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Trends analysis of specialized palliative care services in 51 countries of the WHO European region in the last 14 years

Natalia Arias-Casais[1], Jesús López-Fidalgo[1,2], Eduardo Garralda[1,3], Juan José Pons[1,4], John Y Rhee[5], Radbruch Lukas[6,7], Liliana de Lima[7] and Carlos Centeno[1,3]

Abstract

Background: Service provision is a key domain to assess national-level palliative care development. Three editions of the European Association for Palliative Care (EAPC) Atlas of Palliative Care monitored the changes in service provision across Europe since 2005.

Aim: To study European trends of specialized service provision at home care teams, hospital support teams, and inpatient palliative care services between 2005 and 2019.

Design: Secondary analysis was conducted drawing from databases on the number of specialized services in 2005, 2012, and 2019. Ratios of services per 100,000 inhabitants and increase rates on number of services for three periods were calculated. Analysis of variance (ANOVA) analyses were conducted to determine significant changes and chi-square to identify countries accounting for the variance. Income-level and sub-regional ANOVA analysis were undertaken.

Setting: 51 countries.

Results: Forty-two countries (82%) increased the number of specialized services between 2005 and 2019 with changes for home care teams (104% increase-rate), inpatient services (82%), and hospital support teams (48%). High-income countries showed significant increase in all types of services ($p < 0.001$), while low-to-middle-income countries showed significant increase only for inpatient services. Central–Eastern European countries showed significant improvement in home care teams and inpatient services, while Western countries showed significant improvement in hospital support and home care teams. Home care was the most prominent service in Western Europe.

Conclusion: Specialized service provision increased throughout Europe, yet ratios per 100,000 inhabitants fell below the EAPC recommendations. Western Europe ratios' achieved half of the suggested services, while Central–Eastern countries achieved only a fourth. High-income countries and Western European countries account for the major increase. Central–Eastern Europe and low-to-middle-income countries reported little increase on specialized service provision.

Keywords

Palliative care, development, specialized services, provision, public health, trends, Europe, national-level

[1]ATLANTES Global Observatory of Palliative Care, Institute for Culture and Society, University of Navarra, Pamplona, Spain
[2]Statistical Unit, Institute for Culture and Society, University of Navarra, Pamplona, Spain
[3]Healthcare Research Institute of Navarre (IdiSNA), Pamplona, Spain
[4]Department of History, History of Art and Geography, University of Navarra, Pamplona, Spain
[5]Department of Neurology, Massachusetts General Hospital and Brigham and Women's Hospital, Harvard Medical School, Boston, MA, USA
[6]Department of Palliative Medicine, University Hospital Bonn, Bonn, Germany
[7]International Association for Hospice & Palliative Care, Houston, TX, USA

Corresponding author:
Natalia Arias-Casais, ATLANTES Global Observatory of Palliative Care, Institute for Culture and Society, University of Navarra, 31080 Pamplona, Spain.
Email: narias@unav.es

What is already known about the topic?

- Starting in 2005, the Atlantes Research Group conducted regular regional analysis on the development of palliative care within the WHO European region.
- In 2012, Palliative care specialized service provision tended to increase; however, inequalities between West and Central–Eastern European countries persisted.
- Palliative care need is expected to increase in the region and so should service provision.

What this paper adds?

- It allows the prospective assessment of palliative care's specialized service provision within Europe, extending the trends followed by the region from 2005 to 2019. This study is the largest of its kind and includes data from 51 countries (94% of the region).
- It shows that specialized service provision continues to increase but sub-regional inequalities persist. Additional analysis per income group shows that inequalities are also present between high- and low-to-middle-income countries.
- It identifies countries that need to be supported and highlights which type of services (home care teams, hospital support teams, or inpatient palliative care services) are missing.

Implications for practice, theory, or policy

- Informs national and regional stakeholders on the persistent inequalities and hopes to trigger regional and national strategies supporting countries that fall behind.
- In light of the absence of official registers, this study presents the only and largest data set on specialized palliative care service provision. This data can be used to track the trends and strengthen those services that have not been developed and for health planning.
- Provides data on the trends followed per country, informing national stakeholders on their performance. Information can be used to analyze if progress has been made in each country and design policy to improve specialized service provision in those countries lacking it.

