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PEOPLE WITH DISABILITIES AS TRAFFIC ACCIDENT PARTICIPANTS IN A ROAD SAFETY DATABASE IN POLAND

Summary. Actions related to the improvement of the safety of disabled road users have multiple levels and are burdened with problems related to the collection and proper analysis of road incidents. A meta-analysis of databases could provide a better understanding of the causes of these events and prevent them in the future. Currently, residual information on participants of road accidents can be found in the Accident and Collision Record System; the data are analyzed by the Polish Road Traffic Observatory and submitted to the International Road Traffic and Accident Database and the Community Road Accident Database. In connection with the above, an article was prepared containing a propaedeutic review of research materials to date, as well as domestic and foreign databases constituting the diagnostics of the research area. An international literature search was also conducted on accidents involving people with disabilities. The findings indicate the need to collect and expand information about disabled participants of road incidents, fill this gap in databases, and systematize them as the starting material for the development of remedial actions.

1. INTRODUCTION

The safe system approach to road safety aims to provide a safe transport system for all road users. This approach considers the vulnerability of people to serious injuries due to road accidents and recognizes that the system should be designed to mitigate human error. The cornerstones of this approach are safe roads, safe speeds, safe vehicles, and safe road users, all of which must be addressed to eliminate fatal accidents and reduce serious injuries.

Despite this, the World Health Organization (WHO) estimates that 1.25 million people worldwide die in road accidents each year. Almost 50% of them are unprotected road users. Road accidents cause between 20 and 50 million injuries each year and are one of the leading causes of disability [40, 41]. Fig. 1. presents a list of the top 10 causes of death and indicates the change in the position of deaths as a result of road accidents by 2030 compared to 2004 [7].

Although road fatality indicators in many high-income countries have stabilized or even decreased in recent decades while maintaining current trends, the projections suggest an overall increase in most regions of the world to around 2.4 million per year by 2030. This means that the indicators of disabilities related to road traffic accidents will be even higher. According to The Global Plan for the Decade of Action for Road Safety 2021-2030, these numbers are higher [11]. It is forecast that without appropriate actions, disabilities as a consequence of road traffic accidents will be the fifth major source of the global burden of disease and injury, behind cardiovascular and pulmonary diseases [42].

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Road fatalities and injuries represent an economic burden, costing most countries 3% of their gross domestic product. In addition, the burden on the public health sector and the reduction of living standards among road accident participants should be added [12].

The international community has signaled the need to deal with this important issue as an essential element of socio-economic and public life, which is reflected in many documents and the initiatives undertaken representing various fields. They are guided by the overarching goal to halve the global number of deaths and injuries as a result of road accidents by 2030, which also applies to the group of disabled road users [14].

Adequate and effective activities should be supported by an in-depth analysis, contain objectives and assumptions, and consider the existing requirements and methodologies. They should consider the scale of the phenomenon, its components, circumstances, factors, and variables, measured in a similar way, while maintaining the stages and elements of the research process; this, unfortunately, is still problematic. The data available on disabled participants in road accidents (as victims and as offenders) and disabilities caused by accidents are scattered and fragmented. Despite the fact that the issue of people with disabilities (PWD) in road traffic and their needs has been a well-studied issue for decades. This makes it difficult to assess the situation and take effective remedial measures corresponding to the most urgent needs.

2004		2030	
Rank	Disease or injury	Rank	Disease or injury
1	Ischaemic heart disease	1	Ischaemic heart disease
2	Cerebrovascular disease	2	Cerebrovascular disease
3	Lower respiratory infections	3	Chronic obstructive pulmonary disease
4	Chronic obstructive pulmonary disease	4	Lower respiratory infections
5	Diarrhoeal diseases	5	Road traffic injuries
6	HIV/AIDS	6	Trachea, bronchus, lung cancers
7	Tuberculosis	7	Diabetes mellitus
8	Trachea, bronchus, lung cancers	8	Hypertensive heart disease
9	Road traffic injuries	9	Stomach cancer
10	Prematurity & low-birth weight	10	HIV/AIDS

Fig. 1. Top 10 leading causes of death, 2004 and 2030
Source: [7]

2. DEFINITIONS OF “PERSON WITH DISABILITIES”

There is no single, universally accepted definition of the term “disability.” The World Program of Action for Persons with Disabilities and the Standard Rules on the Equalization of Opportunities for Persons with Disabilities emphasize that disabilities are a social problem and is not limited to an individual. A disability entails a relationship between human health, society, and the surrounding environment [46].

