertaken by parents, teachers, and institutions responsible for road safety. Consistency and coherence in adults' actions aimed at preparing children for safe participation in road traffic will contribute to the acquisition of practical skills and knowledge at a level that enables responsible and safe behaviour on the road. In the process of educating the youngest, due consideration should be given to children's psychophysical limitations, as only programmes that address these deficits have the potential to genuinely improve their safety.

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