Introduction

In Europe, around 25 million people die every year without access to palliative care, including 180,000 children.[1] In light of this unmet need in a rapidly aging population, more high-quality palliative care is needed to face the increasing burden of health-related suffering.[2] Some core elements of palliative care, such as basic symptom management, should be routine aspects of care delivered by any practitioner. This is called generalist palliative care. For more complex situation as managing refractory symptoms, the expertise of specialist palliative care is needed.[3] Increasing access to palliative care through specialized service provision was one of the key recommendations suggested by the World Health Organization (WHO), that is, to strengthen palliative care as a component of comprehensive care throughout the life course for all those in need. Other measures included the inclusion of palliative care in health policies, improving educational opportunities for health professionals by developing specialized training, and improving measures to facilitate the use of essential medicines for pain and symptom relief.[4]

Indicators estimating the provision of specialized services have been widely used in regional studies[5] and are recommend by experts for the monitoring of palliative care development globally.[6] Studies assessing development of specialized services have been used as advocacy tools for monitoring palliative care development.[7]

According to the European Association for Palliative Care (EAPC), the number of specialized services required to cover the basic needs of palliative care patients in a given country[8] are the following: at least one hospital support team and one inpatient palliative care service per 200,000 inhabitants, and one home care team per 100,000 inhabitants. In 2012, a study showed significant development in Europe in the provision of home care team, inpatient palliative care service, and hospital support team between 2005 and 2012. This increase was statistically significant for Western European, but not for Central and Eastern countries. Significant development in at least one type of service was reported in 21 of 46 (46%) countries. Despite overall improvement, the study showed that services available in most European countries were still insufficient to meet the palliative care needs of their populations.[7]

The ATLANTES Global Obvservatory of Palliative Care at University of Navarra has experience conducting regional studies assessing national-level palliative care development. Three of our studies were focused on the WHO European region in 2005, 2012, and more recently in 2019.[1,9,10] The aim of this study is to evaluate trends of specialized palliative care service provision in Europe, to

determine if previously detected inequalities persist and to identify areas in need of strengthening.

Methods

Building on the latest EAPC Atlas of Palliative Care 2019,[1] which gathered specific data on specialized service provision, this study aimed at addressing the following research question: What trends has specialized palliative care service provision followed from 2005 to 2019 in Europe?

To address the question, an analysis of variance (ANOVA) test was conducted using data from 51 countries on their specialized palliative care service provision. Analysis was conducted regarding income group, as defined by the World Bank, and sub-region. In addition, rates were calculated.

To evaluate changes in specialized service provision, we performed secondary analyses with data gathered for our last EAPC Atlas of Palliative Care in Europe 2019[1] and compared it with our other two regional studies databases: the EAPC Atlas of Palliative Care in Europe 2007 and the EAPC Atlas of Palliative Care in Europe 2013.[9,10] A previous publication conducted in 2015 by the Atlantes Research Group tracked changes between the first two regional assessments.[7] This study aimed at detecting differences across all three assessments over time. To allow comparison, the same sub-regional division used in 2015 study was used in the evaluation presented here.

Specialized services studied

This study followed the definition of specialized services provided by the EAPC White Paper,[8] describing "specialist" palliative care services as those services whose *main activity* is the provision of palliative care. These services generally care for patients with complex and difficult clinical problems. Specialist palliative care, therefore, requires a high level of education, appropriate staff, and other resources. In this study, data relating to three main types of specialist palliative care services were examined: home care team consisting of four to five full-time professionals, hospital support team with specialists providing palliative care consultation with at least one physician and a nurse, and inpatient palliative care service with units with an optimal size of 8–12 beds or inpatient hospices with capacity of at least eight beds. Definitions were at core the same across the studies conducted; however, minimal changes were incorporated between studies to improve them based on the need of adapting them to current available knowledge on the models of care.

