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Applying a "medical deserts" lens to cancer care services in the North-West region of Romania from 2009 to 2022 – a mixed-methods analysis

Monica Georgiana Brînzac[1,2,3*], Marius Ionuț Ungureanu[1,3] and Cătălin Ovidiu Baba[1]

Abstract

Background Medical deserts pose significant challenges to healthcare systems worldwide, leading to unmet healthcare needs and exacerbated health issues, particularly in underserved regions.

Methods This study aims to characterise cancer care services in the North-West region of Romania through the lens of medical desertification, employing a mixed-methods approach.

Quantitative analysis – descriptive statistics – of secondary data from the Activity of Healthcare Units reports from 2009 to 2022, along with qualitative data – thematic analysis – from interviews with cancer patients and healthcare professionals, were employed to uncover the current state of cancer care in Romania.

Results The qualitative analysis highlighted the prevalence of medical deserts in oncology, with inadequate human resources, facility deficiencies, prolonged waiting times, high costs, and socio-cultural barriers hindering access to cancer care.

Opportunities for action include revising treatment protocols, enhancing palliative care, implementing prevention strategies, promoting collaboration among healthcare professionals, and digitalising the healthcare system. However, challenges persist, including a shortage of oncology specialists, geographical disparities in cancer prevalence, and limited access to advanced treatment modalities in rural areas.

Conclusions Addressing medical deserts in cancer care requires comprehensive approaches, including strategic resource allocation, workforce development, infrastructure investments, access to innovative treatments, and digital health technologies. Collaboration among policymakers, healthcare providers, and communities is crucial to mitigating medical deserts and improving cancer outcomes.

Despite limitations, this study provides valuable insights into cancer care services and underscores the need for concerted efforts to overcome medical desertification and ensure equitable access to high-quality cancer care.

*Correspondence:
Monica Georgiana Brînzac
monica.brinzac@publichealth.ro
Full list of author information is available at the end of the article

Key points

- The study reveals medical deserts in Romania's North-West region, marked by limited access to oncology facilities and healthcare professionals due to various barriers such as inadequate resources, long waiting times, and high costs.
- Addressing medical desertification requires revising treatment protocols, enhancing palliative care, implementing prevention strategies, and embracing digital health. Despite challenges like specialist shortages and geographic disparities, collaborative efforts can improve cancer care accessibility and quality.
- Strategic resource allocation, workforce development, and digitalization are essential for successfully mitigating medical deserts in oncology and ensuring equitable access to high-quality cancer care across the region.

Keywords Medical deserts, Health systems, Access to healthcare, Oncology, Cancer care, Quality of care, Human resources in health, Mixed-methods

Text box 1. Contributions to the literature

- Medical deserts are a pervasive public health problem, affecting cancer care, and posing a significant threat to health system objectives
- Due to medical deserts present in the Romanian health system, Romanians' access to cancer care is inequitable
- The drivers of medical deserts need to be addressed effectively, in order to avoid the toll of worsening health outcomes, increased costs, and less healthy years of life

Background

Medical deserts are defined as "areas where population healthcare needs are unmet partially or totally due to lack of adequate access or improper quality of healthcare services caused by (i) insufficient human resources in health (HRH) or (ii) facilities, (iii) long waiting times, (iv) disproportionate high costs of services or (v) other socio-cultural barriers" [1]. They are an increasingly significant shortcoming of health systems, while still underresearched. As such, they represent instances when people's needs for health are unmet, leading to exacerbated health issues stemming from delayed access to health and care services [1–7].

In 2021, across 26 OECD countries, an average of 2.3% of the population reported unmet medical care needs due to factors like cost, distance, or waiting times. However, Romania exceeded the average, with over 5% of the population experiencing unmet care needs, with cost reported as the main reason. This contrasts with countries like Germany, the Netherlands, Austria, and the Czech Republic, where fewer than 0.5% reported unmet medical care needs. Significant socio-economic gaps exist, as individuals in Romania's lowest income quintile are three times as likely to report unmet medical care needs compared to their counterparts in the highest quintile [8]. This income-based gradient is consistent across all 26 OECD countries. In Romania, the difference between the lowest and highest income quintiles is over 6 percentage points, highlighting the challenge of addressing disparities in healthcare access [8].

For cancer care, the timing of diagnosis, as well as constant access to healthcare services after a diagnosis, are of the utmost importance [9]. Thus, medical deserts directly impact the quality of life and life expectancy of individuals and oncological patients [10, 11].

The consequences of postponed cancer diagnoses and treatments are substantial, impacting both patients and healthcare systems significantly [9, 12]. When surgical treatment for common cancers is delayed, the associated mortality risk rises by approximately 7%. Additionally, a four-week delay in administering chemotherapy or radiotherapy increases the risk of death by as much as 13% [13].

