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ΕΡΕΥΝΗΤΙΚΗ ΕΡΓΑΣΙΑ

A comprehensive analysis of attendance at health services for the populations of two distinct areas within the regional unit of Heraklion, Crete

OBJECTIVE To record the causes and characteristics of attendance at health services of the populations of two areas in the regional unit of Heraklion in Crete. **METHOD** The study design employed a retrospective cohort study approach. The research was conducted in two rural-type primary health care (PHC) centers located within the prefecture of Heraklion. The sample comprised 3,783 individuals who visited the emergency departments of these two PHC centers during the period spanning August to October 2020. The data was sourced from the comprehensive records maintained by these centres. Statistical analysis was conducted using the Statistical Package for Social Sciences (SPSS), version 26.0. Frequency distributions were generated for patients and visitors in the health care. The Chi-square method was used to determine the frequency of grouped causes according to the ICPC-2 classification system. **RESULTS** The majority of attendees and visitors were over the age of 65. The month with the highest attendance was August. In October, there was an increase in visits from people under the age of 18. The main reason for attendance at both health centers for the entire period of the study was based on ICPC-2, procedures. During October, the frequency of occurrence as reasons for attendance for symptoms-complaints and infections ($p < 0.05$) increased, while the frequency of attendance for injuries ($p < 0.05$) decreased compared to the two other months of the study. **CONCLUSIONS** PHC centres play a substantial and highly effective role in providing care to residents. However, certain improvements are necessary to enhance their overall quality.

Primary health care (PHC) is the first point of contact for an individual within the country's health system, as it is the propylaeum of the health system. It serves as a gateway where the triage of incoming cases takes place, determining whether or not to pass them on to the next, more specialized, levels of care of the health system. In Europe, PHC is mainly composed of general practitioners, but there are differences from country to country, in some cases is also provided by pediatricians, gynecologists, specialist pathologists and cardiologists.¹

PHCs worldwide have adopted five crucial rules for their operation: Accessibility (free access for all); continuity (long-term care by the same expert or unit); 24/7 availability; acceptability (avoiding reactions and aligning with local

customs and morals); and comprehensiveness (covering all three dimensions of health: physical, mental, and social).² In Greece, PHC is provided by the urban and rural health centers (HC), cross-border health centers, regional clinics, hospital outpatient clinics, polyclinics of insurance organizations, legal entities of private law contracted with insurance funds, private doctors contracted with insurance funds, open care centers for the elderly (KAPI), and centers for medical prevention and welfare.

The beginning of the HCs was made with the law 1397/83 which defined their creation as decentralized units of hospitals, with the purpose of providing PHC services. The legal framework stipulates that they offer services of therapeutic and preventive medicine, outpatient hospi-

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Καταγραφή και ανάλυση της προσέλευσης στις υπηρεσίες υγείας για τους πληθυσμούς δύο ξεχωριστών περιοχών της περιφερειακής ενότητας Ηρακλείου Κρήτης

Περίληψη στο τέλος του άρθρου

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talization, family planning, school hygiene, information and prevention through courses (workshops, seminars, etc.) which are given by the health professionals working in it, and participation in medical and epidemiological research. The size of a HC, its staffing (scientific and technical personnel) and its equipment are proportional to the population it covers.³

According to Hellenic Statistical Authority (ELSTAT) data, Greece had 312 primary HC facilities in 2023, with 14 in Crete. The number of medical, nursing, and other personnel was 3,388 (214 in Crete), 5,098 (257 in Crete), and 3,348 (236 in Crete).⁴ PHC aims to provide treatment, prevention, education, health promotion, home care, public health, and patient rehabilitation. However, economic crisis has degraded all services in the last decade, exacerbating organizational, administrative, financial, staffing, equipment, infrastructure, and personal limitations.⁵

Today, HC providers focus on monitoring patients' health, therapeutic intervention, and providing first aid for acute and critical health events. A 2013 study by the School of Nursing of the National and Kapodistrian University of Greece involving participating directors, administrators, and users nationwide revealed that the primary reasons for seeking HC services are prescriptions (42.2%), clinical examinations by doctors (34.2%), diagnostic testing (11.7%), vaccination (3.3%), dental visits (1.1%), and the combination of these (7.5%).⁶