The Brief Manual on Health Indicators Monitoring Global Palliative Care Development[6] offers the definitions used in the 2019s EAPC Atlas Survey, which were refined based on the definitions from the 2012s Atlas. Definitions to the 2005 survey can be found in the annex of the EAPC Atlas of Palliative Care in Europe 2007,[9] and those for 2013 in the annex of the EAPC Atlas of Palliative Care in Europe 2013.[10]

Data sources and sense-checking

Data sources for the Atlases included national experts in palliative care who responded to surveys evaluating the development status of their respective countries in 2005, 2012, and 2019. Surveys were similar yet not identical. Since national-level palliative care development assessment is an evolving field of research, surveys varied between the periods. Input from updated evidence and feedback from participants were taken into account to improve them. In this light, the quality of the surveys varied between the first and the second, and the second and third with better questions, layouts, and with current knowledge updated definitions. However, questions for the specialized service provision at home care teams, hospital support teams, and inpatient palliative care did not greatly varied, especially after the publication of the EAPC White Paper on specialized service provision.[8] Data were retrieved from databases from the regional studies conducted in 2005, 2012, and 2019. Data sources included national experts on palliative care or "key informants" defined as persons responding to the surveys fulfilling at least one of the following criteria, in preferential order: (1) leader of a national palliative care association, where available; (2) Ministry of Health representative for the country; (3) leader of a major palliative care service in the country; and (4) key informants of previous Atlas studies. All informants granted written participation consent and all studies were approved by the Institutional Review Board of the University of Navarra (2019: IRB.2017.222). The Institutional Review Board granted permission for conducting the studies, gathering data, and analyzing them for its presentation in the Atlases and in secondary analysis.

The research group implemented a data confirmation algorithm: (1) responses were contrasted with peer's answers, (2) an additional scooping review was conducted to back-up responses, and (3) responses were compared with previous years' databases. The information was then presented in country reports and sent back to country informants and national palliative care associations for final check. In the case of inconsistencies, specific conflicting points were highlighted, and clarification was requested and doubled checked with available official documents. In light of the absence of official registers providing updated data on specialized service provision in Europe and within each European country, this methodology was designed to provide the most accurate data on the topic.

Data have been collected since 2005 and have been used to elaborate the EAPC Atlases. Each of the three

Atlases conducted to the date has a specific database. The latest started data collection on December 2018 and finished in March 2019. Data have been used and published in different ways: reports, articles, and the Atlases.[1,7,9–11] Yet, the current data are being presented for the first time as a longitudinal study, analyzing the trends followed over the past 14 years with regard to specialized service provision in Europe.