Access to cancer care

National context

Romania faces significant challenges in cancer care, with high treatable mortality rates and the second leading cause of death being cancer, driven by late diagnoses, limited access to advanced treatments, and the highest cervical cancer mortality rate in the EU despite recent health policies and initiatives.

Cancer was the second leading cause of death at the European (EU) level in 2020, with a total of 1.16 million deaths, and a share of 22,5% of the total number of deaths [14]. In Romania, it was the second leading cause of death [15], with lung cancer the most frequent cause of cancer death, followed by colorectal cancer and breast cancer [16]. In Romania, treatable mortality was the highest among the 26 OECD countries, alongside countries like Mexico, South Africa and Bulgaria. The primary contributors to high treatable mortality were ischaemic heart diseases, stroke, and certain treatable cancers, including breast, colorectal, and cervix uteri cancers [8].

Cancer-related hospitalisations experienced a decrease at the national level by 32% in 2020 and 11% in 2021, compared to 2019, which might be explained to a certain extent by the COVID-19 pandemic. In contrast, cancer day-care saw a 6% decline in 2020 but rebounded with a 15% increase in 2021 [17].

The delivery of cancer care services in Romania is below the EU average and the patient

outcomes are worse. Survival rates for treatable cancers over five years fall considerably below the EU mean, encompassing instances like prostate cancer (77% compared to the EU's 87%) and breast cancer (75% compared to the EU's 82%). In 2019, the all-cancer mortality rate in Romania was 184.5/100,000 for men and 107.5/100,000 for women [16] and in 2020, 16,7% of all deaths were caused by cancer. Cancer is the second leading cause of death [15], with lung cancer the most frequent cause of cancer death in Romania, followed by colorectal cancer and breast cancer [16]. In 2018, Romania registered the third highest rate of preventable deaths among European Union member states, underscoring the imperative to design and implement initiatives for health promotion and disease prevention [8, 17, 18]. The primary contributors to these preventable deaths include conditions like ischaemic heart disease, lung cancer, and diseases linked to alcohol consumption. Notably, Romania's mortality rates stemming from treatable causes surpass the EU average by more than double, indicating significant room for improvement [8, 16–18]. In 2016, Romania accounted for 15% of all the EU cervix cancer deaths, despite a decreasing trend in mortality rates over the years [17]. While the survival rate for lung cancer has improved from 8% in 2009 to 11% in 2014, it remains notably lower than the EU average of 15% [18].

According to recent analyses, the country faces significant obstacles in cancer care, including the lack of national screening programs, leading to late diagnoses, and limited access to advanced treatments such as targeted therapies or immunotherapy drugs, cancer mortality being a significant public health issue. Romania exhibits one of the lowest estimated five-year survival rates, lowest cancer incidence, alongside the largest projected increase in the number of cases in EU [17, 19]. Despite the fact that the national mandatory state insurance covers the costs for cancer diagnosis, treatment, and follow-up, patients are still experiencing difficulties in accessing the services [17]. The consequences of postponed cancer diagnoses and treatments are substantial, impacting both patients and healthcare systems significantly. When surgical treatment for common cancers is delayed, the associated mortality risk rises by approximately 7%. Additionally, a four-week delay in administering chemotherapy or radiotherapy increases the risk of death by as much as 13% [13]. The phenomenon of "missing patients" within cancer care, evident through reduced hospital stays and a decrease in cancer-related procedures, is frequently linked to fewer new patients entering the cancer care pathway due to delayed diagnoses. Approximately 30% to 50% of cancer cases are avoidable, and mortality rates can be diminished by implementing earlier detection methods and delivering treatments that are both timely and efficacious [13].

Evident shortcomings in the Romanian healthcare system's ability to deliver timely and appropriate care to the population are highlighted by the elevated rates of treatable deaths caused by conditions such as ischaemic heart disease (which is considered both preventable and treatable), stroke, pneumonia, and colorectal cancer, indicating towards suboptimal access to healthcare and medical deserts [18].

As the issues Romania faces are not unique to it, the depth and urgency were acknowledged at the EU level and in 2021 the European Commission launched Europe's Beating Cancer Plan, which focuses on several key areas: (i) primary prevention targeting significant risk factors, (ii) early detection through improved access and quality of screenings, (iii) enhancing diagnosis and treatment for integrated cancer care, and (iv) improving quality of life for cancer patients and survivors [13].

