

# **Describing Patient Transfers from Healthcare Units of Islands to the Hospitals of the Capital City of Greece: The Case of the General Hospital-Health Center of Naxos**

**M. Magiorou<sup>1</sup>, N. Tsaloukidis<sup>2</sup>, A. Lazakidou<sup>3</sup> and E. Jelastopulu<sup>4</sup>**

## **Abstract**

The geographical location of a Healthcare Unit is directly related to its staffing and the services developed. The inter-hospital transfers performed play a key role in the development of the Island and remote health structures. The investigation of these 1.767 transfers, taking place from 1st January 2014 to 31st August 2018, provides valuable information about the dynamics of each Nursing organization, as well as the investigation of its weaknesses. Based on the records of cases that need transfer, strategic planning can be achieved for each remote health structure separately, in order for the necessary structures, departments and laboratories to be developed, to the performance of these organizations to be improved and the need for transfer to be reduced.

**Keywords:** Patient Transfers, National Center for Emergency Assistance, Insularity, Ambulance, Protocols.

---

<sup>1</sup> Head of the Nursing Service Department, General Hospital- Health Center of Naxos, Greece.

<sup>2</sup> Digital Health Applications and Health Economics Analytics Laboratory, Dept. of Economics, University of Peloponnese, Tripolis, Greece.

<sup>3</sup> Digital Health Applications and Health Economics Analytics Laboratory, Dept. of Economics, University of Peloponnese, Tripolis, Greece.

<sup>4</sup> Department of Public Health, School of Medicine, University of Patras, Greece.

## 1. Introduction

The geographical approach is a special parameter, which for the island Greece can be considered strong and decisive, both for the establishment and for the maintenance of health inequalities arising from the territorial discontinuity and isolation, based on the concept of insularity and the data that compose it, as captured by Spinalis (Spinalis G. et al., 2015).

As far as the Greek reality is concerned, the choice of the means of transport is made by the National Center for Emergency Assistance, after contacting the Nursing Institution requesting the transfer and the Greek Armed Forces, where necessary. (Ministerial Decision Nr. F.800/278818/S.4345).

The main criteria considered for the means of transfer are the cause of transfer, the criticality of the situation, clinical requirements of the case and how urgent the transfer is, in terms of the need for immediate intervention (Australian and New Zealand College of Anesthetists ANZCA, 2015).

It is clear due to the special characteristics of the islands, and especially due to the territorial discontinuity, that the complementarity of the health services, as well as the utilization of the productive factors is not served (Dendi A., 2011). Therefore, the state strategic health planning should take into account the need for quality care of the inhabitants of the remote - island areas, in order to take care of their transfer to central Health Structures, where they will receive quality and specialized health services.

## 2. Aim

The aim of the present study is to evaluate the capabilities of the General Hospital – Health Center of Naxos through the hospital transfers that are carried out to other secondary and tertiary hospital units, to identify its weaknesses and the health needs that arise daily. The ultimate goal is to design new strategies to improve its efficiency, through the development of new departments, surgeries and units. Also, the goal of this study is to improve the conditions of hospital transfer from the General Hospital – Health Center of Naxos, but also from every Healthcare Unit of the island area.

## 3. Material and method

The present research is a descriptive retrospective study, conducted at the General Hospital - Health Center of Naxos. It studies the secondary hospital transfers of the specific Healthcare Unit, to other secondary or tertiary hospitals, from January 1<sup>st</sup>, 2014 to August 31<sup>st</sup>, 2018, by any means and for any cause (illness or injury).

Obtaining and recording of data involves the principle of anonymity, strictly following the principles of the European Data Protection Regulation. General Data Protection Regulation 2016/679 (GDPR) (URL 2); also, the collection and use of all statistical data was carried out, after the approval of the research protocol of the study and the granting of the relevant permission by the Scientific Council of the

hospital (Excerpt of the 3rd Scientific Meeting Of the Council, Decision Nr.11 / July 12<sup>th</sup>, 2018)

The underlying population, which was the reservoir, from which we obtained all the requested data, was the total number of patients - injured, who came or were transferred, for any health problem, to the specific Healthcare Unit, either in the emergency room, or in the regular outpatient clinics, or were hospitalized in a department, during the studied period of time. The population under study was the total of the cases that were transferred to another hospital, with any means of transfer and for any disease or trauma from the General Hospital.-Health Center of Naxos in the aforementioned time period.

All the diseases or injuries, which could not be treated effectively in the Naxos hospital and led to the decision of transfer, were defined as determinants of the outcomes (transfers). To facilitate statistical analysis, all diagnoses were recorded according to the ICD-10 (International Statistical Classification of Diseases and Related Health Problems) coding of diseases and related health problems.

As in any retrospective study, all evidence and data, both those related to the determinants and outcomes, as well as those concerning the underlying population, were collected at the same time from the official records of the hospital.

In particular, the following data were examined in the present study:

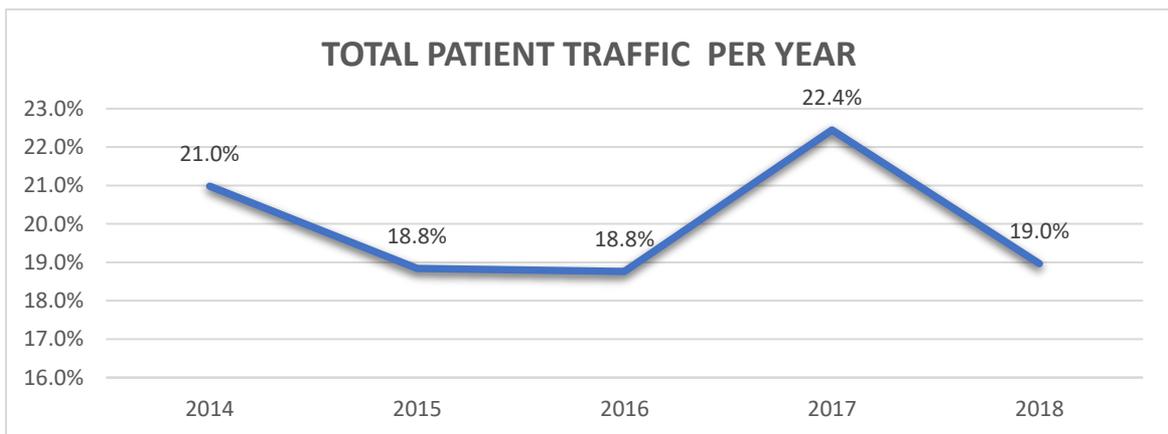
- The number and type of cases transferred from the General Hospital-Health Center of Naxos, from January 1<sup>st</sup>, 2014 until August 31<sup>st</sup>, 2018.
- The seasonal variation of transfers.
- The percentage of those transferred, in relation to the number of those treated and having visited the regular and emergency outpatient clinics of the hospital.
- The outcome of their hospitalization (in case the transferred patients were hospitalized), with the following characterizations (improvement, stagnation, deterioration) that led to the decision for their transfer.
- Also, for those transferred after hospitalization, both the referring clinic and the number of days of hospitalization before the transfer were recorded.
- The patient's diagnosis, categorized according to ICD 10, as recorded in his/her discharge (if he/she was a hospitalized patient), or as recorded in his/ her transfer record (if he was transferred directly from the emergency department).
- The means used for these transfers, as well as their frequency of use.
- The Number of hospital transfers made through a stopover (double or mixed transfers).
- The place of destination of the transfers, for example, if a hospital of the capital (Athens) was chosen, or the nearest hospital of Syros, or another hospital in Greece or abroad.

- The degree to which the inter-hospital transfer of patients was affected, after the operation of the Type B Blood Donation Station and the Artificial Kidney Unit, in the said hospital.
- Other available data of the transferred, mainly demographics, such as gender, insurance coverage, age, occupation (where available), ethnicity, country of origin and place of residence.

#### 4. Results

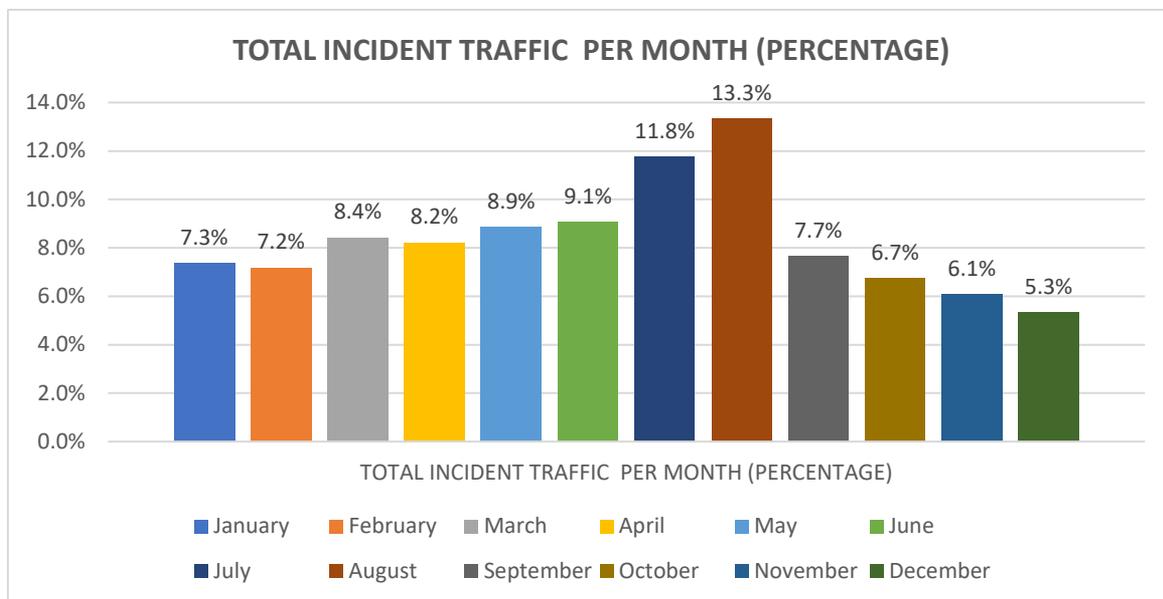
From the data collected, the *total traffic* of the hospital from January 1<sup>st</sup>, 2014 to August 31<sup>st</sup>, 2018 (N = 135.484) was calculated. Analyzing the data, it is observed that the regular outpatient clinics of the hospital exhibited a higher total attendance compared to the emergency clinics, since 54.9% of the people who went to the hospital, were examined in first ones.

Furthermore, in 2014 and 2017 were the years with the highest traffic rates (21.0% and 22.4% respectively). At this point it should be noted that for 2018 there are data available until August (not for the whole year), so if the remaining four months of 2018 were to be added to the records, the results will probably be modified.