The WHO in the United Nations has introduced the following concepts related to disabilities, considering the state of human health:

- impairment – a loss of fitness or an abnormality in the structure or functioning of the body in terms of psychological, psychophysical, or anatomical aspects;
- disability – a limitation related to leading an active life in a way or to the extent considered typical for humans;
- limitations in fulfilling social roles (handicap) – the inability to fulfill a social role corresponding to age or gender that is not in conflict with social and cultural conditions.

Thus, the definition of “disability” is not easy to specify. Disabilities affect the entire population, and any person may experience a deterioration in health and become a disabled person [17].

In Poland, two definitions of PWD are used, resulting from legal provisions having a valid decision issued by an authorized body (legally disabled persons) and resulting from the declaration of persons regarding restrictions in performing certain activities without a certificate of disability (up to 16 years of age) or about the degree of disability (people with biological disabilities) [43]. Both definitions were included in the 2011 National Census of Population and Housing in the category of voluntary questions [15].

According to the WHO, a disability is any kind of limitation or complete inability of a person to perform a given activity in a way or to the extent considered by the community to be normal for a human being. These limitations result from damage to or impairments of the body’s functions and can be of either a temporary or permanent nature [3, 13]. A permanent disability is a permanent inability to freely and unrestrictedly fulfill one’s social roles as a result of the constant impairment of the organism’s efficiency due to some kind of damage or impairment of the organism’s functions. Meanwhile, a temporary disability is a temporary inability to freely and unlimitedly fulfill social roles as a result of a temporary or permanent impairment of the body’s efficiency due to some kind of damage or impairment of the body’s functions. The WHO also mentioned the inability to exist independently, meaning a permanent or temporary inability of the body as a result of some kind of damage to or impairment of the body’s functions to a degree that completely prevents one from meeting their basic life needs (e.g., in terms of self-service, movement, and communication) without the help of other people [37].

The above terms are related to the terminology of road accidents themselves, in which a road accident is a road incident resulting in a person being killed or injured and a seriously injured person is a person who has suffered a health impairment in the form of:

a) the loss of eyesight, hearing, speech, fertility, some other serious disability, a serious incurable disease, a long-term illness that is life-threatening, a permanent mental illness, a total and permanent incapacity to work in one’s profession, or a permanent significant disfigurement or deformation of the body,

b) other injuries causing disturbances to the functions of the body’s organs or a disturbance of health lasting longer than seven days [22, 33, 37].

3. PEOPLE WITH DISABILITIES – NUMBERS

In the European Union, around 15% of the population comprises PWD. Applying the criterion of biological disability, the population of people with disabilities in Poland may be from 5.3 million to 9 million. The lower estimated limit includes all persons legally recognized as disabled, as well as persons who have very serious limitations in performing their duties; the upper limit also includes persons who have declared limitations. The first estimated figure (5.3 million people) corresponds to the assumptions that were used to determine the population of these persons in Poland, while the second (9 million) takes into account all biological disability criteria applicable to European statistics. According to Eurostat, in 2009 in Poland, there were 8.1 million PWD who, due to loss of health, had problems performing their daily activities, but the aspect of having a legal certificate of disability was not taken into account [32].

The most common causes of disability are diseases of the motor organs and the circulatory system and neurological diseases. However, a relatively low percentage of people with visual and hearing impairment, mental illness, and mental retardation in the population of PWD applies to thousands of people with reduced efficiency in everyday functioning. Nevertheless, according to the results of the European Health Survey, in 2014, there were 7.7 million people with biological disabilities in Poland. The latest Research on Economic Activity of the Polish Population for 2018 shows that there are over 3 million people over 16 years of age with a certified degree of disability (severe, moderate, or light) in Poland [19]. According to data from the Electronic National Disability Adjudication Monitoring System, the number of people with a disability degree certificate in the fourth quarter of 2019 was over 4 million [25].

4. PEOPLE WITH DISABILITIES AS ROAD TRAFFIC PARTICIPANTS IN POLAND

Current data on the number of people with mobility problems were collected in various institutions and in various forms. Recently, only the State Fund for Rehabilitation of Disabled Persons conducted research in 2017 determining the functional needs of PWD and an assessment of the level of their implementation.

The study covered officially disabled persons with a certificate of a significant or moderate disability or a certificate of disability. The following types of disabilities were included in the analysis: people with sight and hearing impairments, people with movement impairments, mentally ill people, and people with mental retardation. Among the indicated areas of needs, three of them dominated: needs in the area of housing and independent living (17%); instrument, device, or technology needs (16%); and needs related to transport and movement (16%). Mainly the elimination of architectural barriers in public spaces – but also the adaptation of the transport means – is particularly important for people with mobility impairments (25%), as well as those with sight impairments (14%) [31].

