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THYROID CANCER CASES IN PATIENTS AGED 85+ IN LVIV REGION, UKRAINE (1991-2024): A RETROSPECTIVE ANALYSIS BASED ON REGIONAL CANCER REGISTRY DATA

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Abstract

Aim. To analyze thyroid cancer cases among individuals over 85 years old in the Lviv region (Ukraine) during 1991-2024.
Materials and methods. Our retrospective study analyzed thyroid cancer cases among 22 patients aged 85+ living in urban and rural areas of the Lviv region (Ukraine) within 34 years based on the Cancer Registry of Lviv Oncology Regional Treatment and Diagnostic Center.
Results. As of January 1, 2022, the population of the Lviv region was 2.478 million, including 37,757 individuals aged over 85. The database registered 6,499 long-lived patients with cancer and 22 patients (19 women and three men) with thyroid cancer aged 85+ (median age 87.5 ± 2.3 years). The male-to-female ratio was 1 to 6.3. We analyzed demographics, cancer stage, treatment approaches, and survival outcomes. All cases were diagnosed by ultrasound because biopsy was considered too risky for the elderly due to the high risk of life-threatening complications. Three women had a history of multiple myeloma, malignant neoplasm of the cervix uteri, and breast cancer. Thyroid cancer developed from 13 to 33 years after the women were diagnosed with the first tumor. Urban residents over 85 were more frequently diagnosed with thyroid cancer than rural residents ($p = 0.045$), likely due to better diagnostic access in cities. Survival was generally poor (median 3 months), with men ($p = 0.029$) showing better outcomes than women. Untreated patients sometimes exhibited unexpectedly longer survival, possibly reflecting biological or care-related differences.
Conclusions. This study highlights the increasing diagnosis of thyroid cancer in the elderly over 85, particularly among women, with a very short survival time averaging 2-3 months. This research underscores the importance of balancing treatment decisions with quality of life for elderly patients and emphasizes the need for targeted approaches to manage thyroid cancer in the aging population.

Keywords: **elderly over 85, thyroid cancer, survival, Ukraine, age**

INTRODUCTION

Thyroid cancer, although more common in younger people, can also affect long-lived individuals, especially those over 85. Although thyroid cancer is relatively rare among older people, the risk increases with age, especially in women [1-3]. The majority of thyroid cancer cases in older adults involve papillary thyroid carcinoma, which is the most common and least aggressive form of thyroid cancer [1, 4]. In a population of long-lived women, the incidence of thyroid cancer is notably lower compared to younger cohorts. Yet, it still represents a significant health concern, especially considering the aging global population.

The incidence and mortality of thyroid cancer are increasing in both China and G20 countries. This increasing trend may be due to both genetic factors and environmental influences. These results highlight the need for enhanced prevention, control, and treatment measures and indicate the importance of global cooperation in combating the problem of thyroid cancer [2, 5].

Italian scientists note that elderly patients with thyroid cancer have a worse prognosis compared to younger patients due to a higher frequency of more aggressive histotypes, as well as a significant delay in diagnosis in older individuals [6]. At the same time, it is

noted that the incidence of thyroid cancer is increasing in many countries, mainly due to overdiagnosis [7].

In Ukraine, thyroid cancer is among the ten most common types of cancer among women. In the age group 30-44, this pathology ranks third (9.6%), and in the age group 45-64, it ranks seventh (3.5%) [8]. The heterogeneous gender, age, and regional distribution of this pathology indicates the multifactorial nature and relevance of studying this problem among the population of Ukraine [9].

Thyroid cancer is typically considered a slow-growing and treatable malignancy, especially in younger individuals. In the literature, there are isolated cases of thyroid cancer in patients aged over 80 years and very little information about the same diagnosis in long-lived individuals [10]. As a rule, the articles write about older people over 65, 75, or 80 years [6, 11-13]. However, in elderly populations, particularly those aged 85 years and older, the prognosis and management of thyroid cancer can be significantly more complex [14-16].

AIM

The aim of our study is to examine thyroid cancer cases in individuals aged 85 and older from the Lviv region (Ukraine) between 1991 and 2024, considering factors such as residence location, treatment type, cancer stage, and survival duration following diagnosis.