Romania, aligned to European standards, has implemented several policies and laws to combat cancer. In 2016, the Ministry of Health (MoH) launched the First Integrated Multiannual National Plan for Cancer Control, focusing on the promotion of preventive behaviours [20]. Recently, the National Plan to Prevent and Combat Cancer was promulgated, which outlines multiple approaches for prevention, early diagnosis, and treatment of cancer [21, 22] through law 293/03.11.2022, without any normative acts [23]. Additionally, in 2022, Romania enacted key legislation to enhance the lives of cancer survivors [17]. Furthermore, Romania has implemented significant tobacco control measures, including substantial increases in tobacco taxes (28% in 2009 and 16% in 2010), resulting in higher cigarette prices. Since 2011, excise tax increases have averaged less than 5% annually [24]. The country has a minimum legal smoking age of 18 and prohibits sales to minors. Key regulatory achievements include aligning with EU regulations, the Tobacco Product Directive, and a 2016 ban on smoking in closed public spaces [25].

Because Romania has the highest mortality rate for cervical cancer in the EU, with about 11 deaths per 100,000 women annually, compared to the EU average of 3.4 [26]

as of December 2023, Romania provides free HPV vaccines to boys and girls aged 11–18 and offers 50% reimbursement for women aged 19–45 [27].

Regional focus

Situated in the northwestern quadrant of Romania, the Nord-Vest development region, colloquially known as the Northwest region, comprises a conglomerate of counties: Bihor, Bistrița-Năsăud, Cluj, Maramureș, Satu Mare, and Sălaj [28]. This geographic expanse is defined by distinctive topographical attributes:

- Predominantly nestled within the Carpathian Mountains, with the Apuseni Mountains flanking its western reaches and the Rodna Mountains adorning its northeastern periphery [28].
- Exhibiting elevational gradients ranging from approximately 200 m in the low-lying plains to in excess of 1,800 m in the mountainous enclaves [28].

Encompassing a territorial expanse spanning approximately 34,160 square kilometres, equivalent to roughly 14.33% of Romania's landmass, the Northwest Region shares its borders with adjacent regions [28]:

- Ukraine to the north.
- North-East Region to the east.
- Central Region and West Region to the south.
- Hungary to the west.

As per the 2021 census data, Romania's populace stands at approximately 19,892,812 individuals, with the Northwest region harbouring a populace numbering around 2.6 million [28]. Salient demographic features include:

- Cluj-Napoca emerges as the foremost urban hub, boasting a population exceeding 300,000 denizens, followed by Oradea, Baia Mare, and Satu Mare.
- Reflective of its heterogeneous cultural tapestry, the region manifests a variegated ethnic fabric, wherein Romanians constitute approximately 75% of the populace, accompanied by an 18% Hungarian demographic quotient, alongside lesser proportions of Roma, Ukrainians, Germans, and other ethnic cohorts [28].
- Population density tends to be more concentrated within urban precincts, tapering off in the rustic hinterlands of the mountainous terrain [28].
- Analogous to broader demographic trends witnessed across Romania, the Northwest region has grappled with demographic attrition in recent decades, principally attributable to diminished fertility rates and emigration, particularly among the younger demographic cohort [28].

Methods

Aim of the paper

This research article aims to characterize cancer care in the North-West region of Romania in terms of HRH, facilities, waiting times, costs of services and other socio-cultural barriers by making use of the medical deserts definition [1].

Research question

How can cancer care services from the North-West region of Romania be characterized by using the medical desert definition?

Study design

This study follows a cross-sectional mixed methods design.

We used quantitative secondary data, from the Activity of Healthcare Units report from 2009 to 2022, elaborated by the National Institute of Statistics, and qualitative data collected through Zoom or phone call interviews with cancer patients and healthcare professionals, using an interview guide specially developed for the present study.

The inclusion criteria for professionals were: (i) fluent Romanian speakers, and (ii) medical doctors (MD), nurses and/or pharmacists, working in outpatient or inpatient care in the North-West region of Romania in oncology, radiotherapy, family-medicine, psycho-oncology, or palliative care.

The inclusion criteria for patients were: (i) to be at least 18 years old, (ii) fluent Romanian speakers, (iii) underwent cancer screening, diagnosis, treatment, supportive or survivorship care in the last five years in the North-West region of Romania.

The exclusion criteria for both groups were all individuals that did not respect the inclusion criteria.

We reached information saturation – obtaining no new information – after 15 interviews. The sampling unit was the individual – either the patient, senior MD, resident MD, nurse or pharmacist.

We used a combination of convenience – individuals who were already known to the research team and their network – and snowballing sampling– interview participants were asked to make a referral of one or more individuals respecting the inclusion criteria from their social network who may be interested in participating in the study [29]. The first person interviewed in each group was a convenient sample, and from that person, a referral was asked for another possible participant.

Data collection and analysis

Qualitative data collection commenced on 29.11.2023 and ended on 06.02.2024. To ensure consistency and reliability of the data collected, all interviews were conducted by one person, trained in "Protecting Human Research Participants" by the National Institutes of Health (NIH) Office of Extramural Research.