The Road Traffic Act of June 20, 1997, explicitly regards a person using a wheelchair as a pedestrian traffic participant. Among PWD, there are also people who are licensed to drive motor vehicles and who drive a car. For these people, the legislator applied exemptions from complying with certain road signs [37].

These exemptions refer directly to a disabled person with reduced mobility as a driver of a motor vehicle, as well as drivers carrying persons with reduced mobility and employees involved in the care, rehabilitation, or education of PWD under the care of these institutions. Such persons, in order not to comply with the above-mentioned signs, must have a parking card placed behind the windshield of a motor vehicle such that it can be read. While driving a car, it is obligatory to fasten seat belts; this does not only apply to a sick or disabled person transported on a stretcher or in a wheelchair. It should be mentioned that the provisions on the technical side of vehicles used by PWD (adaptation for the driver's needs) should be equated with general technical conditions. Of course, a disabled person is not exempt from criminal liability for committing a traffic offense or transgression. Failure to comply with road traffic regulations is punishable by police officers on the same terms as other road users [20].

Referring to the subject of this article, it can be said that there are no data on the number of drivers with disabilities. Only information on issued driving licenses with entered codes and sub-codes of restrictions is available, which is a source of information on the number of road users with mobility impairments. These data are located in the system of Polish Security Printing Works. Table 1 presents a summary of the number of documents issued from 2017-2021 obtained for the purposes of this article.

Table 1

Summary of the number of documents issued from 2017-2021

Year of issue of the document – driving licenses	Number of issued documents – driving licenses with code 107 (Poland only)	Number of issued documents – driving licenses with sub-codes 10,15,20,25,31,32,33,35,40,42 (EU)
2017	412	33
2018	446	29
2019	431	33
2020	349	17
2021	404	33

Source: Own study (this data is located in the system of Polish Security Printing Works (21.03.2022) [6])

Unfortunately, the data provided by PSPW expresses an inappropriate tendency of occupational medicine doctors with authorizations to examine drivers to use the restriction code “107” in the documents (driving license, item 12). This code has been used for many years and defines a general clause regarding the required adaptation of the vehicle to the type of disease. This is a very general statement, and the doctor should precisely specify codes and sub-codes of restrictions used in the EU for a given disease or disability. Doctors are presumed not to have adequate knowledge of the disease

entity in combination with the restriction code or the adaptation system used reflecting the devices in the vehicle. Failure to apply the codes and subcodes of restrictions in force in the EU may result in legal sanctions for the driver (e.g., fines, towing the vehicle to the country of origin at the owner's expense) because the code "107" is used only in Poland.

Interpretation of the table is extremely difficult because it lacks data on the group of people who already had a driving license before suffering an accident or falling ill. The change in their legal status was not reflected in the relevant entries in their driving licenses. Currently, it is not possible to determine the number of these people.

5. DISABILITY AS A RESULT OF A ROAD ACCIDENT

According to the United Nations, people with physical disabilities often face stigma and discrimination as a result of road accidents, which can lead to social, educational, professional, and financial deprivation. In addition, many of them suffer from mental health consequences. Being involved in a road accident has physical, emotional and financial consequences. Disabilities caused by road accidents are most common in people in their working lives. The probability of a road traffic accident victim having a disability is related to the age of the victim and the location of the injury. The location of an injury affects its severity. Victims with head injuries are three times more likely than other victims to suffer from a disability, and victims with lower limb injuries are twice as likely to suffer from a disability as those with injuries elsewhere in the body.

Motor impairment is the most common form of disability of road accident participants, affecting both the whole body (resulting from head-neck injuries) and the peripheral parts of the body (resulting from limb injuries). The impaired mobility of the body caused by a head or neck injury is most often caused by damage to the central nervous system and most likely causes permanent damage and, ultimately, a disability; therefore, it is important to wear helmets to prevent head injuries [4, 8-9, 39].

Permanent disabilities can range from partial disabilities to complete disabilities. The most common injuries resulting from road accidents leading to disabilities are:

- paralysis caused by an injury to the spinal cord,
- total or partial limb amputation,
- sensory deprivation, including deafness or blindness,
- traumatic brain injury,
- deformation of a limb causing mobility impairment,
- back and neck injuries,
- severe burns,
- ongoing psychological trauma (e.g., anxiety, depression, post-traumatic stress disorder).

Not all injuries that cause a disability are permanent. Unlike permanent disabilities, temporary disabilities can be cured.

Examples of injuries that may result in temporary disabilities include:

- shock,
- torn muscle fibers,
- broken bones,
- torn ligaments or connective tissue,
- whiplash,
- repairable back injuries.

A disability may be caused by a combination of several of the above injuries of varying intensity and duration, depending on the type of accident and the use of protective elements and safeguards [1, 10, 36].

