

## CHANGES IN THE SYSTEMS OF WASTEWATER MANAGEMENT IN PUBLIC HEALTH PROTECTION INSTITUTIONS OF LUBUSKIE VOIVODSHIP 2007-2010 – RESEARCH RESULTS

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### Abstract:

The article focuses on the issues of wastewater management systems in the voivodal local government health care departments in the Lubuskie Voivodship, 2007-2010. Based on the conducted research, 65% of the public health care units subordinate to the Marshal's Office of the Lubuskie Voivodship show changes in the financial condition of these units which are determined by the wastewater management systems.

**Key words:** wastewater management, wastewater, health units

### INTRODUCION

The situation of the voivodal local government health care departments of the Lubuskie region highlights the necessity of an in-depth analysis of the financial condition which is oriented to recognize the reasons of the negative financial results delivered by these units.

The current debt level of the Lubuskie Voivodship's hospitals is at the height of 350 million PLN. It requires finding rationalized measures in the executive area of management which, most of all, are oriented on economical savings.

During the financial situation's analysis, the bodies governing the health units should primarily focus on finding the reasons of the continuously growing global costs and, at the same time, decreasing the amount of the generated wastewater. This is why this article takes the issue of the wastewater management systems' functioning in the voivodal local government health departments of the Lubuskie region, 2007-2010. It concentrates on showing the endogenous changes determined by the financial condition of the medical services sector.

This article also presents the "ecological problem" of the incorrect practice of wastewater disposal, especially in the case of the hospitals with infectious diseases branches. This problem is important not only because of the ecological and sanitary aspects, but also of the economical aspect due to the fact that non-compliance with the regulations and directives set by the European Union will effect with enormous financial consequences resulting in the form of fines.

For the purposes of this article, 65% of the functioning public health departments subordinate to the Marshal's Office of the Lubuskie Voivodship in 2007-2010 were investigated; also the materials available in public statistics database, provided by the Centre for Regional Studies of the Central Statistical Office in Zielona Góra, were used.

### THE ISSUE OF WATER AND SEWAGE MANAGEMENT IN THE CONTEMPORARY HEALTH UNITS.

The overexploitation of water with its dwindling resources and the incorrect wastewater management cause that the XXI century's water and sewage management is an increasingly raised issue. As does the literature state, the water and sewage management "covers all the issues regarding the water resources, drawing up the balance, the intake, treatment and distribution of water, and the disposal and neutralizing the sewage, and also sludge management" [1]. This issue is governed by the Act of July 18<sup>th</sup>, 2001, Water Law. Presently, the biggest problem in this area is the wastewater originating from the health departments.

According to the regulations, one can qualify it as domestic sewage which is disposed to the municipal sewage system. According to the act, domestic sewage "is understood as wastewater from residential building, collective living buildings and public utility buildings, which derives from human metabolism and the functioning of households; also wastewater of similar composition which derives from the aforementioned buildings" [2]. In the light of the regulation of the Minister of Infrastructure of April 12<sup>th</sup>, 2002, on the technical conditions to be met by the buildings and their location, §3 says that the objects destined for public health care are regarded as public utility buildings [3]. Due to the fact that a part of the wastewater deriving from the public health care units contains microorganisms hazardous for the environment and human health, causes that it should not be discharged to the municipal wastewater system. This is why also this issue is a subject to regulations that „the sewage discharged to the water or to the ground as a part of ordinary or special water use should be purified to the extent required by the law and must not: contain pathogenic microorganisms deriving facilities where patients are treated for infectious diseases" [4].

### THE ORGANIZATION OF THE HEALTH CARE UNIT'S WASTEWATER MANAGEMENT SYSTEMS

The wastewater management in the health care units is quite a challenge for the world and for Poland due to the fact that these facilities deliver one of the most contaminated wastewater. The discharged sewage contains, inter alia, drug residues, hazardous bacteria or pathogenic viruses [5]. The unpurified sewage are a threat not only for the human life, but also for the natural environment. Due to this fact, these impurities require proper management. From the hospitals' wastewater management point of view, the major problem is that the contaminated wastewater is discharged to the municipal sewage system or directly to the environment without a prior decontamination and disinfection. It also happens that the impurities travel directly to rivers [6].