Appointments for the interviews were made in advance, with an interval of approximately 60 min. The interviews were audio recorded and a notebook was available to take notes or/and write questions that emerged from the answers [30].

The research team developed a semi-structured interview guide with open-ended questions, drawing upon existing literature to inform the data collection process. Data obtained through the interviews was audio-recorded, transcribed by the interviewer, anonymising all identifiable data, and stored as Word documents in a password-secured environment accessible only to the research team. Afterwards, the data was analysed in Romanian using thematic analysis, employing NVivo14 [31]. A codebook was developed based on the output of the interviews and the main variables of interest. The codebook was elaborated both deductively and inductively [32], while the entire research was guided by a constructivist paradigm, also known as an interpretative paradigm, where the personal experience, knowledge and judgements of the researcher influence the research [33].

All qualitative research processes were performed by the principal researcher and validated by the rest of the research team – two senior experts.

Quantitative secondary data, collected from the Activity of Healthcare Units report from 2009 to 2022, elaborated by the National Institute of Statistics was analysed using descriptive statistics using Microsoft Office Excel [34].

In this study, quantitative and qualitative data work together to provide a comprehensive picture of cancer care in the North-West region of Romania.

Quantitative data from 2009 to 2022 highlights where disparities exist in access to cancer care, showing that Cluj-Napoca has strong infrastructure while areas like Satu-Mare and Sălaj lag behind. This data helps pinpoint the scale of medical desertification.

Qualitative data from interviews adds depth by explaining why these disparities exist. It reveals personal stories about inadequate resources, long wait times, high costs, and cultural barriers that numbers alone can't convey.

Together, these methods validate and enrich each other. This combined approach leads to well-rounded insights and better-targeted recommendations for improving cancer care, ensuring that both the statistical and human aspects of medical deserts are addressed.

Results

Quantitative analysis results

The indicators of interest to this research study, according to the medical deserts' definition are the number of professionals, facilities, waiting times, cost of services and other socio-cultural barriers. Due to the lack of data, no statistical indicators were identified concerning waiting times, cost of services and other socio-cultural barriers. Overall, a scarcity of data was identified.

To ensure the comprehensibility of the analysis for the HRH, we have included all categories of professionals delivering cancer care: oncological MDs, radiotherapy specialists, family doctors (FD), psycho-oncology therapists, and palliative care specialists. No data was identified for psycho-oncology therapists and palliative specialists, and they were not involved in the analysis. For facilities, we have included in the analysis the number of hospitals, hospital beds, beds for day cases and FD offices (Table 1).

Specialist numbers have steadily increased over the years. Bihor has seen a notable rise in oncology specialists since 2018, reaching 40, alongside consistent growth in Maramureș and Satu-Mare. Bistrița-Năsăud shows fluctuations, while Sălaj has steadily increased to six oncology doctors by 2022. Conversely, the number of FDs has slightly decreased from 1,698 in 2009 to 1,608 in 2022. While Cluj maintains a steady increase to 491 FDs, Bistrița-Năsăud, Satu-Mare, and Sălaj experience modest declines. Cluj also leads in radiotherapy specialists, while Bihor has seen a consistent rise, reaching five specialists in 2018. Maramureș remains stable with four specialists in 2022, but Bistrița-Năsăud and Satu-Mare consistently lack specialists, and Sălaj transitioned to none in 2018, persisting since then (Table 2).

Cluj maintains the highest number of offices, while Bistrița-Năsăud experiences a gradual decrease, and Satu-Mare and Sălaj show stable figures with slight declines. Family doctor offices in Bihor, Cluj, and Maramureș exhibit a modest decline, while Satu-Mare demonstrates a consistent decline. Cluj has 36 units in 2022, Bistrița-Năsăud remains at four units, and Maramureș shows gradual growth to 14 units, with Satu-Mare and Sălaj consistent at six units each.

Oncological day cases beds data reveals gradual growth across counties, with Cluj having the highest count and Maramureș experiencing remarkable growth. Other counties show steady increases, while Sălaj remains stagnant.

Table 1 Number of oncology specialists, family doctors and radiotherapy specialists in the North-West region, Romania, 2009-2022