Many people injured in road accidents achieve a full recovery owing to long-term medical care and rehabilitation therapies, while others remain with permanent disabilities that affect their physical and mental fitness, as well as their ability to keep a job, perform social roles, and function at their previous level in various aspects of life.

The task of decision-makers in this regard is to intensify interventions for safe participation in road traffic, better communication with the public on the relationship between involvement in road accidents and disabilities, and the possibility of using post-accident services.

6. PEOPLE WITH DISABILITIES: ROAD ACCIDENT STATISTICS

The Motor Transport Institute, specifically the Polish Road Safety Observatory [22] operating within it, is the only institution in the country that has a database of road accidents since 1990, which allows it to conduct detailed, current, and retrospective analyses of road safety. Since 1997, as a coordinating institution on behalf of Poland, it has participated in the work of the international database on road accidents through the International Road Traffic and Accident Database (IRTAD) and, since 2003, in the work of the database on the road accidents of the European Union Community Road Accident Database (CARE). Using the data collected in the Polish Road Safety Observatory (POBR) data warehouse, it prepares data for the IRTAD and CARE. It is a signal from the international community and provides domestic and foreign institutions with additional data and information on the issues related to road safety.

The analysis of data on road accidents from the Polish Road Safety Observatory [23] carried out for the purposes of this article showed that PWD in Poland are very rarely victims of road accidents, and accidents involving them constitute only 0.04% of all accidents each year (10 accidents). On the other hand, there is a very large group of elderly people who are particularly vulnerable to the loss of life or health as a result of road accidents.

In the System of Record of Accidents and Collisions [30] database on road accidents, there is a category of “disabled person,” but in the instructions for filling in the event card, this concept was not defined. In the document, according to item 140, section 5, there should be information about the failure to give priority to “a disabled person using a special sign”, or “a person with visible motor disability,” and in Table XI “PARTICIPANTS” (people involved in a road incident), it should be marked in the column “DISABLED PERSON” if the driver is a PWD.

XI. PARTICIPANTS (people involved in a road incident)		REGISTRATION NUMBER: PESEL (for foreigners, date of birth and nationality)										SEX		DISABLED PERSON	UNDER INFLUENCE			DRIVING WITHOUT:		DEATH		INJURED			
		Date of birth					number					MALE	FEMALE		ALCOHOL	OTHER SUBSTANCES	NOT TESTED	SAFETY BELT	CHILD RESTRAINT SYSTEM	HELMET	AT THE SITE	30 DAYS	SERIOUSLY	SLIGHTLY	
DRIVER NR 1	SURNAME																								
	NAME	BLOOD ALCOHOL CONCENTRATION*) mg/dm3 ‰																							
	NAME OF FATHER	YEAR OF PRODUCTION*)											DATE OF THE LAST TECHNICAL INSPECTION *)												
	VEHICLE MAKE	SAFETY EQUIPMENT *)											YES NO												
	VEHICLE NUMBER																								
	INSURANCE/POLICY NUMBER																								
TRAILER/SEMITRAILER POLICY NR..																									

Fig. 2. Including a disabled person as a participant in a road incident in the road incident card [47]

On this basis, the data on accidents involving PWD are collected and then delivered to international databases. Due to their niche nature, these statistics are not widely shared or published in official summaries. Poland also does not keep a register of hospital data according to the Maximum Abbreviated Injury Scale (MAIS3+) [27, 34] or a combination of police and hospital data, which would allow, for example, the tracking of the future situations of accident participants. These data are also not collected at lower levels [24, 48].

The authors of the Annual Road Safety Report 2018 admit that the available statistics underestimate the number of post-accident injuries. Information on injuries is usually taken from police accident records, where data errors or underreporting of injuries occur. This makes them insufficient for analyzing the nature and consequences of accidents leading to serious injuries. Hospital records are more accurate and should be used to supplement police records. This practice is applied in a few countries, but most IRTAD countries are working to improve injury data collection. However, hospital records often lack information on accident mechanisms and road user categories. It is also problematic that countries use different definitions of “serious injury” and different methodologies for calculating them. For this reason, international comparisons of road accidents leading to serious injuries should be treated with caution [16].

7. THE NEED FOR INTERVENTION TO COLLECT DATA ON THE ROAD USERS WITH DISABILITIES

Road accidents are a serious problem related not only to public health [2]. It can be assumed that 10% to 50% [1, 26, 29] of road accident participants become disabled either permanently or temporarily as a result of their injuries. The analyses of this issue are selective. According to the results of available studies conducted at the beginning of the century, the incidence of disabilities among road accident victims varied widely from about 2% to over 80%. The authors of this analysis emphasized that few data are available on this issue, especially in developing countries, where the problem is particularly pronounced.