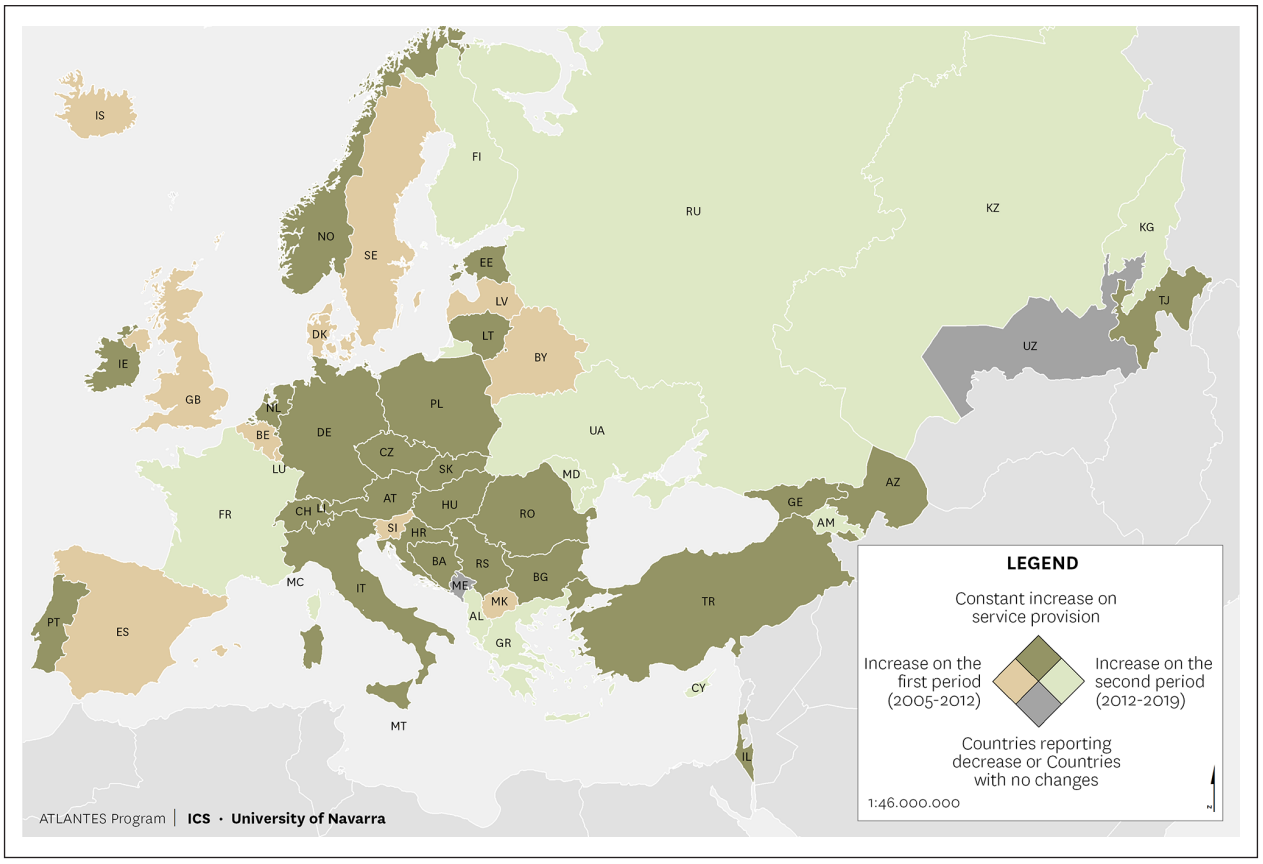
Data analysis

Countries with missing data for any of the years were completed by the following: (1) literature review of reference values, (2) median of values reported in previous measures, (3) where no other data were available or in countries with repeated zeros in other values, a zero was assumed. Median values between data available for two different years were used as proxy of the missing year to provide a mathematical solution to missing data.

Six countries reported teams working in several settings in 2019 and were described as "mixed teams" (Denmark, Luxembourg, Moldova, Norway, Spain, and Ukraine). These types of services were not included in 2005 survey, but were present in 2012 and 2019. To include these services in the count, the total number of mixed services were divided into two, half was added to hospital support team and the other half to home care team. This approach was conducted to use the same methodology followed by the study assessing changes between 2005 and 2012,[7] allowing the inclusion of the reported "mixed services" in the total count of specialized services rather that ignoring them. The statistical software STATA 15 was used to conduct the analysis.

To analyze changes across time, various analyses were conducted and outlined as follows:

1. A comparison of the ratio of total services per 100,000 inhabitants was conducted. A ratio of specialized services was enabled per year (home care team + hospital support team + inpatient palliative care service year 2012/Population 2012) × (100,000 inhabitants). The three resulting ratios were used to assess the tendency of specialized service provision. This is presented cartographically (Map 1). Population data were retrieved from the World Bank Database[12] at each time point.
2. A change rate was calculated for 2005–2012, 2012–2019, and 2005–2019. The rate helped profile whether the changes identified through the analyses were negative or positive and allowed better assessment of the development profile of specialized service provision per country.
3. A repeated-measures ANOVA analysis was conducted to properly assess significant changes across the time and to identify countries with more significant changes over time. The analysis compared the measures for 2005, 2012, and 2019 and calculated a *p*-value. A contingency table for each indicator was constructed using countries as rows and years as columns. Since multiple analyses (one per country) were conducted on the data set, the Bonferroni correction was implemented to address type I error expected from multiple comparisons as follows: 0.05/51 = 0.0009. This value was then compared with *p*-values for assessing significance. Countries with $p < 0.0009$ were identified as those with most significant changes.
4. A Pearson standardized adjusted residual analysis was performed. The sum of square residuals of 1 year was considered significant according to a chi-square distribution with 2 degrees of freedom under the null hypothesis (no differences between years). This was selected as the most appropriate technique because it allowed detecting the countries in which differences across the 3 years studies existed and the amount of change across time. In a contingency table, the test statistic can be computed using the following formula: $\chi^2 = \Sigma((0 - E)2/E)$. In this formula, the expected value of a cell, *E*, is computed multiplying the total of the column times by the total of the row and dividing this by the total of the table. The residual is the difference between the observed, O, and the expected values, E. The residuals were adjusted for individual use of each country by dividing the common estimate of the standard deviation. The residuals, that is (0 – e), was adjusted for individual use of each country dividing by the common estimate of the standard deviation, that is, the square root of *eij* (1–*pi*) (1–*pj*), with *pi* being the marginal proportion of the score of the year I (2005, 2012, or 2019) and *pj* the proportion of the score of country *j*. For brevity, Pearson standardized adjusted residuals are not shown in this article.
5. Countries were categorized according to income group as defined by the World Bank (high-income and low-to-middle-income countries) and geopolitical sub-region using the same criteria as in the 2015 study[7] (West and Central and Eastern Europe). An ANOVA of repeated measures was conducted to check significant differences between these groups.
6. To analyze regional development, medians and averages of all services were compare.