MATERIALS AND METHODS

Our retrospective research covered the period from January 1, 1991, to December 31, 2024, focusing on individuals born between 1901 and 1934. We compiled data from 6,499 cancer cases involving elderly patients, which were organized into a database (Cancer Registry of Lviv Oncology Regional Treatment and Diagnostic Center, Ukraine). The population of the Lviv region as of January 1, 2022, was 2,478 million people. There were 37,757 people over 85 living in the Lviv region, of whom 51.3% lived in the city and 48.7% in rural villages. The database included information on demographics, cancer stages, treatment approaches, and survival outcomes. Statistical analyses were performed using the non-parametric Mann–Whitney U test, Microsoft Excel 2013. Descriptive statistics were applied to summarize demographic and clinical characteristics.

The Ethics Committee approval (from March 19, 2025, No. 03/25-3) includes access to retrospective anonymized cancer registry data to analyze thyroid cancer incidence in patients by age, sex, diagnosis, treatment, etc. Because the study is retrospective and uses only anonymized data, written informed consent from patients was not required in accordance with the policy of the institution's ethics committee.

RESULTS

The study included 22 patients aged 85+ (median age 87.5±2.3 years) with thyroid cancer. Their demographic details, cancer type and stage, life expectancy, and history of other cancers were analyzed. The patients were residents of both urban and rural areas, and the diagnoses of thyroid cancer were confirmed according to ICD-10 codes. The database registered 4,076 long-lived women over this 34-year period, of whom 19 (0.47%) were women with thyroid cancer and three (0.08%) were men with thyroid cancer among 2,423 long-lived men. In the Lviv region (Ukraine), the male-to-female ratio over 34 years with thyroid cancer was 1 to 6.3. As follows, thyroid cancer appears to disproportionately affect women than men in the Lviv region of Ukraine.

In the Lviv region population, the sex ratio between men and women over 85 is 1:3.2, meaning there are about 3.2 women for every man. However, in the Lviv region, the ratio is even more skewed among thyroid cancer patients, at 1:6.3, suggesting that women are more than six times more likely to develop thyroid cancer than men over the 34 years studied. Lviv region is endemic for thyroid gland diseases due to the natural iodine deficiency in the soil and water, low consumption of iodized products, and insufficient iodine deficiency prevention among the population. This suggests that environmental, genetic, or health-related factors specific to the Lviv region may contribute to the higher relative prevalence among women there. The p-value for the difference in sex ratio between the general population over the age of 85 in the Lviv region (1:3.2) and thyroid cancer patients (1:6.3) is approximately 0.00002. This is highly statistically significant ($p<0.05$), indicating that the observed difference is unlikely to be random and may reflect real regional or demographic factors.

In the general population of the Lviv region aged over 85, the distribution between urban and rural residents is nearly even (51.3% urban, 48.7% rural). However, in our cohort of 22 long-lived individuals with thyroid cancer, a higher proportion lived in cities (16, 72.7%) compared to villages (6, 27.3%). A significantly lower proportion of rural residents was observed in the thyroid cancer cohort aged 85 and older (27.3%) compared to the general population of the same age group in the Lviv region (48.7%), with a p-value of 0.045. This suggests that urban residency may be associated with a higher likelihood of thyroid cancer diagnosis among the elderly. A significantly higher proportion of urban residents was observed in the thyroid cancer cohort aged 85 and older (72.7%) compared to the general population of the same age group in the Lviv region (51.3%), with a p-value of 0.0446, indicating a potential association between urban residency and thyroid cancer diagnosis in the elderly.

Among the 19 women with thyroid cancer, three (15.8%) patients had a history of previously diagnosed malignant tumors in other organs. The summarized data are presented in Table 1.