The occurrence of disabilities is related to the socio-demographic characteristics of the accident participants, the circumstances of the event, and the mechanisms of post-accident response. The differences in the results of the research can be attributed to: 1) contextual elements, i.e. the dominant medico-legal and compensation context; secondary – a disabled person as a participant (victim or offender) of a road accident, disability as a result of an accident; 2) different methodologies, i.e. the use of many data collection tools, e.g. the WHO International Classification of Functioning, Disability and Health, the United Nations questionnaire and the Washington Group on Disabilities Statistics; 3) data sources (e.g. retrospective community study, analysis of hospital data); 4) various conditions; 5) study periods; 6) duration; 7) difficulties in comparing data related to discrepancies in the definition of disability, etc.

This view is consistent with the findings of the World Disability Report. Traffic injuries have long been recognized as a cause of disabilities. Despite this fact, the number of disabled people as a result of road accidents is still not well documented. A recent review of the disability risk of motor vehicle drivers as participants in accidents showed variability in the estimates obtained. The estimated prevalence of post-accident disability due to methodological difficulties in measuring ranged from 2% to 87% [1].

These inaccuracies, which result in the inability to draw accurate conclusions, justify the need for well-designed population epidemiological studies using valid performance measures and appropriate comparator groups, as well as the need to include this area in databases on road accidents in order to understand the scale of the phenomenon and its multifaceted issues and to work out countermeasures [38]. Data collection and analysis were devoted to pillar 1 road safety management, The Decade of Action for Road Safety 2011-2020, which calls, inter alia, for the development of data systems to monitor and evaluate activities [40, 44].

According to the next Global Decade of Action Plan for Road Safety 2021-2030, many countries and cities lack experience in implementing safe system principles regarding the effective collection and analysis of road safety data and conducting high-quality research in this field. Research bodies play an important role in generating evidence to help governments and other groups understand (through epidemiological analyses and risk analyses) the nature of the problem and to determine effective solutions and strategies (through intervention trials and implementation studies). However, national governments are responsible for setting priorities within the national plan, which should also ensure the collection and analysis of data on accidents, deaths, and injuries. These demands are contained in Pillar

4 Post-Accident Response; Area: Legislation: Standards for Data Collection, Response and Post-Accident Investigation [11].

The Pillar Safe Man of the Polish National Road Safety Program 2021-2030 indicates that “problems and threats should be identified in relation to all road users. Due to the different phenomena and circumstances belonging to particular categories of road users, differences resulting from age, experience, as well as social, economic or health conditions, the following risk groups should be fully analysed: young drivers, children, older road users /60+/, disabled, high-risk drivers, pedestrians, cyclists, mopeds, motorcyclists” [18].

The problem, therefore, is noticed and must be solved in order to implement the priorities set out in the program and then define the directions of activities dedicated to them based on the analysis of the current state of road safety in Poland and the greatest problems of key risk groups.

As mentioned above, data in Poland on disabled road users are fragmented and dispersed. However, it follows from the position of the government that the issue of collecting data on this group is not being considered [45].

An excerpt from an interview conducted by the co-author of an article for the Road Traffic Safety Quarterly Magazine (BRD), entitled “Disabled people with full rights in the road traffic, an interview with the Minister Paweł Wdówik,” Government Plenipotentiary for Disabled People, No. 1-2/2021, p. 17.

BRD: “The activities undertaken that are related to a given issue most often result from a multifaceted analysis. There is little statistical data on disabled road users in this country’s population, their problems and needs. The CSO data contains only selective information about this group of citizens. Other data, e.g. those from the accident card filled in by the policeman on the scene, do not contain information about the disability of the participants – the ofender and the victims. So, how can we get knowledge about PWD involved in road accidents, in particular the ofenders, and how can we know the scale of the phenomenon in order to effectively counteract it? A similar situation applies to the data on drivers with disabilities (the heterogeneity of this group), people with mobility problems, the elderly ...

P.W.: It depends how we would define it. The subject is risky because we are still heavily marked by certain stereotypes in relation to PWD. Obtaining data, e.g. related to accidents, I think that by some disabled people and organizations supporting disabled people, can be perceived as an attempt to limit the rights of these people in road traffic in order to, for example, prove that the accident rate caused by disabled people is higher and, therefore, that we must prevent them from moving about on their own. (...) Various types of general traffic regulations can be a factor that can improve safety rather than eliminate certain road users such as older drivers. I would rather say that what we, the disabled, need is have ensured, what I mentioned earlier, to a larger number of PWD, i.e., the opportunity to be active participants in traffic, to be drivers ... and in this context, I would look at reality, at the entire infrastructure related to it, i.e. adaptation of parking lots, gas stations, so that the participant can not only move around on his own but also be able to use this infrastructure on his own without arousing a sensation. These are areas that will also require further action [45].”