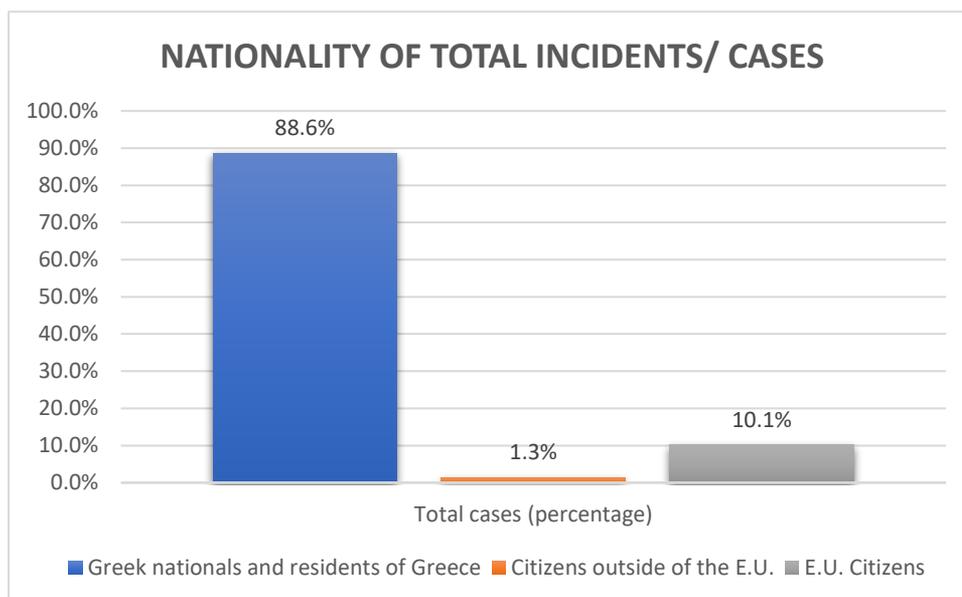
**Figure 1: Total patient traffic per year**

The months with the highest traffic, for the whole studied period, were July and August with percentages of 11.8% and 13.3% respectively. Also, the departments with the highest traffic, for the period under study, were the pathological and the surgical ones with percentages of 39.6% and 20.9% respectively.

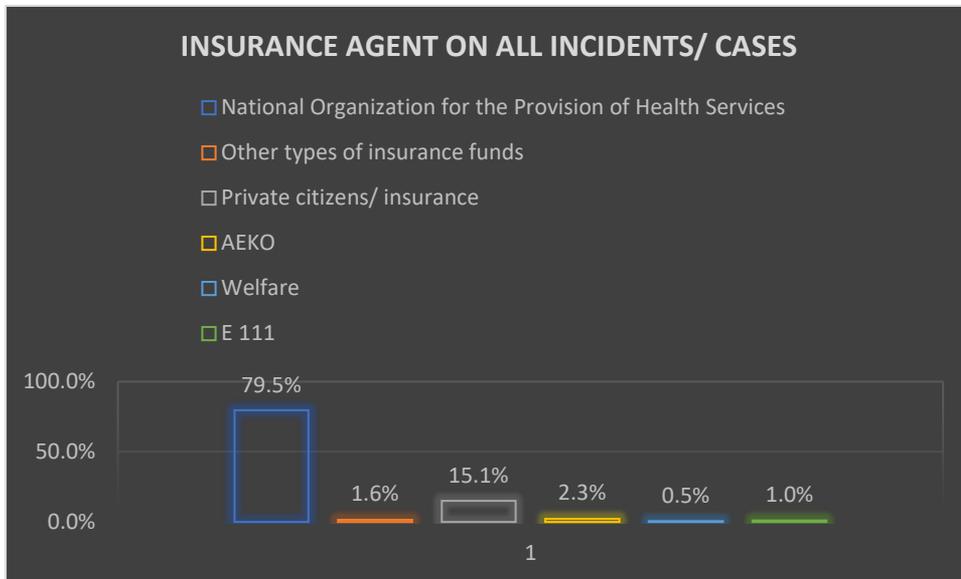


**Figure 2: Total patient traffic per month**

The majority of the people who were served in the General Hospital-Health Center of Naxos were Greeks or foreign permanent residents in Greece (98.2%) and insured with the EOPYY (79.5%). Also, 2.8% of all patients were uninsured or had a booklet of financial weakness, while the percentage of individual patients was significant (15.1%).



**Figure 2: Nationality of patients**



**Figure 3: Insurance coverage of the patients**

For the period under investigation, 5,558 hospital admissions were recorded. The months with the most admissions, cumulatively for all years, were July and August with percentages of 11.8% and 12.6% respectively. Also, most admissions took place in 2017 and 2018 (24.3% and 24.6% respectively). If the data of the four months remaining from 2018 are added, then the percentage of admissions of the specific year will be clearly higher compared to the other ones. The departments with the most admissions, in all years, were the pathology and the surgery department, with percentages of 67.1% and 12.5% respectively. We also notice that the admissions in the pathology department are five times more than those in the surgery department. At a sector level, in fact, the pathological one shows even higher percentages (76.5%) than the surgical one (23.4%).

**Table 1: Total case handling based on the month, year and type of case**

		# admissions	% admissions	# cases	% cases	% admissions to cases
<b>Total</b>		5585		135.484		4,1
<b>Month</b>	January	438	7,8%	9.955	7,3%	4,4
	February	405	7,3%	9.729	7,2%	4,2
	March	515	9,2%	11.422	8,4%	4,5
	April	480	8,6%	11.129	8,2%	4,3
	May	532	9,5%	11.992	8,9%	4,4
	June	527	9,4%	12.285	9,1%	4,3
	July	659	11,8%	15.947	11,8%	4,1
	August	701	12,6%	18.063	13,3%	3,9
	September	377	6,8%	10.373	7,7%	3,6
	October	292	5,2%	9.126	6,7%	3,2
	November	301	5,4%	8.252	6,1%	3,6
	December	331	5,9%	7.211	5,3%	4,6
<b>Year</b>	2018	1370	24,5%	25.700	19,0%	5,3
	2017	1353	24,2%	30.410	22,4%	4,4
	2016	986	17,7%	25.419	18,8%	3,9
	2015	876	15,7%	25.528	18,8%	3,4
	2014	973	17,4%	28.427	21,0%	3,4
<b>Type of Case</b>	Pathology	3746	67,1%	53.628	39,6%	7
	Surgery	697	12,5%	28.373	20,9%	2,5
	Cardiology	399	7,1%	3.994	2,9%	10
	Pediatrics	106	1,9%	4.214	3,1%	2,5
	Orthopedics	404	7,2%	18.556	13,7%	2,2
	Obstetrics-Gynecology	98	1,8%	8.108	6,0%	1,2

4.1% of the total cases were admitted to the hospital. The admission rate was higher in March and December. Furthermore, the admission rate increased over the years (from 2014 to 2018). Finally, the rate of admissions was higher in cardiac and pathological cases.

Data were recorded regarding **1.767 transfers** that took place from January 1<sup>st</sup>, 2014 until August 31<sup>st</sup>, 2018. The table below shows the percentages of transfers, total transfers, admissions and total traffic

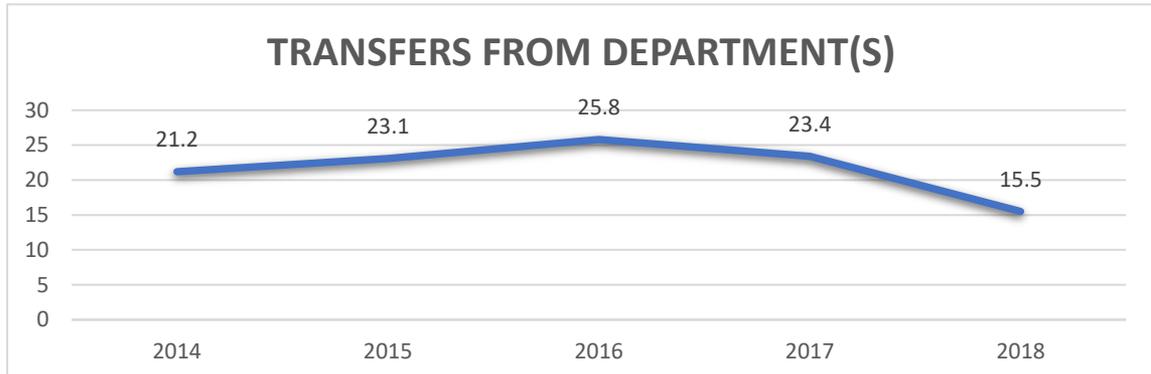
**Table 2: Case transfers**

Transfer from:	N	% on transfers	% on admissions	% on total traffic
Departments	1.190	67,3	21,4	-
Emergency Clinic	577	32,7	-	0,9
Total	1.767	100,0	-	1,3

67.3% of transfers involved patients in wards. Also, the percentage of transfers on admissions was 21.4% (1.190 / 5.558). Moreover, 0.9% (557 / 61,169) of the patients who visited the emergency or outpatient clinics, were transferred, while 1.3% (1.767 / 135.484) of all patients were deemed impossible to treat in the aforementioned Healthcare Unit and were transferred to other secondary or tertiary units.

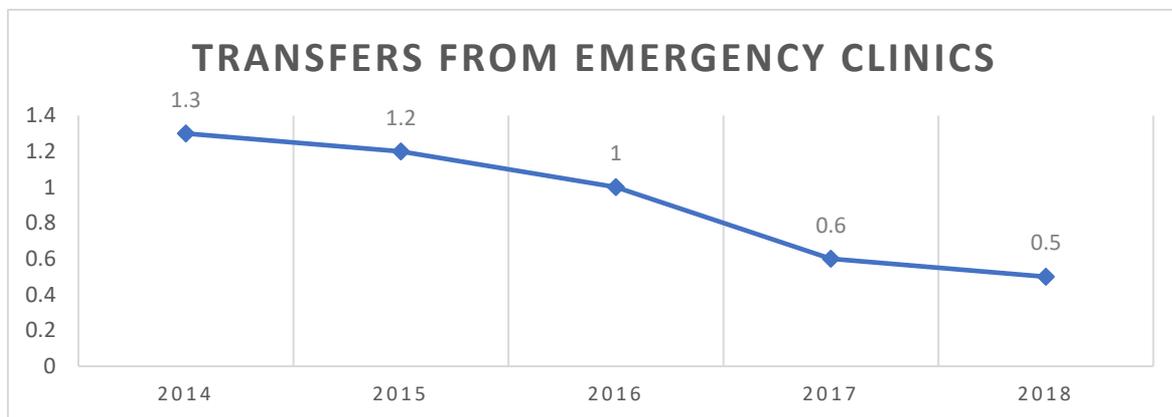
The graph below shows the percentages of transfers from departments on total admissions, per year.

The percentage of transfers from the departments was similar from 2014 to 2017 ( $p > 0.05$ ). For 2018, the significant decrease shown ( $p < 0.001$ ), is due, perhaps, to the fact that we do not have data for the whole year, but only until August.

**Figure 4: Case transfers per year after their admission to the Nursing Unit**

The chart below shows the percentages of transfers from the emergency clinics on all emergency traffic, per year.