The need of neutralizing the hazardous hospital impurities is an obvious fact, yet, in the public health care units, these actions often do not take place due to the high costs. Too big financial expenses do not allow the hospitals to test the impurities on a regular basis and, in result, the impurities, which do not meet the required norms, often travel to, for example, the municipal wastewater system.

It is impossible to avoid the production of harmful impurities in the health care units, hence finding an economically optimal and an environmentally sound solution of this situation should be a priority.

Building hospital sewage treatment plants, which would allow the neutralization of the impurities on sight, is one of the possibilities of solving this problem. Without a doubt, it is an expensive, yet very efficient solution. The execution of such project reaches the cost of few million zloty. Unfortunately, the financial reality of the Polish health care units make it impossible to implement such solution. This is why there are very few hospital sewage treatment plants [7].

The economical aspect of wastewater management is a very important area, not only from the epidemiologic threats and the environment protection point of view. The bad financial condition of the health care, the lack of social willingness to act, and the lack of the state's and local government's units help – these are the most important problems of the Polish health care. The European Union reaches out

to these issues due to its concern about the environment and its protection. For this purpose, one of the Operational Programme Infrastructure and Environment priorities was created, thanks to which the hospitals may gain funds necessary to, for example, build the hospital sewage treatment plants [8].

### FUNCTIONING OF THE VOIVODAL LOCAL GOVERNMENT'S HEALTH PROTECTION UNITS IN THE LUBUSKIE VOIVODSHIP – THE CHARACTERISTIC OF THE RESEARCH AREA

There are 15 voivodal local government's health care units on the territory of the Lubuskie Voivodship, 14 of which function as Independent Public Health Care Centers and one - the Lubush Specialist Pulmonology and Cardiology Hospital in Torzym – which since September 3<sup>rd</sup>, 2010 has been functioning as a limited company, which's only shareholder is the Lubuskie Voivodship [9].

The hospital in Torzym is an example of why should the hospitals be transformed into companies because of the fact that depending on the hospital's debt, a part or the whole liability is taken over the local government. Moreover, in contrary to the public hospitals, a company may provide paid medical services [10] and, at the same time, preserve the services reimbursed by the National Health Fund (NFZ). This provides greater possibilities of developing the hospital and, at the same time, allows to decrease the debt which in the case of the Lubush hospitals peaks at 350 million zlotys. This is why more hospitals await transformation. These are, inter alia: The Independent Public Hospital for Mental Diseases in Międzyrzecz and the Independent Public Voivodal Hospital in Gorzów Wlkp., which have the enormous debt of 271 million PLN and, for which, the transformation is the last resort because, according to commercial law, transforming the hospital into a company will provide it with a chance of getting a grant from the Ministry of Health which can be used to pay the debt [11].

The liabilities of the Lubush hospitals are not the only problem concerning these units; the majority of the hospitals trouble with a great problem of the negative financial results which prevents them from lessening the debts. Table 1, shows the forming of the financial results in exemplar hospitals of the Lubuskie Voivodship.

**Table 1**  
*The financial results of the selected voivodal health care units, October 31<sup>st</sup>, 2010 – December 31<sup>st</sup>, 2010 – (in thousands of PLN)*

Health care unit	The plan for 2010	Financial result as for 31.10.2010	Financial result as for 31.11.2010	Financial result as for 31.11.2010
Independent Public Voivodal Hospital in Gorzów Wlkp	67	-7462	-6634	-5008
Independent Public Voivodal Hospital in Zielona Góra	0	-4568	-4149	-4417
Voivodal Specialist Hospital for Mental Diseases in Cibórz	543	73	447	676
Voivodal Specialist Hospital for Mental Diseases in Międzyrzecz	0	-467	-180	-13
Lubush Orthopedic and Rehabilitation Center in Świebodzin	0	-461	-511	-452
Lubush Specialist Pulmonology and Cardiology Hospital in Torzym	167	-15	40	132
Center for Drug Addicts in Nowy Dworek	6	4	10	1
Treatment Center for Children and youth in Zabór	140	157	201	131
<b>TOTAL</b>	<b>923</b>	<b>-12739</b>	<b>-10776</b>	<b>-8950</b>

The government of the Voivodship, as the creating entity of the voivodal health care units, is its supervisor in accordance to the Act on Therapeutic Activities of April 15<sup>th</sup>, 2011 [12] and in accordance to the Regulation of the Minister of Health of November 18<sup>th</sup>, 1999 on detailed rules of supervision of the Independent Public Health Care Units [13]. It is the council's exclusive jurisdiction to create, transform, liquidate the units and also equip them with assets – article 18, point 19, letter F of the Act on the Council of the Voivodship [14] of June 5<sup>th</sup>, 1998; as well as the approval of statutes and the amendment of the statutes of these units.