8. CONCLUSIONS

All citizens should have free access to means of personal transport, including driving, ensuring independent commuting to work, social activities, and various daily living needs. This possibility is especially important for PWD. The implementation of the postulate of universal mobility and accessibility, despite its general acceptance, still faces implementation problems [21, 28, 35].

Technological development allows the use of vehicles by people with various types of disabilities. These possibilities raise many important questions regarding road safety. The analysis of the needs in this area requires an observation of the subject more broadly than hitherto and conducting research to understand the socio-economic phenomena that occur in an inclusive society.

The period of the pandemic showed that access to one's own means of transport was optimal and comfortable for the majority of PWD. Still, access to one's own vehicle may be limited for economic reasons. Modern technology allows modifications to be made to vehicles so that PWD can operate them and, most importantly, use them safely. Public transport solutions also support the normal functioning of PWD and increase their mobility.

In road accidents involving PWD, when the driver is found to be the offender, they bear the costs related to compensation for the aggrieved party. In addition, drivers with disabilities are required to take additional measures beyond those of other drivers to ensure that their vehicle and any assistive devices are in good condition for safe operation.

A car accident involving a disabled driver may also be caused by a malfunction of the installed device. In such circumstances, the manufacturer of this device may be held liable for damages. Manufacturers have a duty to consumers to ensure that their products are safe and certified.

In 2021, the Faculty of Mechanical Engineering of the Military University of Technology, the Institute of Psychology of the Cardinal Stefan Wyszyński University, and the Motor Transport Institute launched a project entitled "Knowledge centre on accessibility to transport and mobility of people with special needs" [5]. As a result of the project, two consultation and information points will be created, issues related to universal design will be developed, and service standards will be determined, which will lead to increased mobility and improvement of road safety for people with special travel needs using individual transport means. It will also be a data collection point for this group of road users.

Actions related to improving the safety of disabled road users have multiple levels and are burdened with problems, including those related to the collection and proper analysis of road incidents and accidents. Information from databases could allow a better understanding of the causes of these events and counteract subsequent ones. Currently, the residual information on PWD as participants in road accidents can be found in the Accident and Collision Record System. It has been analyzed by the Polish Road Traffic Observatory, and, as a representative of Poland, it has been forwarded to international bases (i.e., the International Road Traffic and Accident Database and the Community Road Accident Database).

On the other hand, the data on disability and health and issued parking cards are, among, in the Social Insurance Institution, the Agricultural Social Insurance Fund, the National Health Fund, and the records of disability assessment teams. The aforementioned restriction codes entered in the driving license and imposed on the driver are related to the health condition (defects or diseases detected during the examination, whether they affect driving, and, for example, whether they require the driver to use any items or use a specially adapted car. The codes can also indicate whether the driver cannot drive the vehicle, although, at first glance, there seem to be no contraindications.

A group that does not appear in any statistics is people who acquired the right to drive before an event or disease and did not subsequently re-check their psychophysical abilities to drive and did not provide any medical or any other data related to their health status in terms of participation in the road traffic (e.g., as a driver). The regulations only regulate this state of affairs in the case of professional drivers because they are subject to rigorous and mandatory medical examinations on a regular basis. Amateur drivers are not subject to these tests.

It is also worth adding that the scientific approach to collecting and analyzing data does not discriminate against people on the basis of their disability. The provisions on the protection of personal data, including sensitive data concerning (e.g., health or disabilities) are intended to protect a given person from the consequences of their improper use. Thus, we enter the area of the generally understood professional ethics of a researcher. The mere collection of data is not a bad thing, but the use of this data can have negative consequences. Taking into account this type of issue will also allow researchers to freely (ethically) use data to assess events (in this case, road accidents involving PWD) in order to counteract these inappropriate behaviors of participants or injured persons.

Attention should also be paid to the matter of aging societies (and related phenomena) in which PWD will have an increasingly significant role as participants in road incidents. Therefore, increasing the scope of information about this group will be a necessity.

Therefore, the authors of this study recommend, for example:

- considering the development and implementation of a model for collecting data from various sources and establishing national institutions;
- establishing national and international cooperation in this field (scientific and research institutions, including those for road safety, PWD, medical institutions, authorities at various levels, and the private sector);
- promoting the need to collect data during meetings, conferences, seminars, and educational activities;
- including the subject of PWD in existing databases (along with the scope of their collection) and developing guidelines that analysts can follow when interpreting them;
- including these statistics in national and international cyclical and thematic reports despite their niche nature;
- expanding the sections in the road incident card concerning PWD and training officers on how to fill them in correctly.