The HCs serve 70,150 people, with Arkalochori serving 21,250 and Agia Varvara serving 48,900. Their coverage areas are Minoa Pediadas, Archanes-Asterousia, Viannos, Gortina, Malevizi, and Heraklion. Arkalochori has 6 clinics: General practice, pediatrics, emergency clinic, gynecology-obstetrics, psychiatry, dentistry, and microbiology-radiology laboratory. Agia Varvara has 13 clinics: General practice, pediatrics, surgery (also as emergency room), gynecology-obstetrics, dentistry, microbiology-radiology laboratory, and dietetic office. Both HCs provide home visits and hospitalization. The purpose of this study was to record the causes and characteristics of attendance at health services of the populations of two areas in the regional unit of Heraklion in Crete.

MATERIAL AND METHOD

Study design, setting and participants

This retrospective case study analyzed data from 3,783 individuals who visited HC of Agia Varvara and Arkalochori in the regional unit of Heraklion in Crete during the period of August to October 2020. The sample included individuals who sought

medical attention at the centers for specific health concerns. Purposive sampling was employed to select the sample based on predetermined criteria.

Data collection

A systematic review of the medical records of the HC of Agia Varvara and Arkalochori was conducted to collect comprehensive data. The records of patients who visited the emergency departments of these HCs served as a primary research resource, facilitating the extraction of demographic information, the medical conditions for which they sought treatment, and the outcomes of their respective cases.

The International Classification of Primary Care (ICPC), 2nd edition (ICPC-2), developed by the ICPC Working Party, revolutionized healthcare classification upon its initial publication in 1987 by the World Organization of National Colleges, Academies, and Academic Associations of General Practitioners/Family Physicians (WONCA). ICPC-2 introduced a single tool that enabled healthcare providers to classify healthcare encounters based on three essential elements: The reason for the visit, the diagnosis or underlying conditions, and the course of care. By clearly delineating the problem from the medical record and linking visits over time, ICPC-2 facilitates the classification of cases from the initial reason for the visit to the conclusion, with a progressively more specific problem, diagnosis, or disease.

ICPC-2 is structured based on a bidirectional approach, comprising 17 chapters organized into body systems on one axis, each assigned a letter code. The second axis features seven identical components, each with rubrics carrying a two-digit numeric code. This structure represents an evolution from the combined structure of the International Classification of Diseases (ICD), which was based on anatomy and etiology. For instance, where the ICD includes separate sections for neoplasms, infections, and disorders, these problems are distributed among the chapters in ICPC based on the organ system to which they belong.⁷

Ethical considerations

This study was performed in line with the principles of the Declaration of Helsinki. Ethical approval was obtained from the Research and Bioethics Committee of the Hellenic Mediterranean University of Heraklion, Crete (ref no 3816/10.12.2020).

Statistical analysis

Statistical analysis of the data was conducted using the Statistical Package for Social Sciences (IBM SPSS), version 26.0. Frequency distributions were generated for the fundamental characteristics of patients and visitors in the healthcare. To determine the frequency (percentage) of grouped causes according to the ICPC-2 classification system, 95% confidence intervals (95% CI) were calculated for comparative purposes. In instances where categorical characteristics exhibited correlation, the Chi-square method was employed. The significance level was established at 0.05.

RESULTS

Characteristics of the attendance

Of the 3,783 patients/visitors of the study's centers, 34.7% with a CI of 33.0–36.3 and $p < 0.05$ were over 65 years old with a mean age of 49.8 ± 25.3 (and a range from 1 to 99 years). Among the three months of the study (August, September, October), a higher visit rate was observed in the month of August at 38.1% with a statistically significant ($p < 0.05$) difference from the other two with September having a rate of 33.4% and October 28.5%. Throughout the study period, the majority of visitors were men at 50.9% with $p > 0.05$ (tab. 1).

In table 2, a comparative distribution of the frequency of visits per month is made according to gender and age. During October, an increase in the frequency of visits of people aged < 18 years is observed with $p = 0.048$ (possibly due to the need to provide certificates or the occurrence of viruses in these ages) in contrast to the other age groups where there is no statistically significant difference in the frequency of visits between the three months. While, the frequency of visits according to gender does not have a statistically significant difference between the three months.

