Introduction

Primum non nocere – this is the main principle followed by emergency medical services worldwide. The system of care provided to victims of emergencies, frequently improved and modified, has finally undergone a transformation in Poland, too. In the situations when the matter of people’s lives and health may be decided within seconds, the necessity of the best possible logistic solutions ought to be the basis for action. Hence the question arises, is the Latin guideline fulfilled in the Polish reality and do all the parts of the system work in an optimal way, fine-tuned to maximize the intended effect?

Medical rescue system medical rescue system

The National Medical Rescue (PRM) was established to come to aid to people in a state of health emergency. The implementation of the system based on the program prepared by the Ministry of Health entitled “Integrated Medical Rescue from 1999 to 2013” commenced in 1999. Prior to that time, there had been virtually no regulations governing this matter. With the year 2001 came the first Act of the National Medical Rescue. Since then, it has been amended many times and the system itself has been frequently improved. The Act of the National Medical Rescue contains the regulations which are legally binding in the matter today. The bodies responsible for the system’s proper operation are governmental administrative authorities (Minister of Health and provincial governors) as well as the system units: medical rescue teams (ZRM) including air rescue teams and hospital emergency wards (SOR). The services which are obliged by law to provide help directly cooperate with the system, among them in particular the State Fire Service (PSP), services entitled to mountain and water rescue and other services subordinate to or supervised by the Minister of Defence or other appropriate ministers in charge of internal affairs. Within Poland the PRM system is under the supervision of the Minister of Health. All actions related to planning and coordinating the system within a given province are its governor’s responsibility.

On March 2nd, 2011 the Minister of Health approved the Action Plan for the Medical Rescue System within the Zachodniopomorskie Province. The plan with its subsequent amendments is legally binding up to the present day. The preparation of the plan was based on a number of analyses of potential dangers to people’s health and lives, the number and distribution of the system units within a given province and hospital units specialized in providing health services necessary for medical rescue as well as the cost calculation of medical rescue teams’ operation. The SRM action plan takes into consideration the structure of urbanism of a given province with particular emphasis placed on upper and lower tier establishments, transportation networks (including the number and quality of roads, the number of transport accidents, dangers resulting from the existing watercourses and hydrotechnical structures, fire risks including fires of large forested areas). The risk evaluation also included the demographic structure of a province’s population and the administrative division. On the basis of the collected data and after performing necessary financial analyses, the decision was taken about the areas of operation of medical control facilities. Since August 1st, 2012 there have been two medical dispatch offices in operation in the Zachodniopomorskie Province: Szczecin and Kolobrzeg. All calls to number 999 are answered and handled there. In total, there are 10 dispatching positions, 4 in Kolobrzeg and 6 in Szczecin.

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2 Reviewed paper.
3 Latin for „first, do no harm.”
5 The Act of the National Medical Rescue of September 8, 2006 (Journal of Laws No 191, Item 1410 as amended).
6 The lastest amendment: "Revision nr 5" approved on 13.08.2013.
Along with calls to number 999, emergency calls to number 112 are also received. The target operational scheme of emergency dispatch system is based on the Provincial Emergency Dispatch Centre (WCPR). Any call within the province to number 112 will be received by dispatchers from WCPR and then after an initial selection and classification redirected to proper services (including medical dispatchers working in Szczecin and Kolobrzeg).

**Fig 1. Medical dispatch offices with their operational areas (status as at June 1st, 2013).**
*Source: Revision nr 5 of the Plan of Operation of the National Medical Rescue System in the Zachodniopomorskie Province, page 80.*

**Fig 2. Functioning of the Provincial Emergency Dispatch Centre (WCPR).**
*Source: own work based on: the Plan of Operation of the National Medical Rescue System in the Zachodniopomorskie Province, page 104.*
Assuming that the system’s teleinformatic network functions in a stable way, the location of dispatch offices and WCPR becomes a matter of lesser importance. The key factor for the injured in need of help is a rescue team’s arrival time to the scene, which makes the location of ZRM teams crucial. The Zachodniopomorskie Province has been divided into 12 operational areas (figure 3). The system contains in dispatching bases, in basic version, 30 ZRMs type S and 49 ZRMs type P. In addition, there are 4 teams of type P during holiday season in Dziwnów, Pobierowo, Ustronie Morskie and in Mielno placed at the disposal of the system.

Fig 3. Operational areas and distribution of units of the PRM system, status as at 13.08 2013 r.