Human resources in health

Bihor	**2009**		**2011**	**2012**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**
	Radiotherapy	1	3	3	3	4	4	5	5	5	5	5
	Oncology	6	11	10	11	11	12	18	29	33	40	52
	Family doctors	453	559	501	398	404	400	417	421	456	450	458
Bistrița-Năsăud	Radiotherapy	0	0	0	0	0	0	0	0	0	0	0
	Oncology	3	3	3	3	4	4	3	4	6	5	6
	Family doctors	148	153	149	145	141	143	142	141	137	134	133
Cluj	Radiotherapy	25	25	33	52	52	56	60	73	75	80	83
	Oncology	53	72	82	108	106	102	106	109	113	122	132
	Family doctors	520	558	496	423	409	414	423	413	451	453	491
Maramureș	Radiotherapy	5	6	2	2	2	1	2	4	3	4	4
	Oncology	6	6	6	8	9	9	10	12	13	13	15
	Family doctors	270	268	265	260	254	251	252	246	247	247	244
Satu-Mare	Radiotherapy	0	0	0	0	0	0	0	0	0	0	0
	Oncology	3	5	8	8	9	10	10	10	9	8	7
	Family doctors	194	200	201	193	202	197	185	182	178	177	174
Sălaj	Radiotherapy	1	1	1	1	1	1	0	0	0	0	0
	Oncology	2	2	2	3	5	4	5	5	5	6	6
	Family doctors	113	120	122	121	120	116	118	115	114	109	108

Table 2 Number of healthcare units, oncological beds for day cases, oncological

Facilities

Bihor	**2009**		**2011**	**2012**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**
	Units	16	12	13	14	14	14	14	14	14	14	13
	Beds day cases	10	12	13	21	21	21	21	36	37	37	39
	Hospitalization beds	100	101	102	104	104	104	114	97	93	99	111
	Family doctor offices	339	360	355	364	361	365	372	372	344	334	334
Bistrița-Năsăud	Units	4	4	4	4	4	4	4	4	4	4	4
	Beds day cases	2	5	10	10	8	8	8	8	8	14	16
	Hospitalization beds	40	40	40	40	40	40	40	40	30	46	46
	Family doctor offices	148	145	145	140	138	138	138	137	134	118	118
Cluj	Units	26	32	32	40	41	42	35	36	37	36	36
	Beds day cases	62	72	72	99	107	106	134	134	128	125	126
	Hospitalization beds	504	590	602	605	605	610	610	611	600	577	601
	Family doctor offices	360	344	344	348	349	349	349	340	343	332	332
Maramureș	Units	11	10	10	12	12	12	13	13	13	13	14
	Beds day cases	2	6	14	13	13	13	26	26	27	35	34
	Hospitalization beds	75	75	75	60	60	60	60	67	67	73	73
	Family doctor offices	270	262	260	260	256	254	254	245	244	233	233
Satu-Mare	Units	5	5	5	5	6	6	6	6	6	6	6
	Beds day cases	9	14	14	13	15	16	16	15	17	17	18
	Hospitalization beds	55	55	55	55	55	55	55	55	55	55	55
	Family doctor offices	183	148	148	143	138	133	130	128	126	123	123
Sălaj	Units	7	6	6	6	6	6	6	6	6	6	6
	Beds day cases	0	1	1	1	1	1	1	1	1	1	1
	Hospitalization beds	25	25	25	25	25	25	25	25	25	25	25
	Family doctor offices	113	113	115	114	112	111	111	108	107	99	99

Regarding hospitalization oncological beds, Bihor demonstrates gradual growth to 111 beds, while Bistrița-Năsăud sees a slight increase to 46 beds. Cluj maintains a relatively high count, and Maramureș, Satu-Mare, and Sălaj maintain stable bed counts at 73, 55, and 25 beds.

Qualitative analysis results

Upon the analysis of the fifteen interviews, three themes and six sub-themes have emerged:

1. Medical deserts in the North-West region in cancer care
    - 1.1 Human resources in health in oncology
    - 1.2 Oncology facilities
    - 1.3 Waiting times
    - 1.4 Cost of services
    - 1.5 Other socio-cultural barriers
2. Experiences within the health system
    - 2.1 The pathway to access to cancer care
3. Opportunities for action

The interviews had an average of 32 min and included eight patients and seven health professionals, working as psycho-oncology therapists [1], oncologists [5], and FD [1] (Table 3).

Medical deserts in the North-West region in cancer care

The interviews conducted have underscored the prevalence of medical deserts at both national and regional levels, particularly within cancer care. Each interviewee provided distinct rationales affirming the existence of medical deserts, with the most prevalent factor being the inadequacy of HRH in terms of number, distribution, quality, training, empathy, collaboration, communication. This was closely followed by deficiencies in essential services and facilities, prolonged waiting times, disproportionate costs relative to patient purchasing power, and patient education- "If we think about the whole county, it seems to me that this (e.g. medical deserts) is exactly the definition of the health service in Romania, that, unfortunately, yes, there are places where the medical service is of very good quality, it exists, it is within reach, but, unfortunately, there are areas where, even if patients want it, it is quite difficult to access medical services." (male, MD, < 65years old, Zalău).

Additionally, participants highlighted patient perspectives on disease and treatment, as well as the apprehension associated with receiving a cancer diagnosis, as contributing factors to the observed medical deserts.