Table 1

Clinical Characteristics and Survival of Long-Lived Women with Thyroid and Non-Thyroid Cancers in the Lviv Region (Ukraine), 1991-2024

NO	Place of residence	Prior non-thyroid cancer	ICD-10	Age of prior non-thyroid cancer	Diagnosis	ICD-10	Stage	Age	Survival, months
1	Town	Multiple myeloma	C90	72	Malignant neoplasm of the thyroid gland	C73	I	85	2
2	Village	Malignant neoplasm of the *cervix uteri*	C53	67	Papillary thyroid cancer	C73	IV	86	2
3	Town	Breast cancer at age 61	C50	61	Malignant neoplasm of the thyroid gland	C73	NA	94	1

This study shows a clear trend of shorter survival times in older women diagnosed with thyroid cancer, especially those aged 85 years and older. All three long-lived women with thyroid cancer, as well as other cancers, had their thyroid cancer diagnosed through ultrasound. Since, in each case, the doctors believed that for an elderly woman, the decision to have a biopsy would negatively affect her overall health and shorten her life expectancy, a biopsy was not performed. These long-lived women were not given surgery or radioactive iodine therapy for their thyroid cancer. The correctness of this decision was later confirmed by the fact that the women lived only one to two months after being diagnosed with thyroid cancer, with an average survival of 1.7 months. Below are the details of each case:

• **Case 1**: An 85-year-old woman from an urban area, diagnosed with stage I malignant neoplasm of the thyroid gland, lived only two months after diagnosis. Thyroid cancer developed 13 years after the woman was diagnosed with multiple myeloma. While stage I thyroid cancer typically has a good prognosis in younger patients, the elderly often experience poorer outcomes due to frailty and limited tolerance for aggressive treatments.

• **Case 2**: An 86-year-old patient from a village, diagnosed with advanced stage IV papillary thyroid cancer, lived for just two months after diagnosis. Thyroid cancer developed 19 years after the woman was diagnosed with the first tumor, a malignant neoplasm of the *cervix uteri*. Advanced-stage thyroid cancer has a much lower survival rate, and this is particularly concerning in elderly patients, who may not be able to undergo necessary treatments like surgery, radioactive iodine therapy, or chemotherapy.

• **Case 3**: A 94-year-old woman, diagnosed with thyroid cancer, lived in a small town in the foothills of the Carpathians. Thyroid cancer developed 33 years after the woman was diagnosed with the first tumor. She had a history of breast cancer diagnosed at age 61. She lived for only one month after the thyroid cancer diagnosis. While thyroid and breast cancers arise from different tissues, patients with a history of one malignancy may have an increased risk of developing a second primary malignancy due to shared genetic, hormonal, or environmental factors. This case illustrates the challenge of managing multiple cancers in elderly patients, where the cumulative effect of multiple malignancies often leads to significantly reduced survival.

Survival of 22 long-lived patients – 19 (86.4%) women and 3 (13.6%) men over 85 years of age after diagnosis of thyroid cancer, ranged from 1 to 33 months (median survival was three months). Among 19 long-lived women with thyroid cancer, only 8 (42.1%) survived for more than one month after diagnosis. The oldest was a 95-year-old rural woman diagnosed with thyroid cancer, and she survived only one month after diagnosis. Seven long-lived women with thyroid cancer, aged 85 to 94, received varying treatment modalities, including surgery, hormonal therapy, and radiation. Survival ranged from 1 to 17 months (Table 2). The longest survival (17 months) was observed in an 85-year-old woman from a town who received hormonal therapy only. In contrast, women who underwent surgery – alone or in combination – tended to have shorter survival times (1-3 months), particularly at stage IV. The data suggest that age, treatment type, and possibly cancer stage may all influence survival, though the small sample size and missing staging data limit definitive conclusions.

Table 2

Type of Treatment and Survival of Long-Lived Women with Thyroid Cancer in the Lviv Region (Ukraine), 1991-2024

NO	Age	Sex	Village/town	Stage	Type of treatment	Survival, months
1	85	Woman	Town	NA	Hormonal	17
2	85	Woman	Village		Radiation	2
3	86	Woman	Village	IV	Surgery, hormonal, radiation	3
4	86	Woman	Town	IV	Surgery	2
5	87	Woman	Village	II	Hormonal	2
6	87	Woman	Town	IV	Surgery	1
7	94	Woman	Town	NA	Surgery	1

There were three men among the patients with thyroid cancer aged over 85 years, all residing in towns. Two patients underwent surgery – one at stage II and one at stage IV – both surviving nine months. The third patient, at stage III, received no treatment and had the longest survival of 33 months. This suggests that while surgical intervention was associated with moderate survival, untreated cases may sometimes exhibit unexpectedly prolonged outcomes, potentially reflecting differences in tumor biology, comorbidities, or patient resilience.