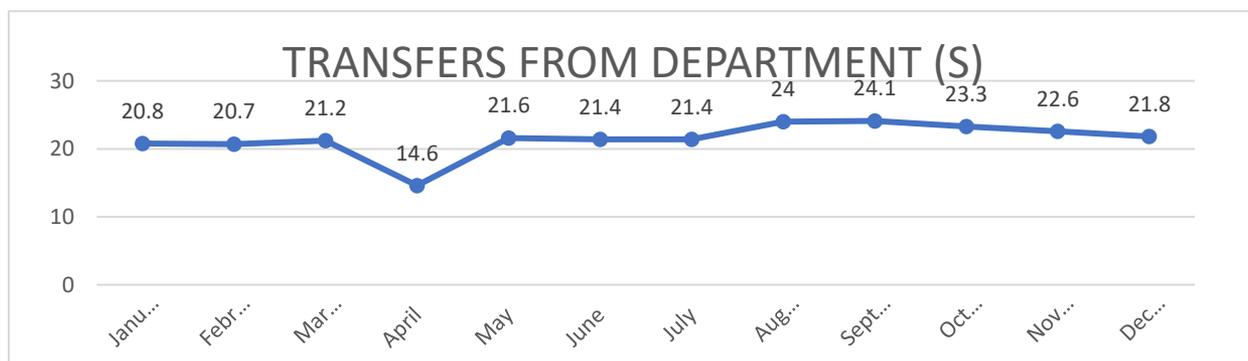
The rate of transfers from the emergency clinics was similar from 2014 to 2015 ( $p > 0.05$ ). In 2016 it decreased significantly ( $p = 0.042$ ) and in 2017 it decreased significantly again ( $p = 0.005$ ) and remained at the same levels in 2018 ( $p > 0.05$ ). It should be noted that this significant decrease in recent years is probably due to admissions to Day Care, which is common when a transfer takes place after a long delay, and materials and medicines administered to the patient should be charged.



**Figure 5: Case transfers per year after their admission to the Nursing Unit**

The graph below shows the percentages of transfers from the departments on total admissions, per month.

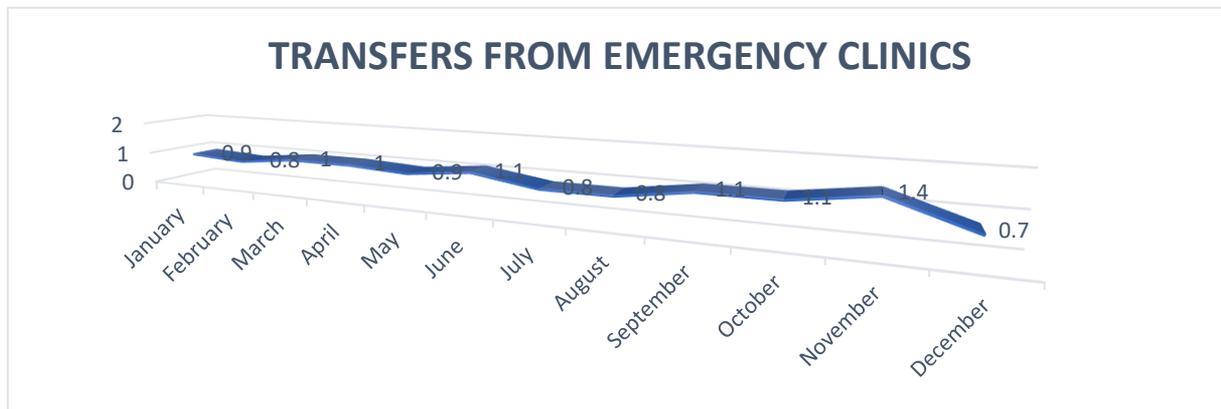
Transfers from the departments were at similar levels throughout time ( $p > 0.05$ ), except in April, when they were significantly lower, compared, both to March ( $p = 0.007$ ) and to May ( $p = 0.004$ ).



**Figure 6: Case transfers per month after their admission to the Nursing Unit**

The following graph shows the percentages of transfers from emergency clinics on the total of traffic in the aforementioned clinics, per month.

Transfers from the emergency clinics were at similar levels throughout the year ( $p > 0.05$ ), with the exception of December, when they were significantly lower compared to November ( $p = 0.015$ ).



**Figure 7: Case transfers per month directly from the Emergency Department/Clinic**

The table below shows the transfers rates before and after the launch of a blood donation station, as well as before and after launch of an Artificial Kidney Unit, on total transfers, admissions and traffic.

**Table 3: Case transfers after the launch of operation of specialized/ special departments**

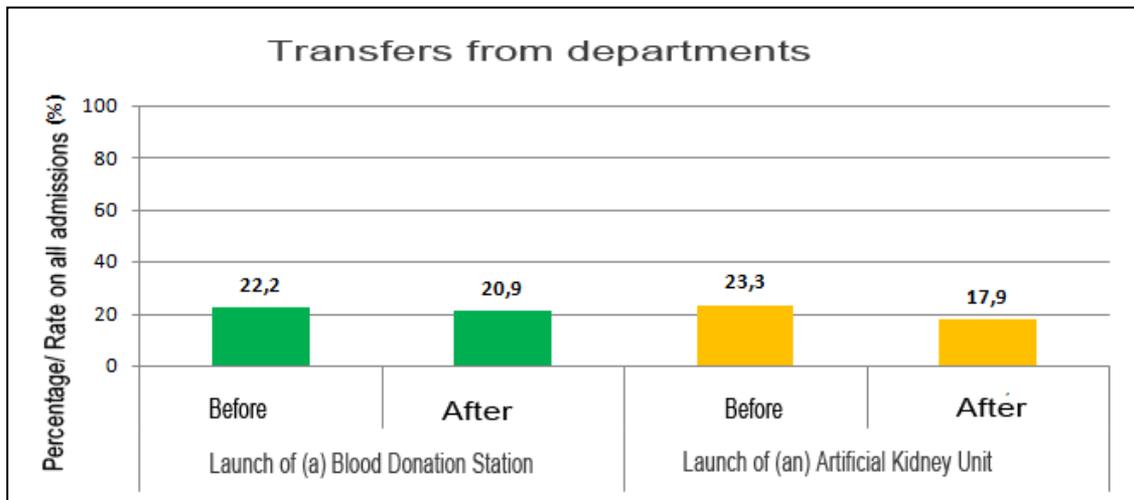
		Transfer from:					
		Departments			Emergency Clinic(s)		
		N	% on transfers	% on admissions	N	% on transfers	% on total traffic
<b>Blood donation station launch</b>	Before	473	39,7	22,2	363	62,9	1,2
	After	717	60,3	20,9	214	37,1	0,7
<b>Artificial Kidney Unit Launch</b>	Before	839	70,5	23,3	494	85,6	1,1
	After	351	29,5	17,9	83	14,4	0,6

22.2% of the admissions were transferred from the departments before the launch of the blood donation station, while 20.9% of the admissions took place after the aforementioned launch, without, however, these two percentages significantly differing. In contrast, the percentage of admissions transferred before the launch of the Artificial Kidney Unit was significantly higher compared to the corresponding percentage after the launch (2.3% vs. 17.9%,  $p < 0.001$ ).

The transfer rate from the emergency clinics before the launch of the blood donation station was 1.2% on the total number of cases, which was significantly higher than the corresponding rate after the launch of the blood donation station, which was

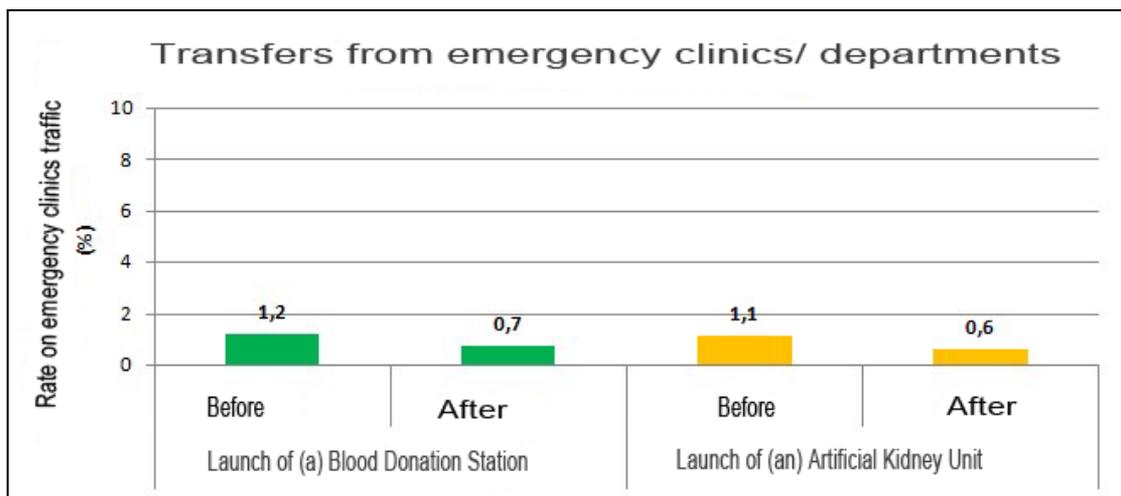
0.7% (  $p < 0.001$ ). Similarly, the percentage of transfers from the emergency clinics decreased significantly after the launch of the Artificial Kidney Unit (1.1% vs. 0.6%,  $p < 0.001$ ).

The graph below shows the transfer rates before and after the launch of a blood donation station, as well as before and after the launch of an Artificial Kidney Unit, on all/ total admissions.



**Figure 8: Transfers from departments in relation to the operation of the Blood Donation and Artificial Kidney departments**

The graph below shows the transfer rates before and after the launch of a blood donation station, as well as before and after the launch of an Artificial Kidney Unit, for all emergency traffic.