Map 1. Trends of specialized service provision in Europe between 2005–2012, 2012–2019 and 2005–2019.

The aim of this study was to analyze the trends on specialized service provision across 2005–2019 with regard to the three types of services above mentioned. For this reason, the most appropriate analysis for checking significant changes across the years (2005–2013–2019) was considered to be an ANOVA of repeated measures. The statistical analysis followed allowed identifying the amount of change along the time reported in each country, rather than countries with more or less scores, and therefore captured the evolution across the three periods assessed. Although the variables to be compared were counts and therefore may follow a Poisson distribution, the number of countries in the sample ($n = 51$) guarantees the suitability of the ANOVA analysis using the Central Limit Theorem even if the residuals were not normal.

Results

Data from 51 countries out of the 54 in the region (including Liechtenstein) were analyzed (96%) in each year. Data from San Marino, Andorra, and Turkmenistan were impossible to access despite efforts to contact key persons.

Services provision trends in the European region

A total of 6461 specialized services were identified in 2019, 1469 more than in 2012 and 2878 more than in 2005. Of those, 2573 were home care team, 1456 hospital support team, and 2432 inpatient palliative care service. The overall trend within the region was toward a significantly increased provision of all types of specialized services. From 2005 to 2019, the specialized service provision had increased 104% for home care team, 82% for inpatient palliative care service, and 48% for hospital support team. Changes from 2005 to 2019 were statistically significant (p-values < 0.001 for all types of services).

Map 1 shows the trends of the total specialized service provision (home care team + hospital support team + inpatient palliative care service) per 100,000 inhabitants during the evaluation period, depicting the periods in which growth has been registered. Twenty-four countries (47%) had a constant positive trend reflecting a consistent increase in specialized service provision over both periods. Of those, 16 are high-income countries (Austria, Croatia, Czech Republic, Estonia, Germany, Hungary, Ireland, Israel, Italy, Lithuania, Netherlands,