Human resources for health in oncology

HRH emerged as a critical domain warranting enhancement within the field of oncology. The discourse centred on various categories of personnel, encompassing

Table 3 Demographic characteristics of participants

Demographic characteristics of the studied sample				
	Patients		***Professionals***	
Age	<65	7	<65	6
	≥65	1	≥65	1
Gender	male	2	male	3
	female	6	female	4
County	Bihor	1	Bihor	1
	Bistrița	1	Bistrița	1
	Cluj	3	Cluj	1
	Maramureș	1	Maramureș	2
	Satu-Mare	1	Satu-Mare	1
	Sălaj	1	Sălaj	1
Type of care	Public	4		
	Private	0		
	Private-Public mix	4		

medical, nursing, allied health, administrative, and support staff. Revisions to personnel regulations per bed are deemed imperative to align with the complex care needs of cancer patients- "We lack staff in terms of numbers, as well as in terms of training. And I don't know how this could be remedied, I think they leave for financial reasons, but mostly for emotional reasons, you know?" (female, MD, < 65years old, Cluj-Napoca).

It has been confirmed that augmenting HRH, in terms of number, distribution and training, is essential to ensure the delivery of high-quality care to cancer patients. In instances where HRH levels were deemed adequate, the escalating patient influx imposed an increasingly concerning strain. Concerns surrounding both the quantity and calibre of HRH have been raised, particularly in smaller counties devoid of medical training facilities. An additional key point concerns the younger generation of HRH, who should receive more empowerment and development opportunities. Investing in their growth is vital for ensuring a competent future workforce capable of meeting upcoming challenges. Younger professionals, more open to new technologies and innovative practices, can drive improvements in healthcare delivery. Providing growth opportunities enhances job satisfaction and retention, reducing turnover rates. Currently, there are no specific empowerment and development opportunities offered specifically for the younger generation, according to the interviewees.

Oncology facilities

Overall, participants reported the absence of critical care services such as radiotherapy and palliative care in several counties, or of materials, equipment and medications– "And the ward is quite large and the day hospitalizations are quite numerous, but the number of patients is increasing and it is possible that in a year, in two, in three years there will not be enough. And you have to develop. In terms of number of hospitals, clinics, professionals in all categories and space." (female, pharmacist, < 65years old, Maramureș).

Waiting times

The experience with waiting times in the six counties has been highly polarized, with patients receiving diagnosis and commencing treatment within a week, while others endured waits exceeding a year for diagnosis, regardless of the type of cancer or age. Instances were noted where appointment times for check-ups or chemotherapy were frequently delayed by several hours due to the high patient volume "For treatment when you go, you wait until you hate yourself. I went last month, I waited for two hours, just for two words." (female, patient, > 65years old, Bistrița-Năsăud); "It seemed that all the doors were opened for me. […] In exactly 10 days I got the diagnosis from the biopsy, on 10 July I got the result, on 19 July I started the treatment." (female, patient, < 65years old, Cluj-Napoca).

A prevalent strategy among patients to mitigate prolonged waiting times involves opting for certain investigations within the private healthcare system, albeit at an additional out-of-pocket cost.

Cost of services

An unexpected finding from the interviews is the participants' readiness to assume any expenses accrued, resorting to borrowing money, or crowdfunding campaigns. While none of the participants reported forgoing accessing a service due to financial constraints, it was acknowledged resorting to borrowing funds or seeking sponsorships to meet expenses. "For the radiotherapy, we did a fundraiser, we got some sponsorship and then it was ok. There is human solidarity that alleviates the costs, but if I were to pay by myself 250,000 lei, I couldn't." (male, patient, < 65years old, Maramureș). One participant disclosed awareness of other patients cutting certain investigations due to cost considerations.

The bulk of incurred expenses were attributed to medication, imaging investigations, and nutritional support. Participants noted that the introduction of the "Monitor 2" program, which facilitates access to medical investigations, necessary to monitor patients diagnosed with oncological diseases, has led to decreased costs and improved access to investigations [35].

Other socio-cultural barriers

The primary socio-cultural obstacles identified encompassed psychological factors, specifically apprehension regarding the detection of a cancer illness and attitudes toward the disease and its treatment- "The main factor is the fear of discovering something more serious. If it can't be dealt with at the GP, it means it's something more serious" (male, MD, > 65years old, Satu-Mare). Health literacy emerged as a notable barrier, involving comprehension of one's condition and the requisite investigations and treatments. "My patient doesn't have a very good understanding of his disease and the importance of his treatment, and for him, it's somehow more bothersome to ask his son to help him get an imaging appointment until he comes back to us. Somehow, he stops there." (female, MD, < 65years old, Cluj-Napoca).

Experiences within the health system

The experiences within the health system among the sample exhibited notable variability, spanning from highly positive experiences to considerations of discontinuing

treatment. While no singular influencing factor was discerned, our analysis suggests that these diverse experiences are likely the outcome of a combination of individual and systemic factors that have accumulated over time, which influenced the individuals' pathway to access to cancer care.