Source: Revision nr 5 of the Plan of Operation of the National Medical Rescue System in the Zachodniopomorskie Province, page 35.

The mobile structure of the SRM is complemented by the Medical Air Rescue (LPR). The area of the Zachodniopomorskie Province is secured by: Helicopter Emergency Medical Service (HEMS Szczecin) "RATOWNIK 11" stationed permanently at the airport Szczecin – Goleniów and Helicopter Emergency Medical Service (HEMS Koszalin) "RATOWNIK 22" with its base at the airport Zegrze Pomorskie. The air fleet also contains an air ambulance team under the command of the national dispatcher of the LPR. Moreover, some hospitals have been equipped with on-site landing pads and other facilities for take-offs and landings of airships.

The last link in the chain of the SMR are Hospital Emergency Wards (SOR) and other hospital units specialized in providing health services necessary for medical rescue. In 2012 in the Zachodniopomorskie Province 149 892 interventions of medical rescue teams were recorded out of which 133 439 were cases of sudden health risk. In 4 838 cases the injured were declared dead before or during medical emergency treatment. The LPR teams intervened 492 times. One of the main criteria of effectiveness of the ZRM operations is the arrival time to the scene. The Act stipulates that it is a province governor’s responsibility to take proper actions in order to achieve the median arrival time every month – no longer than 8 minutes within a city of over 10 000 residents and 15 minutes outside the city limits. In case of a city of over 10 000 residents the maximal arrival time must not exceed 15 minutes and 20 minutes outside the city limits.

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7 Medical Rescue Teams (ZRM).
8 A specialist ZRM team with at least 1 doctor and 2 rescuers.
9 A basic ZRM team with at least 2 rescuers.
10 HEMS – Helicopter Emergency Medical Service.
12 Status as at July 1st, 2013, 8 hospital emergency wards within the whole province.
13 Revision nr 5 of the Plan of Operation of the National Medical Rescue System in the Zachodniopomorskie Province, page 2
14 Article 24 of the Act of the PRM.
Evaluation of functioning of the PRM system

The analysis of ZRM’s interventions in 2012 revealed that arrival times were repeatedly exceeded. In Szczecin the shortest arrival time noted was 5:59 minutes, which was less than legally required. However, the longest time recorded was 53:29 minutes. The overruns of ZRM’s arrival times were observed in all 12 regions of the province and both within cities of 10 000 residents and outside their city limits. Undeniably, the above data clearly prove the weakness of the system’s operation and the lack of full provision of medical help for the public. This state of affairs is partially redeemed by an efficient cooperation between the services. In accordance with the Act of the PRM, the units required to cooperate with the system are the services which are obliged by law to provide help to people in a sudden health risk. Among them, in particular the State Fire Service (PSP). Following a few media-hyped cases of medical emergency interventions in Swinoujście which were carried out by firemen\(^15\) due to the lack of available ambulances in the system, a survey\(^16\) was conducted with 845 respondents. The goal was to determine the public’s views on the efficiency of the PRM’s operation in the area of Swinoujście. Almost 64% of the respondents expressed their astonishment and outrage that it is the firemen who had to provide medical help. The majority of the respondents stressed that despite their high confidence put in the State Fire Service as such, they had doubts whether their medical qualifications were on a par with those possessed by doctors and rescuers from ZRM teams. Strong emphasis was also placed on the lack of identical equipment and a proper means of transport. The respondents also subjectively evaluated the level of medical care of summer tourists. Only 23% of them described it as sufficient while 32% regarded it as poor and for 24% it was inadequate. Evaluation of functioning of the PRM system in Świnoujście shown in the figure 4.

![Fig 4. Evaluation of functioning of the PRM system in Świnoujście.](image)

Source: own work based on: MGC report datek 26.08 2014 "Evaluation of the PRM system in Świnoujście".

The inclusion of the PSP into the PRM’s operation may be viewed as a significant support. The West Pomeranian media\(^17\) report, quoting firemen’s statements, that only in 2014 between January and the mid-August the PSP units have intervened in 180 cases of faints and heart attacks within the Zachodniopomorskie Province. The PRM system has been evaluated nationwide 3 times, at the end of 2002, 2006 and 2012 by the Supreme Audit Office (NIK). In 2002 and in 2006 the control results turned out to be negative in terms of the way of operation and the condition of the PRM system. The controls revealed insufficient operational readiness of the system as well as misappropriations of funds (143 million PLN were spent in violation of law)\(^18\).