Frequency of reasons for care of patients/visitors in the two health centers

The main reason for attendance at the two HCs of the

Table 1. General characteristics of the attendance of all 3,783 patients/visitors in the two health centers of the study with a legal coverage population of $n = 70,150$ residents.

	n	%	95% CI
<i>Selected time period of 2020</i>			
August	1,443	38.1	36.6–39.7
September	1,262	33.4	31.9–34.9
October	1,078	28.5	27.1–30.0
<i>Sex</i>			
Men	1,924	50.9	49.3–52.5
Women	1,859	49.1	47.5–50.7
<i>Age (years)</i>			
Average age \pm SD (range)	49.8 ± 25.3 (1–99)		48.9–50.7
< 18	520	16.1	14.9–17.4
18–39	610	18.9	17.6–20.3
40–64	980	30.3	28.8–31.9
65+	1,120	34.7	33.0–36.3

CI: Confidence interval, SD: Standard deviation

Table 2. Comparative distribution of monthly frequency of visits by gender and age.

	Selected time period of 2020			p-value
	August (%)	September (%)	October (%)	
<i>Sex</i>				
Men	50.4	51.3	50.9	0.759
Women	49.6	48.7	49.1	
<i>Age (years)</i>				
< 18	15.1	15.6	18.0	0.048
18–39	18.3	18.4	20.1	
40–64	31.5	30.6	28.6	
65+	35.1	35.4	33.3	

Chi-square test (linear regression)

study based on ICPC-2 is procedures with a percentage of 39.7% and 95% CI 38.2–41.3 with a statistically significant difference from the other categories. The general term procedures refer to all services offered to the patient/visitor by the PHC provider and include diagnostic tests, preventive vaccination, issuing certificates for various uses, counselling, etc. Subsequently, the respiratory system and skin account for 11.3% of the causes, with a 95% CI of 10.3–12.4. The musculoskeletal system follows with a percentage of 9.7%, ranging from 8.8 to 10.7. Lastly, diseases categorized as general or unspecified comprise 8.0% of the causes, with a 95% CI of 7.1 to 8.9 (tab. 3). In table 4, a larger grouping of the reasons for visits is made according to ICPC-2 in which procedures are again distinguished as the main reason for attendance with a percentage of 39.7% and 95% CI 38.2–41.3, but without a statistically significant difference with the second reason, which is symptoms, complaints with a percentage of 38.0% and 95% CI 36.4–39.5. Injuries follow with a percentage of 10.5% and 95% CI 9.6–11.5 and infections with a percentage of 7.4% and 95% CI 6.6–8.3. The fifth group of reasons is the category other diagnoses with a percentage of 4.4% and 95% CI 3.7–5.0. And lastly, congenital anomalies with only 0.1% rate and 95% CI 0.01–0.20.

Comparative distribution of reasons for encounters by month

Figure 1 shows a comparative distribution of the frequency of occurrence of the reason for encounter (RFE) included in tests, symptoms-complaints, infections and injuries per month of study. It is observed, therefore, that the percentage of the frequency of tests as a cause of attendance does not have a statistically significant variation

Table 3. Frequency of reasons for care of patients/visitors in the two health centers of the study according to the International Classification of Primary Care, 2nd edition (ICPC-2).

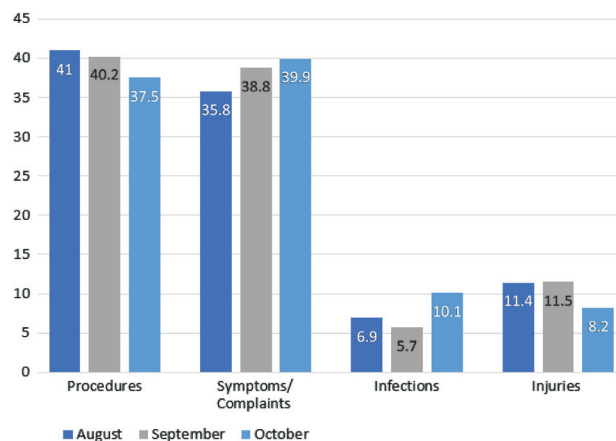
	n	%	95% CI	
Procedures	1,503	39.7	38.2	41.3
A General and unspecified	301	8.0	7.1	8.9
B Blood, blood forming organs and immune mechanism	11	0.3	0.2	0.5
D Digestive	199	5.3	4.6	6.0
F Eye	20	0.5	0.3	0.8
H Ear	69	1.8	1.4	2.3
K Cardiovascular	109	2.9	2.4	3.5
L Musculoskeletal	368	9.7	8.8	10.7
N Neurological	148	3.9	3.3	4.6
P Psychological	37	1.0	0.7	1.3
R Respiratory	428	11.3	10.3	12.4
S Skin	428	11.3	10.3	12.4
T Endocrine/metabolic and nutritional	32	0.8	0.6	1.2
U Urological	115	3.0	2.5	3.6
W Pregnancy, childbearing, family planning	4	0.1	0.0	0.3
X Female genital	8	0.2	0.1	0.4
Y Male genital	3	0.1	0.0	0.2
Z Social problems	0	0.0		