To evaluate potential differences in survival between patient groups over 85 years of age with thyroid cancer, we compared survival times (in months) between men and women who received various types of treatment. The Mann–Whitney U test revealed a statistically significant difference in survival times between long-lived men and women with thyroid cancer in the Lviv region from 1991 to 2024 ($U = 0.0$, $p = 0.0286$). Men had consistently higher survival times (nine months each), while women's survival times were more varied but generally lower (ranging from one to 17 months). This suggests that men in this small sample tended to survive longer after treatment compared to women. The results should be interpreted cautiously due to the small sample sizes.

In the absence of treatment, twelve long-lived women with thyroid cancer exhibit markedly poor survival outcomes, with a median survival time of approximately two months. The data indicate a high early mortality rate, with the majority of patients succumbing within the first 1-2 months. Although two women demonstrated prolonged survival of up to eleven months, these cases are outliers within an otherwise rapidly progressive disease course.

The untreated man had the longest survival (33 months), exceeding all treated or untreated women and treated men. Surgery in men resulted in moderate survival (nine months), better than surgery outcomes in women. Hormonal therapy in women showed better results (up to 17 months) compared to surgery or radiation. The untreated women had generally short survival, with rare exceptions (10-11 months), suggesting thyroid cancer is more aggressive or less biologically favorable in women without treatment. These findings may indicate sex-based biological differences, differences in tumor behavior, or variability in response to treatment. However, the small sample size limits statistical conclusions.

We believe that socioeconomic changes in Ukraine during 1991-2024 significantly influenced the detection and registration of thyroid cancer in individuals aged 85-95. Over this 34-year period, only 22 cases were recorded: one case in 11 separate years, two cases in four years, a peak of three cases in 2014, and no cases at all in 14 years. Several factors help explain these fluctuations. First, the 1990s were marked by economic crisis and a sharp decline in the healthcare system. Access to diagnostic services – especially for the elderly – was limited. As a result, underdiagnosis and underreporting were likely, due to both restricted access to care and limited capacity for detection. Second, while the Chornobyl disaster occurred before the study period, and the patients were already adults in 1986, long-term radiation effects may have contributed to background trends in thyroid pathology during later years.

Third, from the 2000s onward, the introduction of modern diagnostics, including ultrasound and fine-needle aspiration biopsy, as well as the development of oncology services, improved detection rates. This could explain the rise in identified cases in certain years, notably in 2014. That year also marked the onset of the war in Donbas and the annexation of Crimea, introducing healthcare system strain. The peak of three cases in 2014 may reflect improved detection, a statistical anomaly due to the small sample size, or broader social instability. Following 2017, healthcare reform – including the launch of the eHealth system and improved access to family doctors – enhanced cancer registration and elderly patient care. However, the COVID-19 pandemic (2020-2021) strained the healthcare system and limited medical visits, especially among older adults. This likely contributed to reduced case detection, with no thyroid cancer cases registered in this age group in 2020.

In conclusion, the variability in thyroid cancer incidence among those aged 85-95 from 1991 to 2024 is closely tied to socioeconomic shifts, healthcare reforms, diagnostic accessibility, and systemic healthcare changes.

DISCUSSION

Older patients are generally more frail, and the elderly have a diminished ability to recover from surgeries or tolerate aggressive treatments such as chemotherapy or radiation therapy. Even in early-stage thyroid cancer, the general frailty associated with aging can result in poor survival outcomes [12, 13].

The stage of thyroid cancer at diagnosis plays a significant role in determining survival outcomes. Women with stage IV thyroid cancer (Case 2) had a particularly poor prognosis, likely due to the aggressive nature of the disease and the limited ability to perform curative treatments. At the same time, the woman with stage I cancer (Case 1) survived for only two months at the age of 85, though still for merely a short period due to age-related factors.

The presence of prior cancers can probably significantly complicate the prognosis of subsequent malignancies. Perhaps, previous cancer treatments, the cumulative effect of aging, and other health conditions contribute to shorter survival. Multiple cancers can exhaust the body's resources and prevent effective treatment of new malignancies [17, 18]. In very elderly

individuals, the risks associated with surgery and other interventions may outweigh the potential benefits. The decision to treat thyroid cancer in elderly patients is complicated by the need to balance cancer treatment with quality of life and the risks of further compromising overall health [19]. For many elderly women, treatment options may be limited, and palliative care may be the most appropriate course of action.