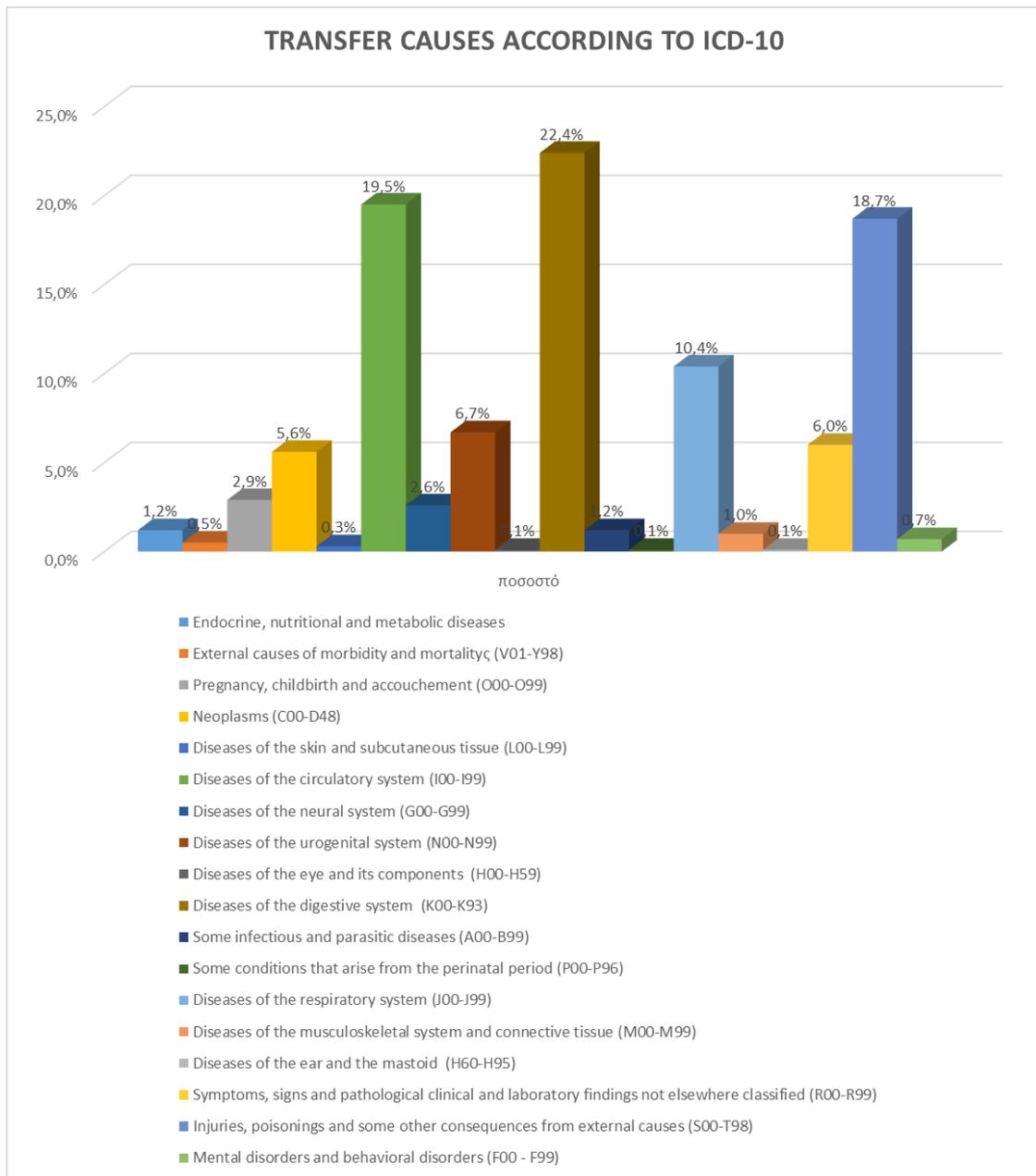
The demographics of patients transferred are given in the table below.

**Table 4: Demographics of transferred patients**

		N	%
Gender	Male	1.002	56,7
	Female	765	43,3
Age, average (SD)		58,0 (24,6)	
Nationality/ Ethnicity	Greeks & residents in Greece	1.457	82,5
	Citizens outside EU	54	3,1
	EU Citizens	256	14,5
Residents	Naxos	1.341	75,9
	Greek tourists	195	11,0
	Foreign tourists	194	11,0
	Minor Cyclades	36	2,0
	Paros	1	0,1

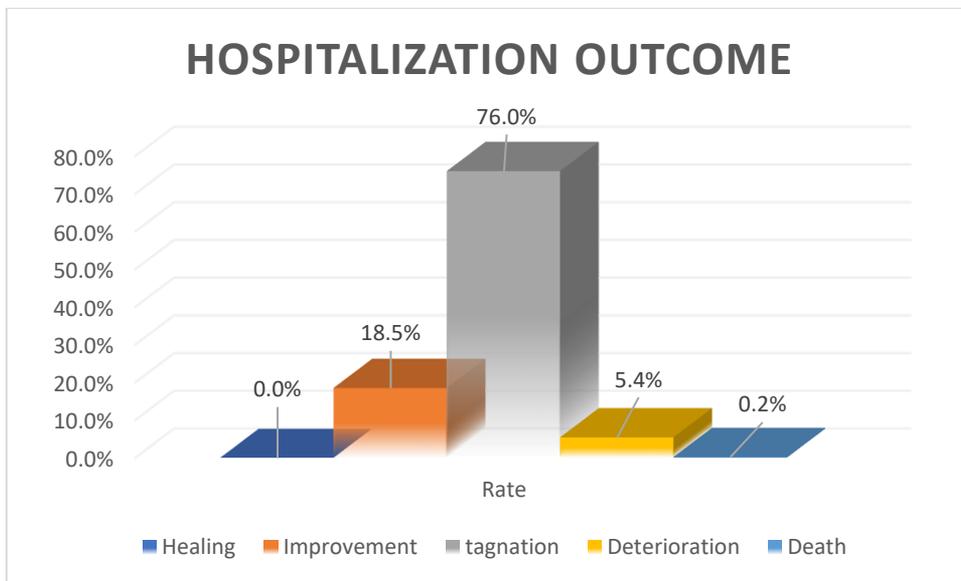
The average age of the patients transferred was 58 years old (SD = 24.6 years). 56.7% of the patients were men, 82.5% were Greeks and 75.9% were residents of Naxos.

From the following graph we observe that, of the patients transferred from the General Hospital-Health Center of Naxos, 22.4% suffer from diseases of the digestive system, 19.5% from diseases of the circulatory system (mainly cardiovascular diseases), while a significant percentage (18.7%), are transferred to other hospitals mainly after accidents and injuries. Also, a significant percentage is transferred suffering from diseases of the respiratory system (10.4%), in order to be treated in pulmonary clinics or units.



**Figure 9: Transfer causes, categorized according to ICD -10**

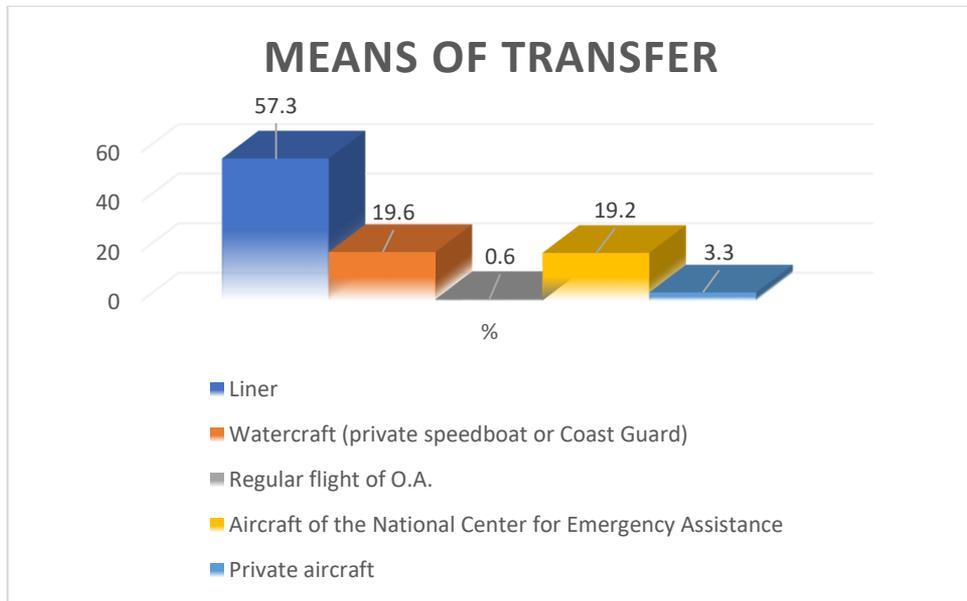
According to the data obtained from the discharges of the patients transferred, 76.0% of the patients were transferred because their condition remained unchanged, 18.5% were transferred to another Healthcare Unit, even though their condition had improved, 5.4% were transferred due to a worse (worsened) condition, while there were some cases of patients who died during transfer (0.2%).



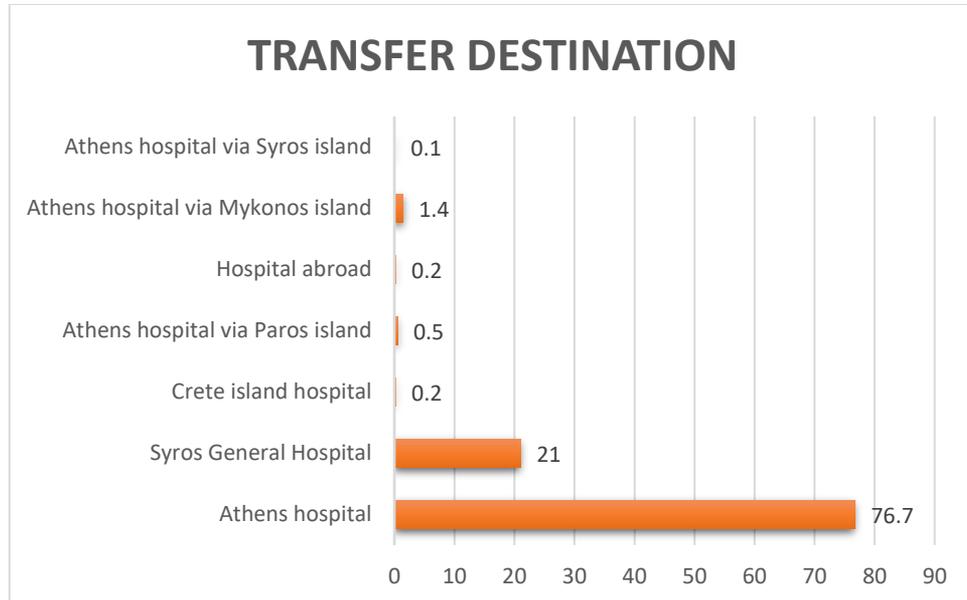
**Figure 10: Outcome on all the cases that visited Naxos General Hospital**

In the following graphs we obtain important information regarding the means of transfer. Of the inter-hospital transfers from the General Hospital of Naxos, most of them took place with the liners at a rate of 57.3%. 19.6% of the transferred were transported by another vessel (speedboat, boat, etc.), while for 23.1% of them a means of flight was chosen. Regarding the air transfers, the National Center for Emergency Assistance performed 19.2% of them, while for 3.9% of them private means were used [private insurance, or Olympic Aviation (OA)].