Table 4. Frequency of grouped reasons for care of patients/visitors in the two health centers of the study according to the International Classification of Primary Care, 2nd edition (ICPC-2).

Grouping	n	%	95% CI	
Procedures	1,503	39.7	38.2	41.3
Symptoms/complaints	1,436	38.0	36.4	39.5
Infections	280	7.4	6.6	8.3
Neoplasms	0			
Injuries	398	10.5	9.6	11.5
Congenital anomalies	3	0.1	0.01	0.20
Other diagnoses	165	4.4	3.7	5.0

CI: Confidence interval

between the three months. While, during the month of October it was observed that symptoms-complaints had a higher frequency than the other months with a percentage of 39.9% and $p < 0.05$ compared to 38.8% in September and 35.8% in August. Accordingly, in October, infections had a higher frequency than other months with a percentage of 10.1% and $p < 0.05$ compared to 5.7% in September and 6.9% in August. On the contrary, injuries showed a decrease in

**Figure 1.** Comparative distribution of the frequency of procedures, symptoms-complaints, infections and injuries in the months of August to October 2020 in the two health centers of the study.

frequency as a cause of attendance in October compared to other months with a percentage of 8.2% and $p < 0.05$ compared to 11.5% in September and 11.4% in August.

DISCUSSION

The purpose of the present study was to record the characteristics of individuals and the reasons for attending health services of the populations of two areas (one semi-mountainous and one lowland) in the regional unit of Heraklion, Crete. In summary, it was found that the majority of patients and visitors were over the age of 65. The month with the highest attendance was August. In October, there was an increase in visits from people under the age of 18. This is likely due to the reopening of schools and various extracurricular activities, which resulted in an increase in the need for health certificates and the spread of infections among people of these ages. The main reason for attendance at both HCs for the entire period of the study was based on ICPC-2, procedures. During the month of October, the frequency of occurrence as reasons for attendance for symptoms-complaints and infections ($p < 0.05$) increased, while the frequency of attendance for injuries ($p < 0.05$) decreased compared to the two other months of the study. Urban and rural primary HC facilities (which were the subject of this study) constitute one of the main pillars of PHC. For this reason, it is important to thoroughly investigate their operation and compare them with other countries in order to identify any shortcomings and improve the services provided.

Initially, regarding the characteristics of the patients who attended PHC facilities during the period studied,

the results related to age were the most statistically significant and showed that the majority of people who use PHC facilities were >65 years old, which coincides with the results of a study carried out in England, which showed that older age, gender and other characteristics affect attendance at the corresponding departments of the health units there.⁸ In contrast, in a study conducted in Canada in similar structures, people aged >65 years reached 11.1% of the study sample, while the largest percentage, 23.7%, belonged to those between 18–29 years.⁹ A systematic review, which included studies conducted in the United Kingdom for the period 1995–2019, showed that the most frequent users of similar structures were children <5 years old.¹⁰ Furthermore, a study sample conducted in Germany consisted mainly (54.9%) of patients aged 18–39 years.¹¹ In addition, a retrospective study carried out in the outpatient clinic records of a university hospital in China for the period January 2014–December 2020 showed that the largest percentage of visits (60.02%) was made by people aged 20–44.¹² Finally, in a sample of research in PHC structures in Brazil, adults >65 years old are a minority with a percentage of 19.2% of the total.¹³