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References

1. Ameratunga, S.N. & et al. Risk of disability due to car crashes: a review of the literature and methodological issues. *Injury*. 2004. Vol. 35. P. 1116-1127.
2. Beck, B. & Cameron, P.A. & Fitzgerald, M.C. & et al. Road safety: serious injuries remain a major unsolved problem. *The Medical Journal of Australia*. 2017. Vol. 207. P. 244-249.
3. *Bulletin of the World Health Organization*. 2001. Vol. 79(11). 90 p.
4. *Car accidents involving people with disabilities*. Miami. Available at: <https://www.flaccidentattorney.com/car-accidents-involving-people-with-disabilities.html>.
5. *Centrum wiedzy o dostępności website*. [In Polish: *Accessibility Knowledge Center*]. Available at: <https://cwod.wim.wat.edu.pl>.
6. *Data form Polish Security Printing Works. Summary of the number of documents issued from 2017-2021*. Warsaw.
7. *Decade of Action for Road Safety 2011-2020. Saving millions of lives*. Geneva: World Health Organization 2011. 25 p.
8. *Do my car accident injuries qualify for disability benefits?* Available at: <https://www.benefits.com/social-security-disability/car-accident-short-term-disability>.
9. *Disability Accidents: Conditions and Statistics*. Available at: <https://www.disabled-world.com/disability/accidents>.
10. Dobrowolska, E. & et al. *Wielka encyklopedia medyczna*. 2011. Warsaw: Agora. [In Polish: *Great medical encyclopedia*].
11. *Global Plan for the Decade of Action for Road Safety 2021-2030*. 36 p.
12. *Global Road Safety Partnership (GRSP) Interim Strategic Plan 2021*. 13 p.
13. *Three Types of Disability Common after a Car Accident*. Available at: <https://hensleylegal.com/articles/three-types-disability-common-car-accident>.
14. *Improving global road safety*. Resolution adopted by the General Assembly on 31 August 2020 (A/RES/74/299).
15. *Informacja o wstępnych wynikach Narodowego Spisu Powszechnego Ludności i Mieszkań 2021*. [In Polish: *Information on the preliminary results of the 2021 National Census of Population and Housing*]. Available at: <https://stat.gov.pl/spisy-powszechno/nsp-2011/nsp-2011-wyniki-wstepne/wyniki-narodowego-spisu-powszechnego-ludnosci-i-mieszkan-2011,3,1.html>.