The pathway to access cancer care

The pathway to receiving cancer care is highly individualized and influenced by various factors, including the patient's attitude towards the disease, its stage, the healthcare professional overseeing treatment, the healthcare facility, as well as the patient's city of origin and treatment. Interviewee experiences vary widely, ranging from relatively smooth experiences to challenging pathways characterized by multiple HRH exchanges, prolonged waiting periods, and financial burdens stemming from service costs.

A common pathway identified in the interviews is the adoption of a public–private mix, where patients predominantly receive care within the public system but opt for selected consultations or investigations in the private sector to circumvent waiting lists. Another common trend is the utilization of multiple healthcare facilities across different cities, wherein patients initiate their care journey in their city of residence but subsequently seek specialized or higher-quality services in university centres or other locations offering services unavailable locally.

The pathway to accessing cancer care has been described as particularly challenging until specialists for treatment are identified. However, once specialists are engaged, the navigation of the care pathway is described as more manageable.

Opportunities for action

A recurrent recommendation entailed the revision of treatment protocols to provide patients with innovative therapies, alongside enhancing the availability of palliative care services. Strategies focusing on the prevention of cancer diseases, early screening initiatives, and patient education were consistently advocated, as were efforts to promote formalized collaboration

Table 4 Respondents' perspectives on possible improvements in cancer care

Opportunities for action	"It would be very good if there were some people whose role is to talk to the patient, as nurses do in England, for example, to talk to the patient about the psycho-emotional aspects of his illness, to explain very clearly and after you have explained it to the doctor, to spend some time with him, to make sure that he understands the possible adverse reactions, to have, not only on paper, psychological counselling, nutritional counselling, to have many of the problems that end up afterwards being evident in the system, because of the education, the lack of health education of each of the people. Of course, I have a lot of patients who say that, I don't know, they got cervical cancer because they raised too much in the garden or whatever. One thing would be, I don't know, I would really like a social worker to help me with cases that just don't know what to do when they walk out the hospital door." (female, MD, <65years old, Cluj-Napoca);
	"Yes, from my point of view, it could be improved and brought to European and international standards this whole part of medication, the oncology medication circuit, both for staff and patient. That is to say, if we manage to bring the medication circuit up to international standards, then we will be able to provide the patient with medication without the slightest problem." (female, pharmacist, <65years old, Maramureș);
	"absolutely everything should be carried out, including the initiation of treatment, if necessary, because we should not put the patient on the roads, the first part of the treatment is done in Cluj, the second in Timisoara and the third and fourth in Satu-Mare." (male, MD, >65years old, Satu-Mare);
	"So, first of all, if one would think of things as making, not making life easier for us, but making life easier for us in all these respects, we help the patient in the end. [...] I don't know, there's no point in saying we need to build more hospitals. Because if it's the same system at NHIH, the computer system we work with and the system we use to draw up treatment schedules, then it's all for nothing. And if we still don't have the people to put in it and well-trained people, then it's also useless. And I work with a lot of good and dedicated people and they stay overtime, but you can't do that forever and you can't help the patient as you would like and as you know every human being deserves in the end and then you go home with a lot of sadness. Now with the costs, I don't know if that's necessarily where you need to intervene the most. What bothers me from a financial point of view is access to treatments that are approved by the EMA, the European Medicines Agency, but are not reimbursed in Romania, and it would be wonderful if we were not in the last place or the last places in terms of the time it takes for a reimbursed medicine in Europe to be available in the country." (female, MD, <65years old, Cluj-Napoca);
	"to increase the number of HRH and decrease the number of papers needed to be filled in" (female, psycho-oncologist, <65years old, Bistrița-Năsăud);
	"It seems very complicated to me, but I think not all GPs are trained to talk to the patient and not to make them scared from the beginning that they are going to die, because now there are a lot of treatments and not everybody dies. [...] The number of doctors seems to me to be small compared to the number of patients, but I think that this thing with dual practice is not good, and it makes the doctor... I mean, it doesn't seem normal to me that you are a university professor, you teach, you go to the public hospital and then you go to private practice." (female, patient, >65years old, Satu-Mare);

among healthcare professionals and units, and empowerment of the younger HRH. Additionally, there was a recommendation for the digitalization of the healthcare system and the adoption of Electronic Health Records (Table 4).