Then, comparing the months under study, August was the one with the highest attendance, which is due to the increase in the population of the areas of responsibility of the PHC facilities under investigation during the summer months due to tourists/visitors as well as the increase in outdoor activities. Similar results emerge from the study conducted in eastern Turkey, with injuries dominating in the months of July (16.5%) and August (18.5%).¹⁴ Furthermore, in a study by Neskorumna-Jędrzejczak conducted in Poland, showed that higher temperatures are associated with an increase in insect bites and that meteorological and geophysical factors can directly influence the descriptive epidemiology of animal-related injuries.¹⁵

Regarding the increase in visits by individuals aged <18 years in October, a possible reason is the need to provide them with health certificates for the purpose of using them for participation in sports and school activities at the beginning of the new academic-school year. Additionally, the beginning of the outbreak of viral infections (seasonal influenza, gastroenteritis, etc.) occurs during this time, with younger people being more vulnerable to its spread.¹⁶ Also, in a retrospective study conducted in the archives of a primary care center in Ireland, one of the months with the highest attendance was October.¹⁷

Regarding the causes, the present study highlighted procedures as the main one, in contrast to the systematic review mentioned above which highlighted respiratory,¹⁰

but also in a study carried out in Germany and the main cause was the skin category, based on ICPC-2, with 24.2%.¹¹ While, in another study conducted in Germany and comparing the populations and reasons for visiting urban and rural health centers, it appeared that the most common reason for rural ones was ear-related diseases with odds ratio (OR) 1.42 and $p=0.046$.¹⁸ In a study conducted in China and mentioned above, it was found that the main reason for outpatient visits in people aged <45 years was respiratory-related diseases.¹² Respiratory was also the main reason in another study conducted in 14 community health centers in China with a rate of 47.9%.¹⁹ This is also consistent with the results of a qualitative review of 15 studies conducted in health centers in Trinidad and Tobago and showing respiratory-related diseases as the most common reason for their visits.²⁰ A study conducted in similar structures in Norway and covering the years 2014–2017, as well as in the aforementioned retrospective study, showed “General and unspecified” as the most frequent reason for attendance, based on ICPC-2, amounting to 21.2% and 31.55%, respectively.^{16,21} General and unspecified were the first cause in the aforementioned study conducted in Brazil with a percentage of 46%.¹³

In October (10.1%), a statistically significant change in the percentage of infections and symptoms-complaints is observed compared to the other months. A possible explanation for this is the change in weather conditions, which favors the outbreak of infections in all ages, as well as the opening of schools, which may contribute to their spread among students and, by extension, the people who interact with them (parents, teachers, etc.). This hypothesis is confirmed by the results of a study conducted in England between September 30, 2013 and July 19, 2015, which showed that during the month of September, the month when children return to school, cases of flu and colds began to increase. Furthermore, during the month of October, there was an exponential increase in cases of exposure to respiratory pathogens (influenza, human metapneumovirus) and symptoms (cough, fever, sore throat, etc.).¹⁶

Finally, analyzing the cases related to injuries, a decrease was observed in October with a statistically significant difference from the other months. This decrease might be due to the fact that during the autumn-winter months outdoor activities are limited due to weather conditions. Therefore, the chances of causing an accident are also reduced.

During the research process, several limitations arose, hindering the acquisition of crucial information and impacting the research outcomes. The primary impediment

was the prevailing circumstances during the research period (winter-spring 2021). Consequently, the utilization of questionnaires was deemed infeasible, as it would have yielded more specific results regarding the prevalent diseases in the two populations, particularly the contribution of the two HCs to their treatment. Furthermore, the absence of a centralized registry that systematically reports the epidemiological characteristics of patients posed a significant challenge. As each doctor primarily manages their own patients, the majority of whom lack a registry, the only available study tool was the emergency room registry books of the two HCs. These records, while valuable, cannot provide an accurate epidemiological profile of the residents, as individuals seek medical attention for various reasons, including accidents and injuries. Consequently, a rudimentary epidemiological picture of the two regions was obtained, enabling indirect conclusions about the potential dominant diseases.