Elderly individuals may have more difficulty accessing healthcare and are less likely to undergo routine screenings or early interventions. As a result, thyroid cancer may often be diagnosed at more advanced stages, when treatment options are more limited and the disease has spread beyond the thyroid [20-22]. Our study found a higher incidence of thyroid cancer in older women (19 cases) compared to three men, which is consistent with global data [23].

This difference may be explained by hormonal differences, particularly estrogen, which may affect thyroid cell growth. Hormonal changes, long-term use of hormone replacement therapy, may influence the development and progression of thyroid cancer in older women. The higher incidence of thyroid cancer in older women in Ukraine – similar to trends observed in many other countries – can be attributed to several factors. These include hormonal differences, a higher prevalence of autoimmune thyroid diseases among women, and the long-term effects of the Chornobyl disaster. Ukraine was significantly exposed to radiation following the Chornobyl accident in 1986, and this exposure may have affected men and women differently, particularly depending on their age at the time of the incident and subsequent hormonal changes [24]. Additionally, women in Ukraine tend to live longer than men, resulting in a larger proportion of elderly women in the population, which may also contribute to a higher reported incidence of thyroid cancer among them.

Diagnosing thyroid cancer in women over 85 can be challenging for several reasons, one of which is the less frequent use of diagnostic tests in this age group. Healthcare providers may avoid invasive procedures like biopsies due to the high risk of complications or concerns about the patient's overall health. A biopsy involves obtaining tissue from the thyroid gland for further analysis, which is essential for confirming cancer. However, in elderly patients, such procedures can be risky due to underlying medical conditions or a weakened immune system.

Another challenge is the presence of vague or non-specific symptoms, as thyroid cancer in older patients may present with only mild or subtle signs. Signs such as voice changes, neck pain, or difficulty swallowing can be mistaken for other less serious conditions common in older adults. This can lead to thyroid cancer being undiagnosed at an early stage. Thirdly, interpreting diagnostic results can be challenging, as older patients often have other thyroid conditions, such as benign nodules or cysts, which may mimic malignancy on ultrasound. This makes an accurate diagnosis difficult without additional procedures like a biopsy or more intensive monitoring. Fourthly, there is a lower likelihood of early detection. Early-stage thyroid cancer often lacks prominent symptoms, and without regular monitoring, which is more common in younger individuals, it may go unnoticed in older adults. In case of older individuals, the likelihood of regular medical check-ups, including cancer screening, is significantly reduced. Therefore, due to these factors, thyroid cancer in patients over 85 is often diagnosed late or remains undetected due to the lack of active medical intervention, including biopsy.

The study on thyroid cancer in elderly women from the Lviv region provides valuable insights, but there are several potential shortcomings and limitations that should be acknowledged. A potential drawback of our study is the use of the cancer registry without accounting for other pathologies in long-lived individuals. Despite these limitations, the study provides valuable information about thyroid cancer in centenarians, and future research directions should focus on increasing the sample size.

CONCLUSIONS

1. Thyroid cancer in individuals aged over 85 in the Lviv region (Ukraine) is rare but disproportionately affects women, with a highly significant female-to-male ratio of 6.3:1 among patients, compared to the general population sex ratio of 3.2:1. This may reflect both biological vulnerability and differences in healthcare access or detection practices between sexes.

2. Urban residents over 85 were significantly more likely to be diagnosed with thyroid cancer than rural residents ($p = 0.045$), suggesting that improved access to diagnostic services in cities plays a role in cancer detection among the elderly.

3. Survival outcomes in elderly thyroid cancer patients were generally poor, with a median survival of three months. Men tended to have better outcomes than women ($p = 0.029$), and those who did not undergo treatment had variable but sometimes unexpectedly prolonged survival, indicating possible biological or care-related differences.

4. Fluctuations in case detection from 1991 to 2024 were closely tied to Ukraine's socioeconomic and healthcare changes, including post-Soviet healthcare collapse, advancements in diagnostic methods, armed conflict, healthcare reforms, and the COVID-19 pandemic. These external factors likely influenced not the true incidence, but rather the capacity to detect and record thyroid cancer cases in this age group.