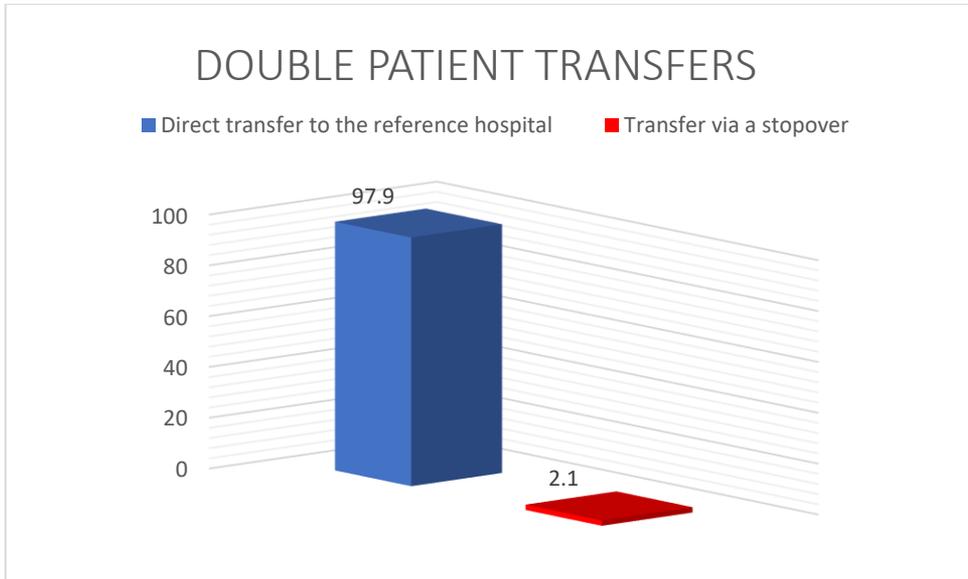
Most cases were transferred to hospitals in Athens (76.7%), while double transfer (via a stopover) was decided in 37 cases (2.1%). 70.3% of the double transfers were made by air through Mykonos.



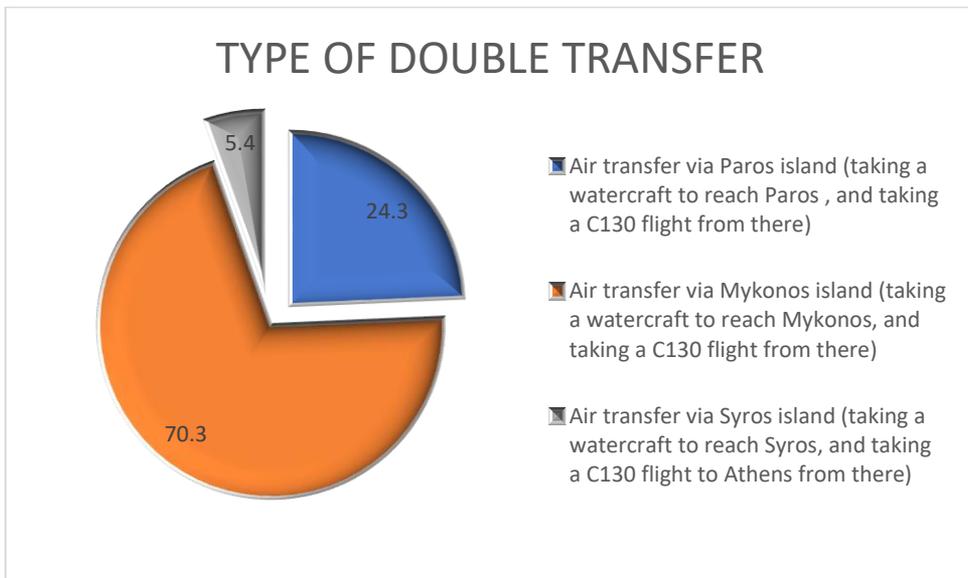
**Figure 11: Means of transfer for cases regarding the General Hospital of Naxos**



**Figure 12: Destination of the transferred patients from the General Hospital of Naxos**



**Figure 13: Double patient transfers from Naxos General Hospital**

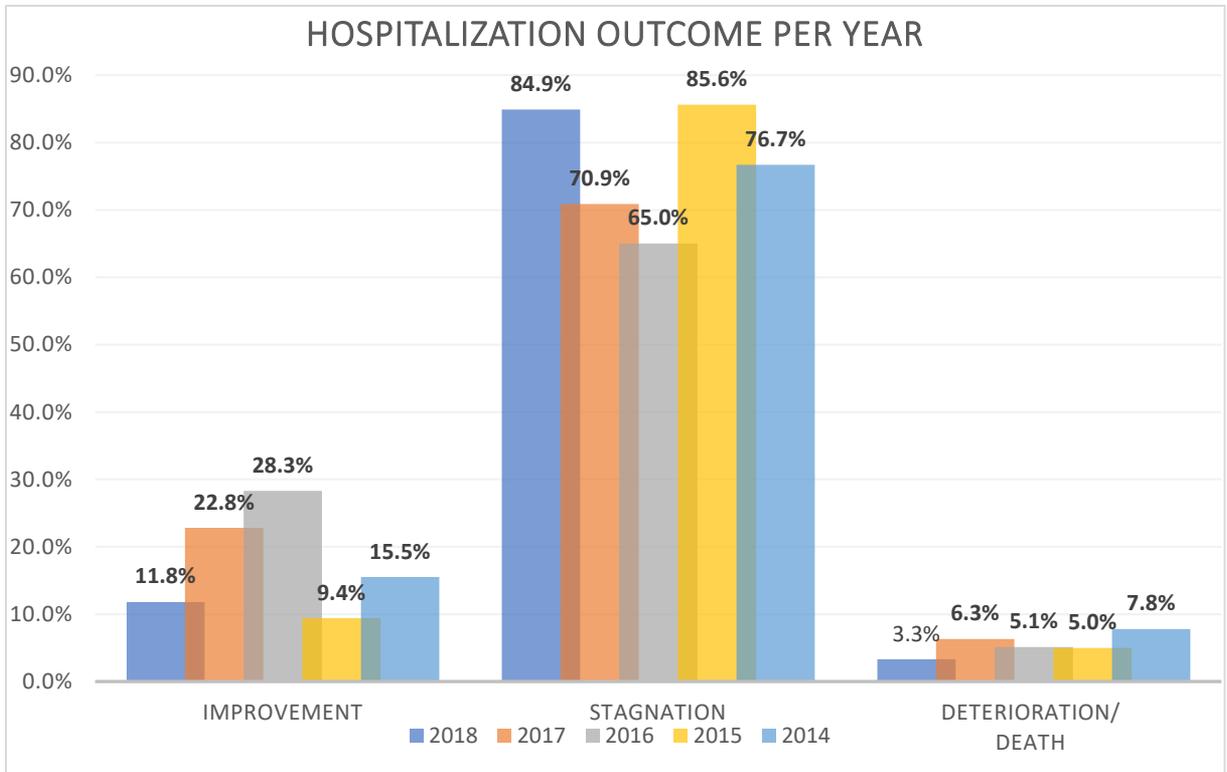


**Figure 14: Type of double transfers from Naxos General Hospital**

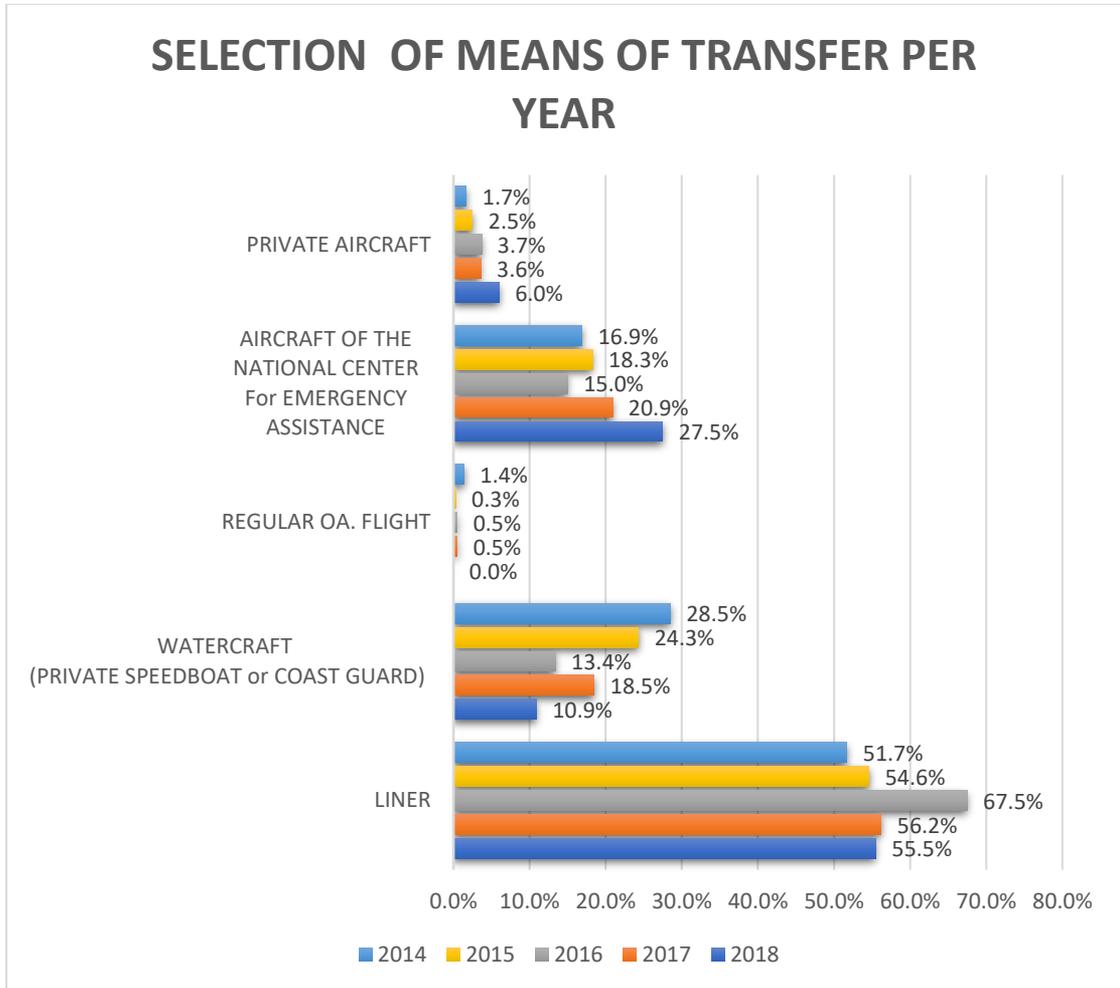
The table below presents the outcome and the data related to the transfers, per year. There is a significant difference in all the data of the table below between the years. Specifically, the percentage of transfers using an Aircraft of the National Center for Emergency Assistance was higher in the years 2017-2018, the percentage of transfers to Syros and Crete was higher in the years 2014-2015 and the percentage of double transfers was lower in 2014. The deterioration / death rate was lower in 2018 and higher in 2014.