As for April 10<sup>th</sup>, 2013, the units subordinate to the Voivodship's government consist of 15 health care units such as:

1. Independent Public Voivodal Hospital in Zielona Góra (SPZOZ).
2. Voivodal Specialist Hospital for Mental Diseases in Cibórz (SPZOZ).
3. Lubush Specialist Pulmonology and Cardiology Hospital in Torzym (SPZOZ).
4. Lech Wierusz's Lubush Orthopedic and Rehabilitation Center in Świebodzin (SPZOZ).
5. Treatment Center for Children and youth in Zabór.
6. "Nowy Dworek" Center for Drug Addicts (SPZOZ)
7. Independent Public Voivodal Hospital in Gorzów Wlkp.
8. Voivodal Specialist Hospital for Mental Diseases in Międzyrzecz.
9. Voivodal Ambulance Station in Zielona Góra (SPZOZ).
10. "MEDKOL" Independent Public Health Care Unit in Zielona Góra.
11. Voivodal Center for Addiction in Zielona Góra.
12. The Independent Health Care Center for Circuit Therapeutics in Gorzów Wlkp.
13. Independent Public Voivodal Ambulance Station in Gorzów Wlkp.
14. Voivodal Center for Occupational Medicine in Zielona Góra.
15. Voivodal Center for Occupational Medicine in Gorzów Wlkp.

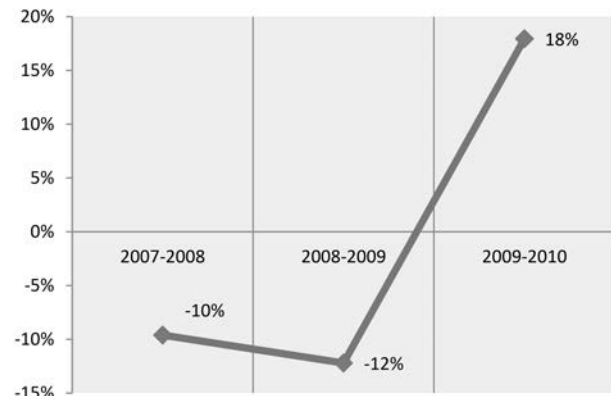
*Translator's note: The SPZOZ is an Independent Public Health Care Unit, this abbreviation is commonly used in the structure of the Polish National Health Fund.*

#### THE ANALYSIS OF THE WASTEWATER MANAGEMENT SYSTEMS OF THE PUBLIC INDEPENDENT HEALTH PROTECTION UNITS SUBORDINATE TO THE LUBUSH VOIVODSHIP'S GOVERNMENT, 2007-2010 – RESEARCH RESULTS

The research was conducted in the first quarter of 2012 among 65% of the Independent Public Health Care Units subordinate to the Marshal's Office of the Lubuskie Voivodship in the years 2007-2010. The study used a questionnaire. Based on the study, it was determined that only 20% of the researched medical units confirmed to have been equipped with a wastewater treatment plant in that period (most commonly using biological sewage decontamination), while as 40% discharged the sewage directly to the municipal wastewater system without decontaminating the at all. This might has been a potential bacteriological threat which could have resulted in an epidemic. At that time, the remaining health care units discharged the wastewater in the hospital cesspits.

The research also established that the global volume of all of wastewater generated by the researched health care units systematically decreases till the end of the year 2009.

However, in 2010, the units reported a significant increase of the aforementioned volume. This relationship is shown in the wastewater growth graph (Fig. 1).