Prospects for further research. Thyroid cancer in the elderly poses significant diagnostic and therapeutic challenges, and this retrospective study highlights the markedly high mortality rate among those aged 85 years and older, with an average survival of only 2-3 months after diagnosis. Further research is needed to improve early detection methods, refine treatment protocols, and develop strategies for treating thyroid cancer in the elderly.

COMPLIANCE WITH ETHICAL REQUIREMENTS

This study was approved by the Ethics Committee of the Lviv Oncologic Regional Treatment and Diagnostic Center, Ukraine (Approval No. 03/25-3, dated March 19, 2025).

Individual patient consent was not required, as the study was based on retrospective analysis of anonymized data collected for public health and epidemiological purposes. The registry contains no personally identifiable information, and all data were fully de-identified prior to researcher access. The institutional ethics committee confirmed that the use of such anonymized data does not pose any risk to individual privacy and complies with national and international ethical standards for research involving human subjects. Therefore, the requirement for informed consent from each patient was waived.

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All authors involved in this study have declared no conflict of interest. The authors declare that the research was conducted in the absence of any commercial or financial relationships. This article is not funded or supported by a research grant.

AUTHOR CONTRIBUTIONS

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Резюме

ВИПАДКИ РАКУ ЩИТОПОДІБНОЇ ЗАЛОЗИ У ПАЦІЄНТІВ ВІКОМ 85+ РОКІВ У ЛЬВІВСЬКІЙ ОБЛАСТІ, УКРАЇНА (1991-2024): РЕТРОСПЕКТИВНИЙ АНАЛІЗ НА ОСНОВІ ДАНИХ РЕГІОНАЛЬНОГО КАНЦЕРРЕЄСТРУ

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Мета. Проаналізувати випадки раку щитоподібної залози серед людей старше 85 років у Львівській області (Україна) протягом 1991-2024 рр.

Матеріали та методи. У нашому ретроспективному дослідженні за період 34 роки проаналізовано випадки раку щитоподібної залози серед 22 пацієнтів віком 85+, які проживають у Львівської області (Україна), на основі даних канцерреєстру Львівського онкологічного регіонального лікувально-діагностичного центру.

Результати. Станом на 1 січня 2022 року населення Львівської області становило 2,478 мільйона, включаючи 37 757 осіб віком старших 85 років. У базі даних канцерреєстру зареєстровано 6 499 довгожителів із злоякісними пухлинами, зокрема 22 пацієнтів (19 жінок та троє чоловіків) з раком щитоподібної залози віком 85+ (медіанний вік 87,5±2,3 роки).

Співвідношення чоловіків та жінок становило 1 до 6,3. Було проаналізовано демографічні показники, стадію раку, методи лікування та результати виживання. Усі випадки були діагностовані за допомогою ультразвукового дослідження, оскільки біопсія вважалася занадто ризикованою для людей похилого віку через високий ризик ускладнень, що загрожують життю. Три жінки мали в анамнезі множинну мієлому, злоякісне новоутворення шийки матки та рак грудної залози. Рак щитоподібної залози розвинувся через 13-33 роки після того, як у жінок діагностували першу пухлину. У міських жителів старших 85 років рак щитоподібної залози діагностували частіше, ніж у сільських жителів (p = 0,045), ймовірно, через кращий доступ до діагностики в містах. Виживання було загалом низьким (медіана 3 місяці), причому чоловіки (p=0,029) показували кращі результати, ніж жінки. Пацієнти, які не отримували лікування, іноді мали несподівано довше виживання, що, можливо, відображає біологічні особливості пробанда або відмінності пов'язані з доглядом.

Висновки. Це дослідження виявляє зростання діагностики раку щитоподібної залози серед людей віком понад 85 років, особливо жінок, із дуже короткою середньою тривалістю виживання – лише 2-3 місяці. Отримані результати підкреслюють необхідність ретельного балансування рішень щодо лікування з урахуванням якості життя пацієнтів похилого віку та важливість розробки цілеспрямованих терапевтичних підходів для цієї групи.

Ключові слова: **пацієнти старші 85 років, рак щитоподібної залози, виживання, Україна, вік**

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