Discussion

An uneven distribution of cancer care services across the North-West region of Romania areas was emphasised [19]. Our analysis has revealed disparities in access to oncology facilities, healthcare professionals, and specialized treatment modalities among different counties within the region. There is no standardized or universal pathway for cancer care, which means that the experiences of both patients and healthcare professionals can be quite varied and highly individualized. Each patient's journey is unique, shaped by personal circumstances, the type of cancer, and the specific treatments they receive. Similarly, healthcare professionals adapt their approaches to fit the needs of each patient, leading to a wide range of practices and experiences within the field. Cluj-Napoca, as a major urban and academic centre, has a more robust cancer infrastructure compared to areas like Satu-Mare and Sălaj, where access to cancer services is limited. This imbalance in healthcare resources underscores the existence of medical deserts in oncology, where individuals residing in underserved areas face challenges in accessing timely and quality cancer care [36, 37].

Romania faces significant challenges in cancer prevention and care, as highlighted by multiple reports and studies. Disparities in access to cancer care persist, and a lack of systematic screening, with low participation rates and suboptimal screening practices, particularly affecting rural populations, as underscored by the Romania: Country Health Profile report [38] and confirmed by our findings. Weaknesses in cancer diagnosis, treatment outcomes, and systematic screening practices exacerbate these disparities. The COVID-19 pandemic has further exacerbated access issues, leading to increased levels of unmet needs and delayed care [38]. Additionally, geographical disparities in cancer prevalence across Romania, indicate significant inequities in access and care standards, with the North-West region having among the highest prevalence of oncological diseases [39].

Furthermore, the shortage of oncology specialists exacerbates unmet needs/access disparities etc. This shortage not only affects the provision of specialized treatment but also impacts the capacity for early detection and timely intervention, leading to delayed diagnoses and poorer outcomes for patients in medical desert areas [19].

Additionally, the lack of comprehensive cancer centres and advanced treatment modalities in rural and remote areas contributes to the characterization of oncology as a medical desert [40]. Patients often have to travel long distances to access specialized care, imposing financial and logistical burdens on individuals and their families. This geographical barrier to healthcare access further exacerbates disparities in cancer outcomes, as patients in medical desert areas may experience delays in diagnosis and treatment initiation, leading to suboptimal clinical outcomes [41].

The response to the research question "How can cancer care services from the North-West region of Romania be characterized by the medical desert definition?" is that medical desertification, disparities in access to care and quality of care characterize the cancer services in the North-West region of Romania.

In conclusion, our analysis highlights the multifaceted nature of medical deserts in oncology within the North-West region of Romania. Addressing these challenges requires a comprehensive approach that involves the strategic allocation of resources (financial, human, material), investment in cancer infrastructure and workforce development (training, upskilling and reskilling, task-shifting), access to innovative medication, and digital health technologies [42] to ensure equitable access to high-quality cancer care for all individuals, regardless of geographical location.

While this study provides valuable insights into cancer care in the North-West region, providing the first comprehensive picture of cancer care in the North-West region of Romania, several limitations should be acknowledged. From a quantitative perspective, the lack of data, and the fact that the study relied on secondary data, could introduce inaccuracies. Additionally, from a qualitative perspective, the sample size was small, limiting generalizability. Future research with larger, diverse samples, and national designs is needed.

Conclusions

Inequalities exist in accessing oncology facilities, healthcare professionals, and specialized treatment methods across various counties within the North-West region, which might lead to worsened health outcomes and burdened health systems in neighbouring counties. Collaboration among policymakers, healthcare providers, levels of care (primary, secondary and tertiary care) and communities is essential to mitigate medical deserts in oncology and improve cancer outcomes. Through collective effort, we can overcome challenges in cancer care and strive for better outcomes.

Abbreviations

OECD	Organisation for Economic Co-operation and Development
EU	European Union
MoH	Ministry of Health
HRH	Human Resources in Health

MD Medical doctors
FD Family doctors
NIH National Institutes of Health

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Authors' contributions
M.G.B. and M.I.U. had the idea; M.G.B. handled data collection and analysis with the support of M.I.U. and C.O.B.; M.G.B. prepared a draft and M.I.U. and C.O.B. commented equally, read and approved the final version.

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Availability of data and materials
The data that support the findings of this study are available from the corresponding author, MGB, upon reasonable request.

Declarations

Ethics approval and consent to participate
The research study received research ethics approval from the Scientific Council of the Babeș-Bolyai University of Cluj-Napoca under reference number 464/29.05.2023 and followed all the ethical guidance, involving voluntary participants that consented to participation in the study.

Consent for publication
Not applicable.

Competing interests
The authors declare no competing interests.

Author details
[1]Department of Public Health, Faculty of Political, Administrative, and Communication Sciences, Babeș-Bolyai University, Universitas Building, No. 7 Pandurilor Street 9 Floor, 400095 Cluj-Napoca-Napoca, Romania. [2]EUPHAnxt, European Public Health Association, Utrecht, Netherlands. [3]Center for Health Workforce Research and Policy, Faculty of Political, Administrative and Communication Sciences, Babeș-Bolyai University, Cluj-Napoca-Napoca, Romania.

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