**Fig. 1 The growth of the wastewater produced by the health care units**

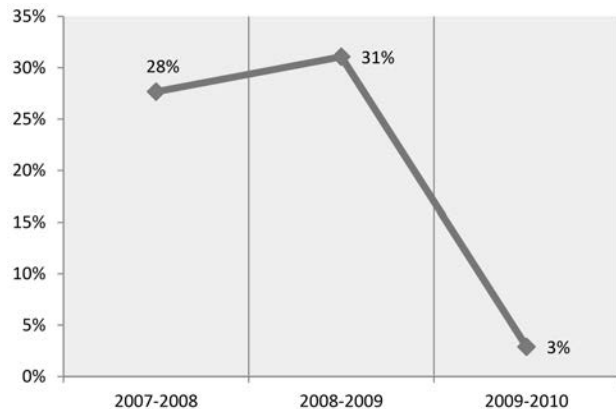
At the same time, the global costs related to the wastewater management, 2007-2010 could be observed with a systematic upward trend. These dependencies are shown in Table 2.

**Table 2**

**The approximate (global) cost of the operation of all the wastewater management systems in the health care units subordinate to the Marshal's Office of the Lubuskie Voivodship, 2007-2010. Costs in subsequent years [in PLN]**

2007	2008	2009	2010
2 276 164	2 626 746	3 022 539	3 668 759

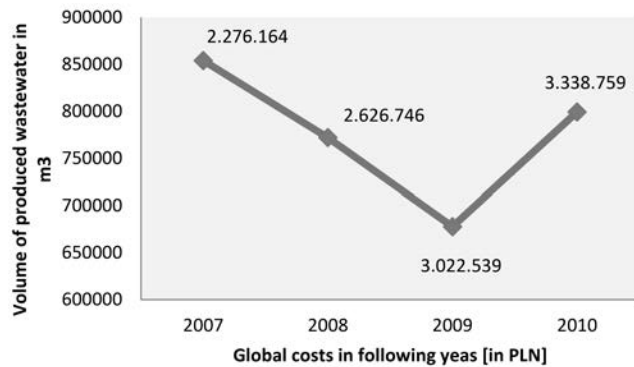
The analysis of the variability of costs, per unit cost of managing 1 m<sup>3</sup> of wastewater, which is actually targeted at determining the system's economical effectiveness, provides us with extremely interesting information (Fig. 2).



**Fig. 2 The growth of the average cost of wastewater management per 1 m<sup>3</sup> of produced wastewater**

In the years 2007-2010, the average cost of decontaminating 1 m<sup>3</sup> of wastewater raises systematically what results in the increase of global costs of the functioning wastewater management systems and, at the same time, the reduction of their production – Fig. 3.

The increasing unit cost of managing 1 m<sup>3</sup> of wastewater, which causes the increase of the global costs of the functioning wastewater management systems, could have been caused by the inflationary pressure which is observed in the whole national economic and which results of the raise of indirect expenses related with the transport or energy costs.



**Fig. 3** The volume of produced wastewater in relation to global costs of the functioning wastewater management systems, 2007-2010

### SUMMARY

The wastewater management issue in the Lubush health care units (and not just the health care units) is an extremely important and valid topic due to the type of hazards related to it and, when thinking of the future, it will grow in importance. This may be indicated by the continuously varying volume of its production in the analyzed period, which determined some sort of a long-term trend and which systematically increases the global costs of its decontamination in 2007-2010. All of this, combined with the difficult financial situation of the Polish health care system is, and will be, quite the challenge in the perspective of the upcoming years.

The conducted studies showed that the analyzed Independent Public Health Care Units, which functioned in the times of the horrific financial situation of the health care sector, had not increased the effectiveness of their wastewater management systems in 2007-2010 thanks to what, the unit cost of managing 1 m<sup>3</sup> of wastewater raised systematically in that period. Considering the continuously falling amount of produced wastewater in 2007-2010, this may have been caused by the lack of seeking rationalized savings-oriented actions in that field. In 2010, the increase of produced wastewater was noticed what because of the lack of the aforementioned rationalized actions resulted in the enormous raise of the global costs in the form of over 600 000 PLN.

The analysis also showed how could the external inflationary pressure, which is most probably related to the observed increase of unit costs in the 2010's national economics, influence the economical drop of the functioning wastewater management systems.

Hence, the public authorities which define the units' framework of functioning, are also responsible for including these issues when creating the wastewater management systems and the methods assisting the restructure and improvement of these managing systems in the units creating the Polish medical services sector.

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