**Table 5: Collective data of transfers per year**

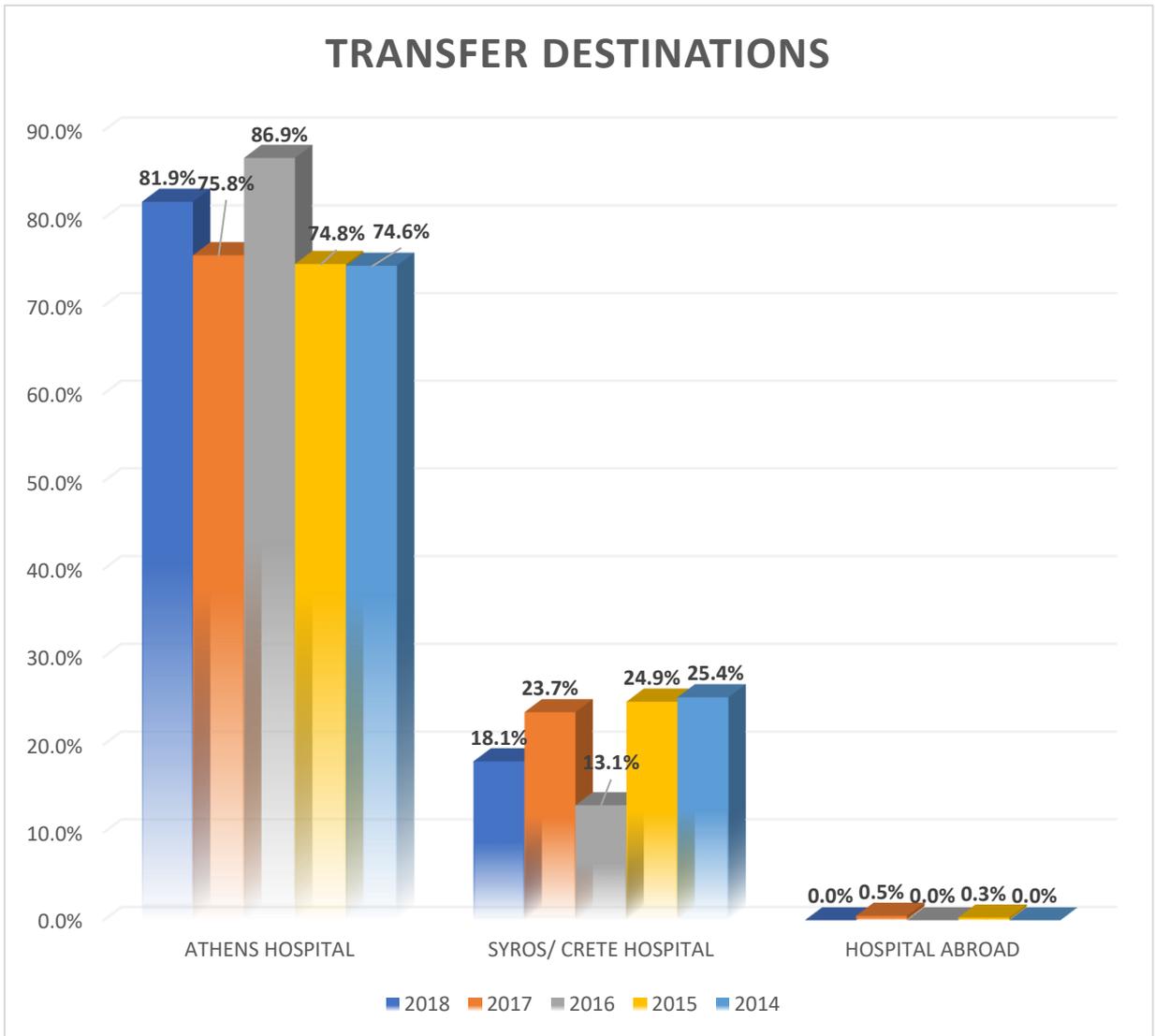
		Year										P Pearson's x <sup>2</sup> test
		2018		2017		2016		2015		2014		
		N	%	N	%	N	%	N	%	N	%	
<b>HOSPITALIZATION OUTCOME*</b>	IMPROVEMENT	25	11,8	72	22,8	72	28,3	19	9,4	32	15,5	<b>&lt;0,001</b>
	STAGNATION	180	84,9	224	70,9	169	66,5	173	85,6	158	76,7	
	DETERIORATION/ DEATH	7	3,3	20	6,3	13	5,1	10	5,0	16	7,8	
<b>MEANS OF TRANSFER</b>	LINER	147	55,5	221	56,2	257	67,5	200	54,6	187	51,7	<b>&lt;0,001<sup>+</sup></b>
	WATERCRAFT (PRIVATE SPEEDBOAT or COAST GUARD)	29	10,9	74	18,8	51	13,4	89	24,3	103	28,5	
	REGULAR OA. FLIGHT	0	0,0	2	0,5	2	0,5	1	0,3	5	1,4	
	AIRCRAFT OF THE NATIONAL CENTER For EMERGENCY ASSISTANCE	73	27,5	82	20,9	57	15,0	67	18,3	61	16,9	
	PRIVATE AIRCRAFT	16	6,0	14	3,6	14	3,7	9	2,5	6	1,7	
<b>DESTINATION OF TRANSFER</b>	ATHENS HOSPITAL	217	81,9	298	75,8	331	86,9	273	74,8	270	74,6	<b>&lt;0,001<sup>+</sup></b>
	SYROS/ CRETE HOSPITAL	48	18,1	93	23,7	50	13,1	91	24,9	92	25,4	
	HOSPITAL ABROAD	0	0,0	2	0,5	0	0,0	1	0,3	0	0,0	
<b>DOUBLE TRANSFER</b>	Yes	261	98,5	385	98,0	374	98,2	365	99,7	345	95,3	<b>0,001</b>
	No	4	1,5	8	2,0	7	1,8	1	0,3	17	4,7	



**Figure 17: Hospitalization outcome per year**



**Figure 15: Selection of means of transfer per year**



**Figure 16: Transfer destinations per year**

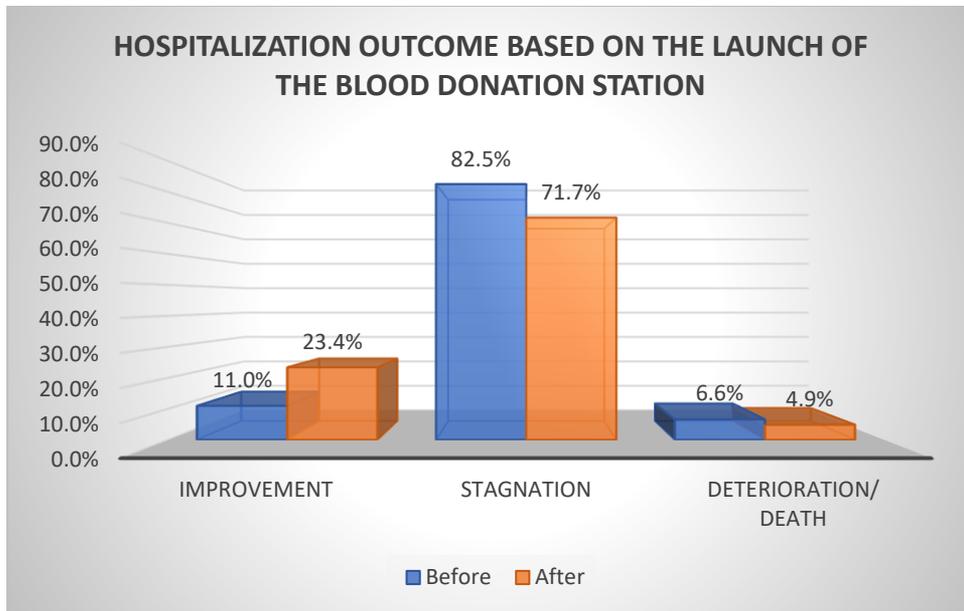
The table below shows the outcomes and data of the transfers, before and after the launch of a blood donation station.

**Table 6: Collective data for transfers per year in relation to the launch of the blood donation station**

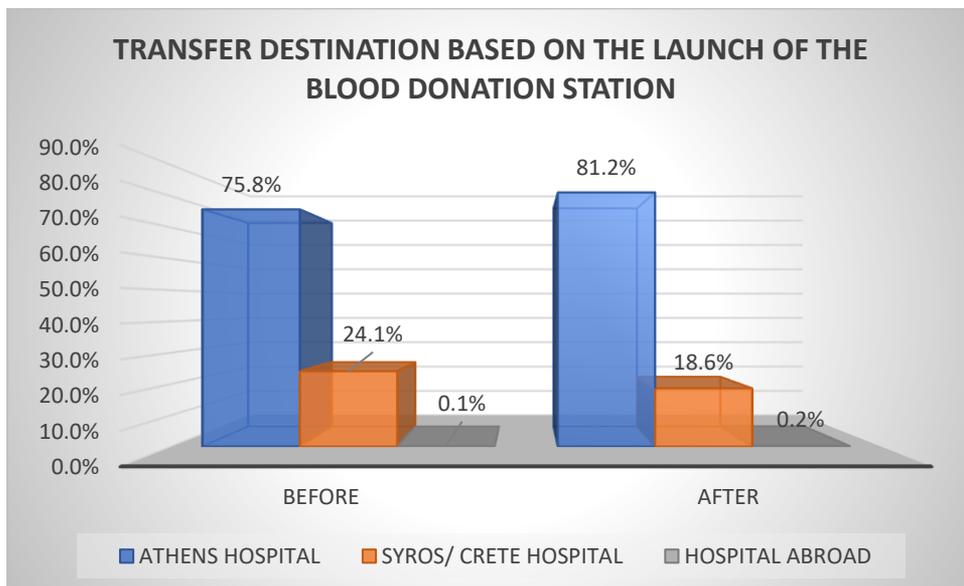
		Launch of blood donation station				P Pearson's $\chi^2$ test
		Before		After		
		N	%	N	%	
HOSPITALIZATION OUTCOME*	IMPROVEMENT	52	11,0	168	23,4	<0,001
	STAGNATION	390	82,5	514	71,7	
	DETERIORATION/ DEATH	31	6,6	35	4,9	
MEANS OF TRANSFER	LINER	453	54,2	559	60,0	<0,001
	WATERCRAFT (PRIVATE SPEEDBOAT or COAST GUARD)	210	25,1	136	14,6	
	REGULAR OA. FLIGHT	7	0,8	3	0,3	
	AIRCRAFT OF THE NATIONAL CENTER For EMERGENCY ASSISTANCE	150	17,9	190	20,4	
	PRIVATE AIRCRAFT	16	1,9	43	4,6	
DESTINATION OF TRANSFER	ATHENS HOSPITAL	633	75,8	756	81,2	0,009+
	SYROS/CRETE HOSPITAL	201	24,1	173	18,6	
	HOSPITAL ABROAD	1	0,1	2	0,2	
DOUBLE TRANSFER	Yes	818	97,8	912	98,0	0,869
	No	18	2,2	19	2,0	