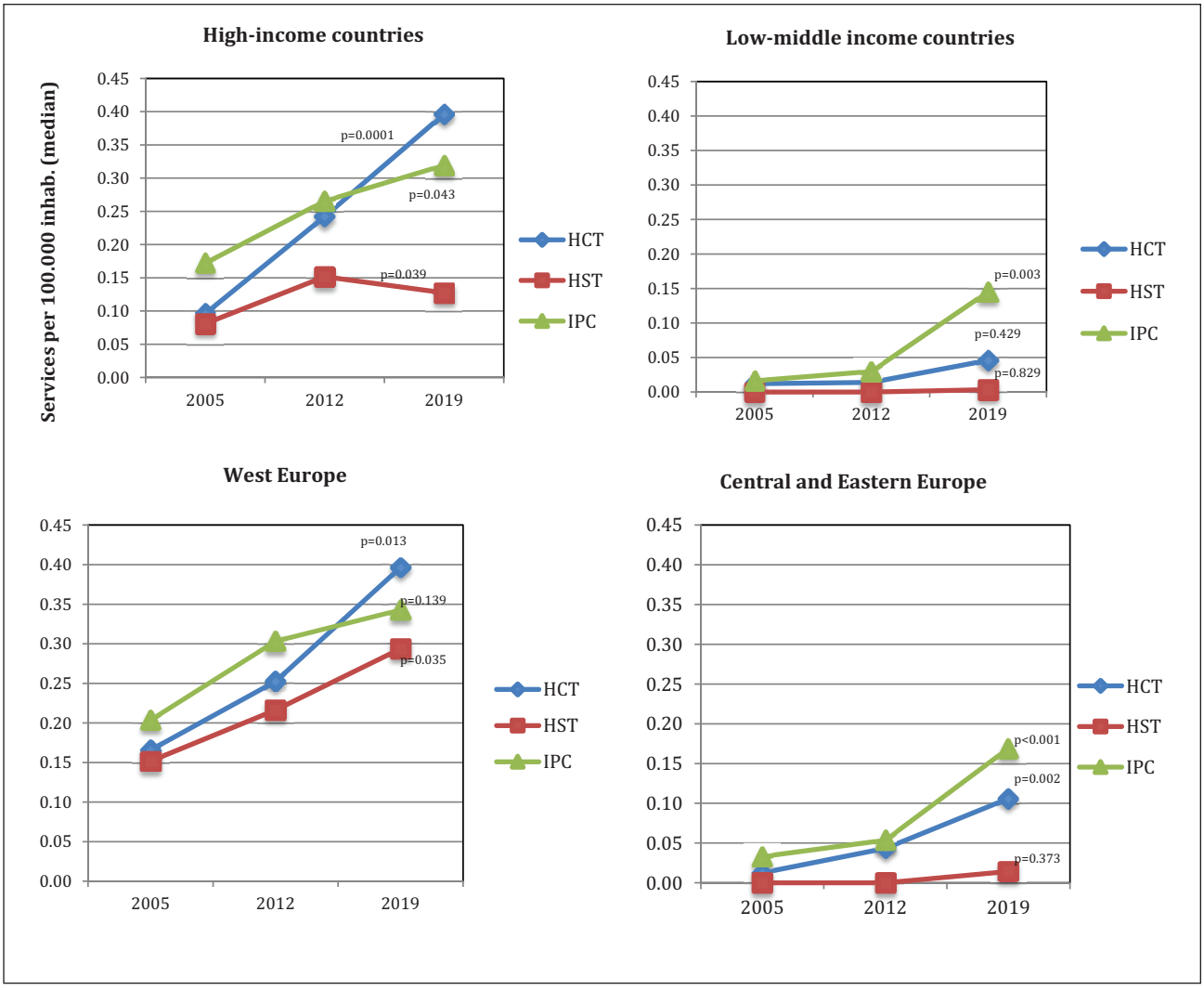


Figure 1. Development trends in specialized service provision adjusted by sub-region and by income group. Analysis was conducted using ANOVA.
HCT: home care teams; IPCS: inpatient palliative care services; HST: hospital support teams.

Norway, Poland, Portugal, Slovakia, and Switzerland). Over the same period, eight low-middle-income countries also displayed a positive trend in service provision (Azerbaijan, Bosnia and Herzegovina, Bulgaria, Georgia, Romania, Serbia, Tajikistan, and Turkey).

Twelve countries reported growth in their total specialized service provision per 100,000 inhabitants during the last period 2012–2019 (Albania, Armenia, Cyprus, France, Finland, Greece, Monaco, Kazakhstan, Kyrgyzstan, Ukraine, Moldova, and Russia). Six of these countries correspond to low-middle-income countries located in Central and Eastern Europe.

Eighteen countries (35%) accounted for the most significant improvements with increases in their service provision of over 200% (Estonia, Serbia, Kyrgyzstan, Tajikistan, Portugal, Georgia, Croatia, Belarus, Turkey, Romania, Lithuania, Albania, Ukraine, Czech Republic, Austria, Israel, Slovakia, and Cyprus). Most of them are located in Central and Eastern Europe. However, seven countries had a trend to decrease their total number of specialized services per population, with the majority of them in Western Europe (Spain, Liechtenstein, United Kingdom, Iceland, Armenia, and Greece).