In conclusion, PHC is the basis for a comprehensive and properly organized health system. Therefore, the better it is designed, the more efficient the health system will be. One of the most important providers of PHC is PHC. The dominant diseases suffered by the residents of the study areas were not clearly visible in the research. However, it

seems that in both areas, diseases related to the respiratory system prevail. Nevertheless, the most frequent causes of attendance at PHCs, based on ICPC-2, were procedures and respiratory, followed by skin in equal order. The main environmental factor that affects these causes was the weather. Based on the results of the research, the contribution of PHCs to the care of the populations was evaluated. Specifically, out of the 3,783 patients, 511 (13.5%) were referred to other structures, demonstrating that the two HCs contribute satisfactorily to meeting the needs of these populations. However, the percentage is not considered low and indicates the need to upgrade the HCs in terms of equipment and personnel.

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ΠΕΡΙΛΗΨΗ

Καταγραφή και ανάλυση της προσέλευσης στις υπηρεσίες υγείας για τους πληθυσμούς δύο ξεχωριστών περιοχών της περιφερειακής ενότητας Ηρακλείου Κρήτης

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ΣΚΟΠΟΣ Η καταγραφή των αιτιών και των χαρακτηριστικών προσέλευσης στις υπηρεσίες υγείας των πληθυσμών δύο περιοχών της περιφερειακής ενότητας Ηρακλείου Κρήτης. **ΥΛΙΚΟ-ΜΕΘΟΔΟΣ** Για τον σχεδιασμό της μελέτης χρησιμοποιήθηκε μια αναδρομική προσέγγιση μελέτης κοόρτης. Η έρευνα διεξήχθη σε δύο κέντρα πρωτοβάθμιας φροντίδας υγείας (ΠΦΥ) αγροτικού τύπου που βρίσκονται εντός του νομού Ηρακλείου. Το δείγμα περιλάμβανε 3.783 άτομα, που επισκέφθηκαν τα τμήματα επειγόντων περιστατικών αυτών των δύο κέντρων ΠΦΥ κατά τη χρονική περίοδο από τον Αύγουστο έως τον Οκτώβριο του 2020. Τα δεδομένα προέρχονταν από τα ολοκληρωμένα αρχεία που τηρούν τα εν λόγω κέντρα. Η στατιστική ανάλυση διεξήχθη με το λογισμικό πρόγραμμα Statistical Package for Social Sciences (SPSS), έκδοση 26.0. Δημιουργήθηκαν κατανομές συχνότητας για ασθενείς και επισκέπτες στο κέντρο υγείας. Η μέθοδος χ^2 χρησιμοποιήθηκε για τον προσδιορισμό της συχνότητας των ομαδοποιημένων αιτιών σύμφωνα με το σύστημα ταξινόμησης ICPC-2. **ΑΠΟΤΕΛΕΣΜΑΤΑ** Η πλειοψηφία των παρευρισκομένων και των επισκεπτών ήταν ηλικίας >65 ετών. Ο μήνας με τη μεγαλύτερη προσέλευση ήταν ο Αύγουστος. Τον Οκτώβριο σημειώθηκε αύξηση στις επισκέψεις από άτομα ηλικίας <18 ετών. Ο κύριος λόγος παρακολούθησης και στα δύο κέντρα για όλη την περίοδο της μελέτης βασίστηκε στο ICPC-2, διαδικασίες (procedures). Τον Οκτώβριο, η συχνότητα προσέλευσης για συμπτώματα-

παράπονα και λοιμώξεις ($p < 0,05$) αυξήθηκε, ενώ η συχνότητα προσέλευσης για τραυματισμούς ($p < 0,05$) μειώθηκε σε σχέση με τους άλλους δύο μήνες της μελέτης. **ΣΥΜΠΕΡΑΣΜΑΤΑ** Τα κέντρα πρωτοβάθμιας φροντίδας υγείας διαδραματίζουν ουσιαστικό και εξαιρετικά αποτελεσματικό ρόλο στην παροχή φροντίδας στους κατοίκους. Ωστόσο, απαιτούνται ορισμένες βελτιώσεις για τη βελτιστοποίηση της συνολικής ποιότητάς τους.

Λέξεις ευρητηρίου: Αγροτικό, Αίτια προσέλευσης, Επείγοντα περιστατικά, Κέντρα υγείας, Πρωτοβάθμια φροντίδα υγείας

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