\*only for patients of specific Departments †Fisher's exact test

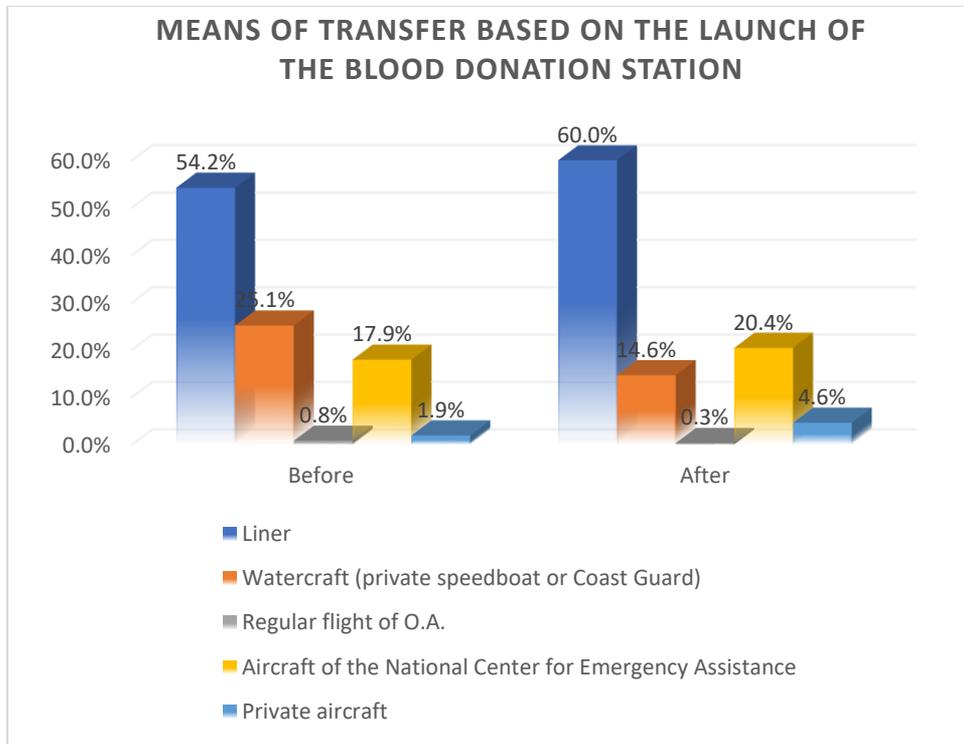
There was a significant difference in the outcome, means and destination of transfer before and after the launch of the blood donation station. In particular, the improvement rate was higher after the launch. The percentage of transfer by boat (private speedboat or Coast Guard) was lower after the launch; the same stands for the percentage of transfers to the hospitals of Syros and Crete.



**Figure 17: Hospitalization outcome based on the launch of the blood donation station**



**Figure 18: Transfer destination based on the launch of the blood donation station**



**Figure 19: Means of transfer based on the launch of the blood donation station**

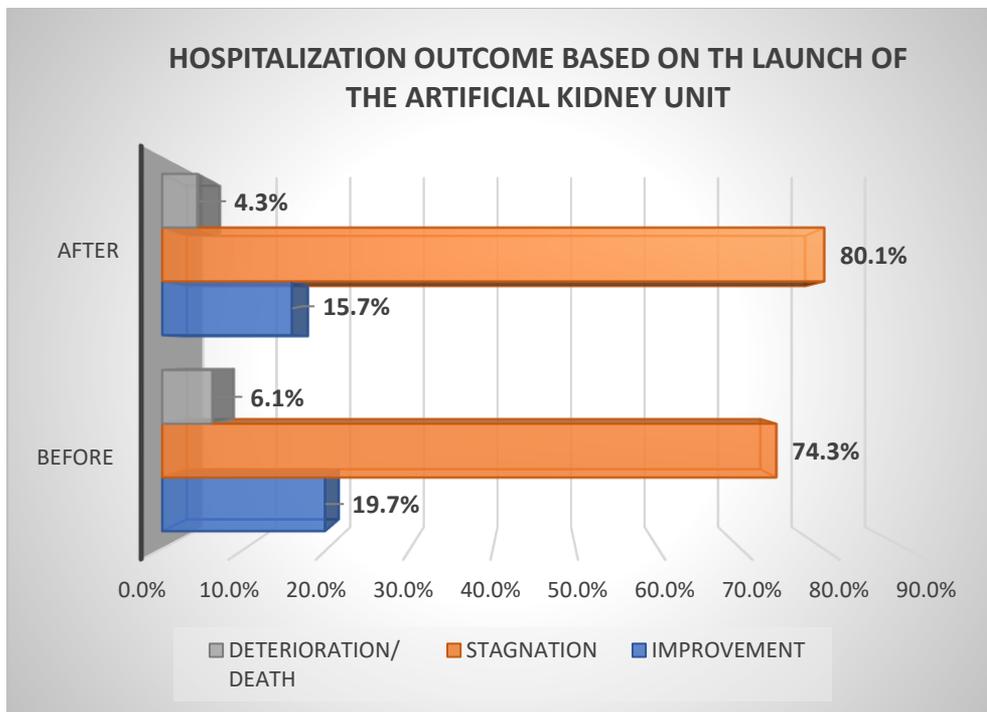
The table below presents the outcome and data related to the transfers, before and after the launch of the Artificial Kidney Unit.

**Table 7: Collective data for transfers per year in relation to the launch of the Artificial Kidney Unit**

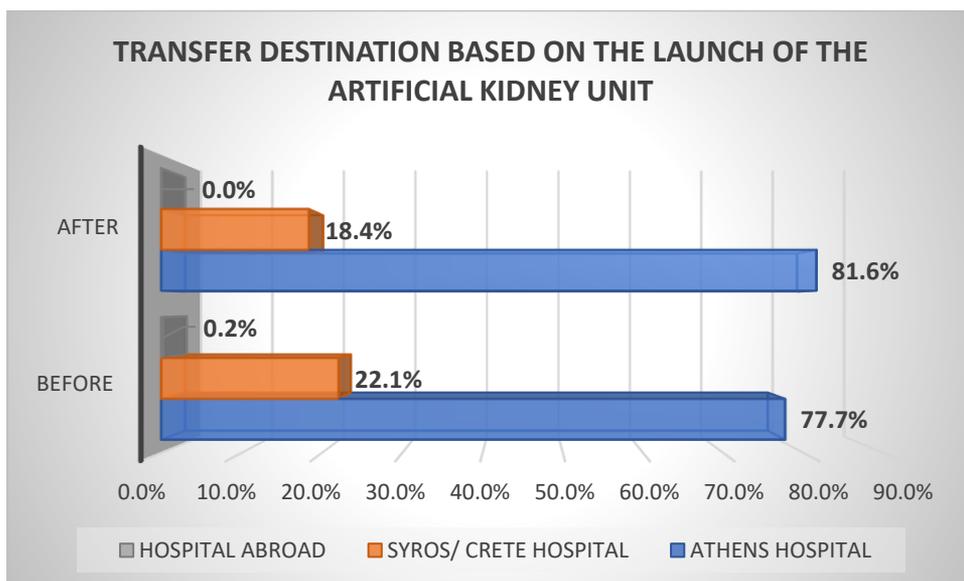
		Launch of the Artificial Kidney Unit				P Pearson's x <sup>2</sup> test
		Before		After		
		N	%	N	%	
<b>HOSPITALIZATION OUTCOME*</b>	IMPROVEMENT	165	19,7	55	15,7	0,096
	STAGNATION	623	74,3	281	80,1	
	DETERIORATION/ DEATH	51	6,1	15	4,3	
<b>MEANS OF TRANSFER</b>	LINER	754	56,6	258	59,4	<0,001
	WATERCRAFT (PRIVATE SPEEDBOAT or COAST GUARD)	288	21,6	58	13,4	
	REGULAR OA. FLIGHT	10	0,8	0	0,0	
	AIRCRAFT OF THE NATIONAL CENTER For EMERGENCY ASSISTANCE	246	18,5	94	21,7	
	PRIVATE AIRCRAFT	35	2,6	24	5,5	
<b>DESTINATION OF TRANSFER</b>	ATHENS HOSPITAL	1035	77,7	354	81,6	0,184 <sup>+</sup>
	SYROS/ CRETE HOSPITAL	294	22,1	80	18,4	
	HOSPITAL ABROAD	3	0,2	0	0,0	
<b>DOUBLE TRANSFER</b>	Yes	1302	97,7	428	98,6	0,233
	No	31	2,3	6	1,4	

\* It only has to do with the patients of specific Departments <sup>+</sup>Fisher's exact test

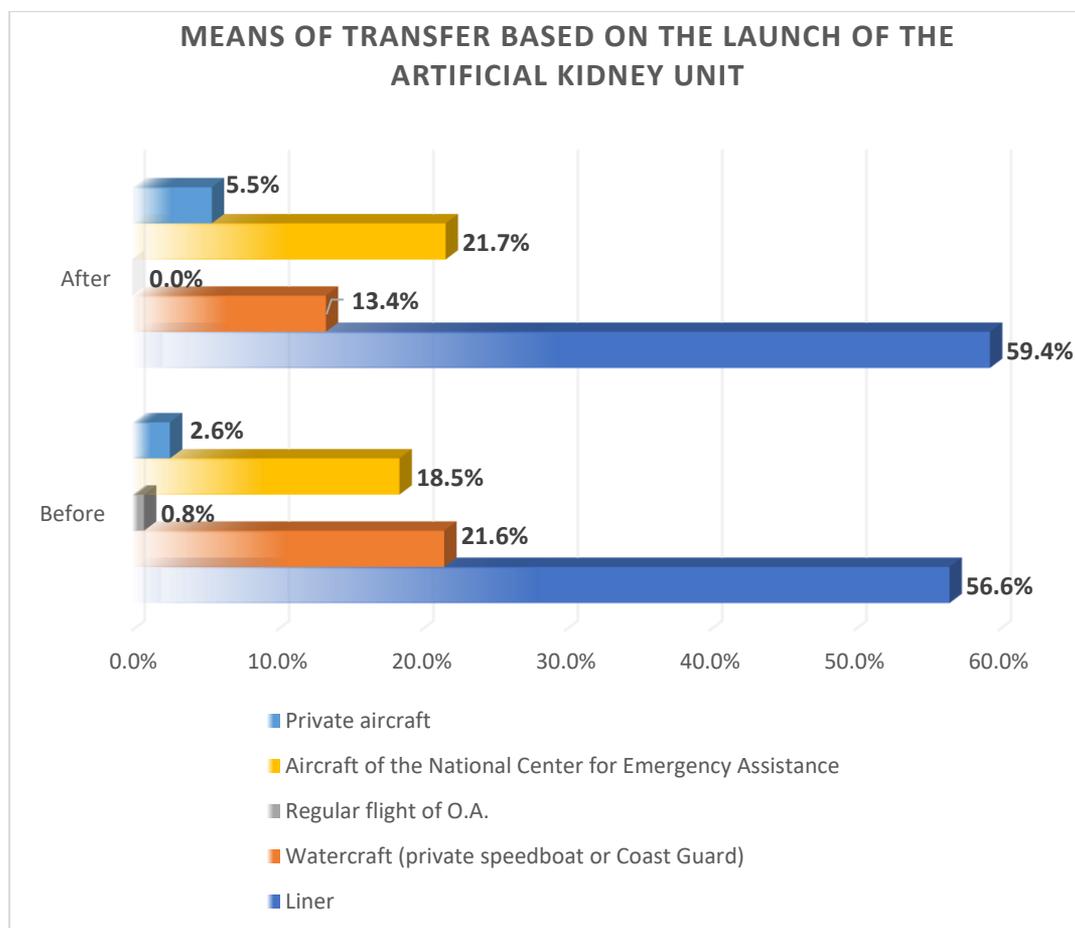
There was a significant difference in the means of transfer before and after the launch of the aforementioned unit. Specifically, the percentage of transfers by watercraft (PRIVATE SPEEDCRAFT or COAST GUARD) was lower after the launch.