16. *Road Safety Annual Report 2018*. IRTAD. 2018. 74 p.
17. *Konwencja o prawach osób niepełnosprawnych*, sporządzona w Nowym Jorku dnia 13 grudnia 2006 r. Dz.U. 2012 poz. 1169. [In Polish: *Convention on the Rights of Persons with Disabilities*, New York, December 13 2006 Journal of Laws of 2006 No. 2012 item 1169].
18. *Narodowy Programy Bezpieczeństwa Ruchu Drogowego 2021-2030*. Krajowa Rada Bezpieczeństwa Ruchu Drogowego 2021. [In Polish: *National Road Safety Program 2021-2030*. National Road Safety Council 2021].
19. *PWD website: Demographics data*. Available at: <https://www.niepelnosprawni.gov.pl/p,78,dane-demograficzne>.
20. *Niepełnosprawni w ruchu drogowym*. [In Polish: *Disabled people in road traffic*]. Available at: <https://jedrzejow.policja.gov.pl/tja/dzialania-policji/ruch-drogowy/353,Niepelnosprawni-w-ruchu-drogowym.html>.
21. *PWD website: News*. Available at: <https://niepelnosprawni.pl/ledge/x/1952554>.
22. *Polish Road Safety Observatory: Definition*. Available at: <https://obserwatoriumbrd.pl/pl/rejestracja/definicje>.
23. *Polish Road Safety Observatory: Car accidents map*. Available at: https://obserwatoriumbrd.pl/pl/rejestracja/mapa_interaktywna.
24. *Warmian-Masurian Road Safety Observatory*. Available at: <https://obserwatorium.word.olsztyn.pl>.
25. *Orzekanie o niepełnosprawności*. [In Polish: *Adjudication of disability*]. Available at: <https://wcp.pl/nasze-uslugi/osoby-niepelnosprawne/orzekanie-o-niepelnosprawnosci>.
26. Palmera-Suarez, R. & Lopez-Cuadrado, T. & Almazan-Isla, J. et. al. Disability related to road traffic crashes among adults in Spain. *Gaceta Sanitaria*. 2015. Vol. 29. P. 43-48.
27. *Practical guidelines for determining the number of serious road injuries (MAIS3+)* publication of SafetyCube project EU. 2016. 4 p.
28. *Raport o Celach Zrównoważonego Rozwoju 2021* (informacja prasowa). [In Polish: *Report on the 2021 Sustainable Development Goals* (press release)].
29. Rocha, G.D. & Mello Jorge, M.H. & Grembek, O. After-Effects and Disabilities in Traffic Crash Victims in Northern Brazil. *Traffic Injury Prevention*. 2017. Vol. 18. P. 412-419.
30. *System of Records of Accidents and Collisions website*. Available at: <https://sewik.pl>.
31. Sochańska-Kawiecka, M. & et al. *Badanie potrzeb osób niepełnosprawnych*. Raport końcowy. [In Polish: *Research on the needs of people with disabilities*. Final report]. PFRON. 2017. 253 p.
32. *Stan Zdrowia Ludności Polski w 2009 r.* GUS. 2011. [In Polish: *State of Health of the Population of Poland in 2009*. Central Statistical Office].
33. *Central Statistical Office website*. Available at: <https://stat.gov.pl/metainformacje/sloownik-pojec/pojecia-stosowane-w-statystyce-publicznej/3829,pojecie.html>.
34. *Study on serious road traffic injuries in the EU*. Available at: <https://www.swov.nl/en/publication/study-serious-road-traffic-injuries-eu>.
35. *Sustainable Development Goals*. Available at: <https://www.gov.pl/web/polskapomoc/cele-zrownowazonego-rozwoju>.
36. *Types of disabilities caused by car accidents*. Available at: <https://www.findlingpark.com/blog/2020/03/types-of-disabilities-caused-by-car-accidents>.
37. Ustawa z dnia 27 sierpnia 1997 r. o rehabilitacji zawodowej i społecznej oraz zatrudnianiu osób niepełnosprawnych (Dz.U. 1997 nr 123 poz. 776). [In Polish: Act of 27 August 1997 on vocational and social rehabilitation and employment of disabled people].
38. *What happens when a car accident causes a permanent disability?* Available at: <https://www.daveabels.com/what-happens-when-a-car-accident-causes-a-permanent-disability>.
39. *When a car accident causes permanent disability*. Available at: <https://www.rsinyrurylawyers.com/library/car-accident-permanent-disability.cfm>.
40. World Health Organization (2018). *Global status report on road safety 2018*. Geneva. 424 p.
41. World Health Organization. Regional Office for Europe. (2020). *European regional status report on road safety 2019*. Geneva. 147 p.
42. World Health Organization (2021). *World health statistics 2021: monitoring health for the SDGs, sustainable development goals*. Geneva. 136 p.

43. WHO (2011). *World Report on Disability*. Geneva. 350 p.
44. WHO (2017). *Save lives: a road safety technical package*. Geneva. 60 p.
45. Wnuk, A., Niepełnosprawni pełnoprawni w ruchu drogowym rozmowa z Ministrem Pawłem Wdówkiem, Pełnomocnikiem Rządu do Spraw Osób Niepełnosprawnych. *Kwartalnik BRD*. 2021. Vol. 1-2. [In Polish: Disabled people with full rights in road traffic Interview with Minister Paweł Wdówik, Government Plenipotentiary for Disabled People. *Road Traffic Safety Quarterly Magazine*].
46. Vademecum dla osób niepełnosprawnych – przewodnik zawodowy Część I. Podstawowe pojęcia A. Niepełnosprawność: definicje pojęcia. Centra Informacji i Planowania Kariery Zawodowej Wojewódzkiego Urzędu Pracy w Krakowie, Nowym Sączu i Tarnowie 2009. [In Polish: Handbook for people with disabilities – vocational guide Part I. Basic concepts. Disability: definitions of the concept, Information and Career Planning Centres of the Voivodship Labour Office in Krakow, Nowy Sącz and Tarnow 2009]. 13 p.
47. Załącznik 1 Karta zdarzenia drogowego do Zarządzenia nr 38 Komendanta Głównego Policji z dnia 15 grudnia 2021 r. zmieniające zarządzenie w sprawie metod i form prowadzenia przez Policję statystyki zdarzeń drogowych. [In Polish: Appendix 1 Road incident card to the Regulation No. 38 of the Police Commander in Chief of 15 December 2021 amending the regulation on the methods and forms of traffic incident statistics conducted by the Police].
48. Żukowska, J. Regionalne wdrożenie obserwatorium bezpieczeństwa ruchu drogowego w Polsce. *Archiwum Transportu*. 2015. Vol. 36. P. 77-85. [In Polish: Regional implementation of the road safety observatory in Poland. *Transport Archive*].

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