Only the control conducted in 2012 brought positive results despite some critical remarks about the efficiency of the system’s operation. “The chain of deliveries” to a SOR, initiated by a phone call notifying about a person in need of medical help and finished with an admission to a hospital emergency ward or to a trauma centre (CU), constitutes a key element. However, stage I during which a medical rescue team has to arrive to the scene to provide help to the injured is regarded as significantly more essential. As for stage II, where a patient is transported to hospital, there are no clear time restrictions due to a diversity of medical procedures. According to the latest NIK report\(^19\), the system provided an efficient arrival of medical rescue teams to the scene. Nationwide, 10% of arrival times were, however, exceeded. The ensuing situation may be justified by an increase in ZRM teams’ interventions in some regions of Poland even by 30% compared to the earlier periods but also by the lack of a effective mechanism eliminating interventions which lie beyond the duties stipulated by the Act of the PRM or

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\(^{15}\) www.iswinoujscie.pl/artykuly/32625/ dostęp z dnia 25.08 2014 r.

\(^{16}\) MGC report dated 26.08 2014 “Evaluation of the PRM system in Świnoujście”.

\(^{17}\) www.radioszczecin.pl/1,115324,wzywa-karetke-spodziewaj-sie-strazakow-wideo dated 30. 08 2014 r.

\(^{18}\) “Information on control results of implementing medical rescue system in Poland” (September 2003, KPZ- 441012-2002, Number: 164/2003/P/02/127/KPZ) i “Information on the control results of governmental an administration’s actions to create and organize medical rescue system in Poland” (August 2007 KPZ- 41012/2006, Number: 138/2007/P/06/091/KPZ).

\(^{19}\) Functioning of medical rescue teams, Number: 149/2012/P11094/KZD.
directives from the chairman of the National Health Fund (NFZ). Ambulances were called for transporting, between hospitals, patients who were not in emergency medical conditions and ZRM teams were sent to people not eligible for rescue services and death declaration. Another factor affecting the arrival time is the distribution of dispatching bases. Feedback on arrival times enabled province governors to change the borders of operational areas while increasing the number of ZRM stationing/standby places. This last element is carried out to a moderate degree. In Szczecin there are 2 designated standby places for ZRM teams. However, there could be much more of them due to subordination or cooperation with other institutions (even with units of the same system). Standby duties of ZRM teams at hospitals or designated PSP units would both expedite arrivals to the scene and substantially shorten their times. A separate issue is adapting the road infrastructure to a quick movement of priority vehicles within city limits – particularly on the main roads with the heaviest traffic in rush hours. There are some engineering-technical solutions which could reduce arrival times by even 20-25%. Taking into consideration shorter arrival times of ZRM in stage II, what seems to be vital is not only introducing engineering-technical changes within city limits but also an optimal distribution of trauma centres and hospital emergency wards. The NIK report took notice of this matter. Between 2009 and 2011 the number of hospital emergency wards increased from 221 to 235 within Poland while in the Zachodniopomorskie Province from 5 to 12.

**Conclusion**

The principles resulting from the Act of the PRM appear to be right. Much effort has been already put in improving medical rescue in our country and thus in the Zachodniopomorskie Province. Nevertheless, there are still significant shortcomings caused by logistic mistakes, inappropriate distribution of ZRM teams or underinvestment. Therefore, what should be defined as a top priority is optimization of access routes, more efficient utilization of means of transport, better engineering solutions in terms of adapting roads and traffic lights as well as increasing the number of ZRM teams both type S and type P. All these steps require additional funding. Moreover, attempts to improve the system should be accompanied by social and educational campaigns on proper drivers’ behaviour on the road in the vicinity of a priority vehicle as well as on optimization of ways of calling for help and providing premedical care. Possible changes in health care functioning should also concern Primary Health Care (POZ) as well as hospital care. Consequently, ZRM teams and SOR wards would be utilized in a correct way.

**Abstract**

Where human lives and health are at stake, every smallest detail in system solutions of logistic provisions must be specified precisely and carried out in a way which can be set as an example to follow in other fields, too. The Polish Medical Rescue System finally received the act of Parliament, its revision and partial implementation. The following article concerns issues related to implementing the system in the Zachodniopomorskie Province. The research used to prepare it shows that in the view of public opinion and independent experts the logistic guidelines are acceptable and correct, however, their implementation is viewed in a much worse light.

**REFERENCES**

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