**Figure 20: Hospitalization outcome based on the launch of the Artificial Kidney Unit**



**Figure 21: Transfer destination based on the launch of the Artificial Kidney Unit**



**Figure 22: Means of transfer based on the launch of the Artificial Kidney Unit**

## 5. Discussion

The Naxos General Hospital - Health Center is a key Healthcare Unit within an Island Complex, which provides primary and secondary Health Services. Of course, the demand for additional health services is constantly increasing given the lack of health options on the island, as well as the increase in population and high traffic in the summer.

In particular, it is observed that of all the patients who visited Naxos Hospital for a health problem, 1.3% was referred to another nursing facility due to inability of the Hospital to treat them. The highest percentage of transfers was recorded during the summer months and especially in July and August. Similar results are recorded in other papers (Tousis E., 2016), stating that requests for air transfer throughout Greece were increased during the summer months. Also, transfers executed directly from emergency clinics/ units show similar fluctuations throughout the year with

the exception of December, when they show a significant decrease; the same stands for transfers from clinics, being at about the same level throughout the year, except for April, when a decrease is observed.

As observed from the statistical analysis, 48.6% of the patients who visited the General Hospital – Health Center of Naxos, visited doctors of pathological specialty (physician, general practitioner, neurologist, nephrologist, cardiologist, pediatrician, etc.), while 51.4% visited a doctor of a surgical specialty (surgeon, orthopedist, ophthalmologist, dentist, dentist, etc.

Especially regarding the patients with circulatory diseases, those who were transferred to another hospital unit were mainly cardiac patients. About 1/5 of the cardiac cases reported were acute myocardial infarctions (3.8%) and about 1/7 (2.6%), pre-myocardial infarction conditions (angina, unstable angina, etc.). Also, patients with various types of arrhythmias (atrial fibrillation, fluttering, etc.) were transferred, as they could not be treated due to lack of a cardiologist for a long time and accounted for 1/6 of those treated with circulatory system diseases (3.1%). Most patients with acute myocardial infarction were admitted to cardiology units in Athens, in order to undergo coronary angiography and angioplasty, while some were transferred to the cardiology unit of the General Hospital of Syros, which, however, does not have a hemodynamic department. Another reason for transfers related to cardiac cases was the need for a pacemaker installation, especially in patients with complete atrioventricular block or other severe arrhythmias (1.6%).

Similarly, in a study conducted at the Corinth hospital, a large percentage of his cardiac cases were transferred to an Athens hospital, to undergo coronary angiography (Saridi M. et al., 2017).

This proves that some transfers, to wards, or units of another hospital, in order for the patients to undergo specialized examinations and interventions, cannot be avoided by a Healthcare Unit of small, or even medium, capacity.

Regarding the trauma cases received by the Naxos hospital, most of them were fractures that required surgery, namely hip fractures (7.7%) which were slightly less than half of the cases referred to other hospitals, under the category "injuries, poisonings, consequences from external causes", while craniocerebral injuries (skull fractures, hematomas, brain fractures, etc.) and personal skull injuries accounted for 2.6% of transfers.

Similar are findings of a research regarding the Corinth hospital (Saridi M. et al., 2017), which focuses on providing immediate support for the survival of the injured, as well as on the subsequent long neurological rehabilitation.

At an international level, other researches advocate for the immediate treatment, evaluation and screening of the injured in local non-specific trauma centers, before being transferred to specialized centers (Gagliardi AR., N., Athens AB, 2015); however, the data collected were insufficient to show the improvement of the quality of the result/ outcome, due to the implementation of a system of direct evaluation - screening.

It is clear that all these statistics should be a cause for concern and better planning of the network of hospital transfers in island areas or an occasion to strengthen the

existing Healthcare Unit, because these conditions are not just health inequalities but unfavorable situations, unacceptable to exist in a European country. A similar view on the precariousness of the transfer conditions of the seriously ill with an improperly designed vessel/ watercraft is expressed in a master's thesis on the evaluation of health services in small islands of the Cyclades (Dendi A., 2011).

Another important finding is the destination of the transferred patients. Most regular and urgent cases from the General Hospital-Health Center of Naxos in the investigated period were transferred to hospitals in Athens (76.7%). This is despite the fact that Syros could cover most of the needs of the transferees, because on the one hand the intra-Cycladic transport was not frequent and on the other hand the preference of the residents of Naxos and those who accompanied them, leaned towards hospitals in Athens, where they had their own house or a relative's house to stay during the patient hospitalization period. Thus, even when the National Center for Emergency Assistance proposed the choice of the Syros hospital, the patients and their companions, most of the time, reacted strongly and tried by various means to change the decision and succeed in their transfer to a hospital in Athens. Similar findings are recorded in other papers, (Dendi A. 2011; Gandhi B. 2018), where it is noted that, according to reports of doctors serving in small Cycladic islands, the main destination of their cases was Athens and not Syros, due to the reduced accessibility of the hospital, as well as the lack of specialties for special cases (pediatric surgeons, or neurosurgeons etc), or due to the low acceptance and appreciation by the islanders, of the services provided by the regional health structures. Also, (Tountas I., et al. 2009), on the above mentioned selectivity towards hospitals in Athens, conclude that the G.N. Syros has not managed to play a central role for the entire prefecture of Cyclades. Of course, in cases where we are dealing with patients that require a specialized unit or other specialized care, Athens hospitals (public and private) are a one-way street, although Syros is often chosen as a temporary solution (as example in premature birth) and then a second transfer follows (as example transfer of the newborn to a premature unit).

It is evident that a serious parameter for the interconnection of the Healthcare Units, as well as for the definition of those strategies, which will make the transfers the exceptions and not the rule, is the cost. With this as a given and with rough calculations of this serious parameter, we would say that if calculated, that the average cost for a transfer by private speedboat, to the General Hospital of Syros, is about 3.500 euros and the cost for an air transport (depending on the means chosen and the flight time) can exceed 10.000 euros (Mariola A 2012; Government Gazette 2808 / 2013 B).

## **6. Conclusions**

It is easily understood that the costs of the state and insurance companies for transfers are extremely high. On the other hand, the payroll costs of the specialty hospital (surgeons, orthopedists, anesthesiologists, gynecologists) that the system cannot make the most due to its own weaknesses, are high, unprofitable and do not contribute to the professional satisfaction of employees.

Of course, in calculating the cost, the cost borne by the family of the patient who is being treated should not be overlooked. For ship transfers, patients will have to pay the cost of the cabin, for themselves and their attendants (which for the insured can probably be reimbursed by their insurance company afterwards). In addition, for the relatives - companions, there are expenses for accommodation, food and travel abroad, costs of hiring other people for the care of their family, while the cost for the supply of care items, or assistance to their relative is also important. Possible reduction or even loss of family income, from the pause of work of the patient or his companion, or both, should be added to the aforementioned, combined with the psychosocial burden that they all experience together, due to the morbid condition called upon to manage. This would be the decisive step for the drastic reduction of the hospital transfers from the General Hospital – Health Center of Naxos, for the benefit of the inhabitants and for the alleviation of the health inequalities in general, for the wider island region.

## References

- [1] Advanced Trauma Life Support Student Course Manual, 9<sup>th</sup> Edition; Translation by Ms. Eugenia Vasilopoulou (ISBN 978-618-81572-0-0) 2012)
- [2] Australian and New Zealand College of Anaesthetists (ANZCA) (2015) Guidelines for Transport of Critically Ill Patients, <http://www.anzca.edu.au/documents/ps52-2015-guidelines-for-transport-of-critically-i>
- [3] Bourn S., Wijesingha S., Nordmann G. (2018) Transfer of the critically ill adult patient,
- [4] Gagliardi A. Nathens A. (2015) Exploring the characteristics of high-performing hospitals that influence trauma triage and transfer. *Journal of Trauma and Acute Care Surgery*. 78(2):300–305
- [5] Levesque J. F., Harris M., and Russell G. (2013) Patient-centred access to health care: conceptualising access at the interface of health systems and populations: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3610159/>
- [6] Aloizos S., (2014) Patient transfer. Who, When and by what. [api.ning.com/files/8CHlPifuA0JoqmQVihdQt9f-s3f.../08.ppt](http://api.ning.com/files/8CHlPifuA0JoqmQVihdQt9f-s3f.../08.ppt)
- [7] Gandi B. (2018) Provided health services in a small Cyclades island. Evaluation of services by the residents of the area. Thesis. University of Athens <https://pergamos.lib.uoa.gr/uoa/dl/frontend/file/lib/default/data/2778366/theFile>
- [8] Dendi A. (2011) Islands and Health services. Evaluation of the health services in the small island of Cyclades. Thesis. University of Athens.
- [9] National Printing Office (2013) Official Gazette (Official Gazette Issue/ OGI 2808/2013, issue B F.800/278818/S.4345 M.D., Costing of Services Provided and Financial Settlement of Transactions of the Armed Forces Branches
- [10] Mariola A. Transfers and the role of National Center for Emergency Assistance (2012) <https://slideplayer.gr/slide/11417631/>
- [11] Babiniotis, G. (2010) Etymological Dictionary of the Modern Greek Language. History of Words. Lexicology Center Ltd, Athens.
- [12] Pelekis M.P. (2011) Dictionary of Ancient Greek. Savvalas, Athens
- [13] Saridi M., Papakonstantinou E., Damoulianiou M., Panoutsopoulou Th., Papageorgiou G., Toska A. (2017) Needs for the development of care structures as evidenced by data from the annual transfers from a regional hospital. *Hellenic Journal of Nursing Science*, 10(2): 28-35
- [14] Spilanis S. (1996) Regarding a European Policy for Islands [http://www1.aegean.gr/lid/internet/elliniki\\_ekdosi/Dimosieuseis/Politiki-Nision.htm](http://www1.aegean.gr/lid/internet/elliniki_ekdosi/Dimosieuseis/Politiki-Nision.htm)
- [15] Tountas I., et al. (2009) “Health services in Greece, 1996-2006”, p. 30. Papazisis Publications. Αθήνα
- [16] Tousis E. (2016) Air transfers in Greece: Operational and financial dimension. Thesis. University of Piraeus.

[http://dione.lib.unipi.gr/xmlui/bitstream/handle/unipi/9601/Tousis\\_Euthimios.pdf?sequence=1&isAllowed=y](http://dione.lib.unipi.gr/xmlui/bitstream/handle/unipi/9601/Tousis_Euthimios.pdf?sequence=1&isAllowed=y)

[17] Ministerial Decision Nr. F.800/278818/S.4345, OGI 2808/2013 B

[18] URL 1: EKAB, 2020, <https://www.ekab.gr/mesa-diakomidis/>

[19] URL 2: <http://www.privacy-regulation.eu/el/>