Improvement in service provision by level of income

Analysis per income group is shown in Figure 1. As most of high-income countries are located in Western Europe, the graphics by geographical sub-region are similar to those by income group.

In high-income countries, a significant and constant increase was observed in home care team and inpatient palliative care service, while hospital support team tended

to decrease in the latest observed period. The tendency to promote home care team was clearly more prominent between 2012 and 2019 and was the most popular kind of service for the first time. In fact, provision of home care team in 2019 reached a median of 0.4 services per 100,000 inhabitants, more than inpatient palliative care service (with a median of 0.32 services per 100,000 inhabitants) and hospital support team (median of 0.13 services per 100,000 inhabitants).

In 2005, low-middle-income countries reported ratios of services per population close to zero, and the specialized services that existed in these countries were mainly one-off services being organized by pioneers in their respective countries. The second period evaluated showed a significant improvement in home care team and inpatient palliative care service. However, inpatient palliative care service's improvement was more significant making it the most representative specialized service in 2019, similarly to the trend seen in high-income countries in 2012. Yet, the ratios of services per population in low-middle-income countries in 2019 were still far lower than those in high-income countries: 0.15, 0.05, and 0.00 median of services per 100,000 inhabitants for inpatient palliative care service, home care team, and hospital support team, respectively.

Changes by type of services, country, and sub-region

Tables 1 to 3 show the changes across time of the total number of services, the ratio of services per 100,000 inhabitants, and the countries accounting for the most statistically significant changes. Countries were organized by sub-region and income group.

Home care team (Table 1) were the most popular kind of specialized palliative care service in Europe with 2573 services identified in 2019. This type of service had the most significant improvement in the last 14 years (p-value < 0.001). Some countries (Sweden, Israel, Poland, Lithuania, Monaco, and Estonia) were "champions in home care provision" for 2019, achieving or surpassing the EAPC established goal of one home care team per 100,000 inhabitants. Other countries (Hungary, Austria, and Cyprus), though not achieving the EAPC threshold, were very close with ratios between 0.7 and 0.8.

Hospital support team (Table 2) were an almost unknown model of palliative care services in Central–Eastern Europe. The regional study for 2019 was able to identify very few of these services in the sub-region. Exceptions include Croatia with 16 services, followed by Bulgaria and Czech Republic with eight and nine hospital support team, respectively. Only seven Western European countries achieved the EAPC threshold of 0.5 services per 100,000 inhabitants (Austria, Belgium, France, Iceland, Ireland, Monaco, and the United Kingdom) with means ranging between 0.5 and 1.02, leaving the 85% of remaining European countries falling below the target.

Inpatient palliative care service (Table 3) were present throughout the region with 2432 services identified. In 2019, seven countries achieved the EAPC threshold of 0.5 services per 100,000 inhabitants (Albania, Bulgaria, Romania, Austria, Germany, Liechtenstein, Luxembourg, Monaco, and Switzerland); of these, only one country is located in Central–Eastern Europe. Other countries close to achieving the target include Belgium, Denmark, Italy, Netherlands, and Norway, ranging from 0.40 to 0.49 services per 100,000 inhabitants.

In Tables 1 to 3 countries with most significant changes are marked. These countries correspond to countries with $p < 0.0009$ after Bonferroni correction, representing very high significance. It is important to note that other countries with relevant changes with significant p-values ($p < 0.05$) remain unmarked.

Discussion

Main findings

There is an overall trend in the WHO European region toward an increasing ratio of specialized service provision. Several countries in the region achieved the EAPC goals for service ratios, and analysis showed an increase in both periods studied in 47% of the countries within the region. Much of the increases occurred in the second period, particularly in Central–Eastern European countries. On these countries, major advocacy and implementation activities were conducted following the resolution of the World Health Assembly on palliative care (WHA67.19) in 2014. This resolution might have resulted in promotion of palliative care specialized service provision.

What this study adds

Specialized palliative care provision continued to develop unequally based on sub-region and income level. Median ratios of services per population were markedly higher in high-income and Western European countries than in low-middle-income and Central–Eastern European countries. Significant changes in all types of services occurred in high-income countries, while low-middle-income countries showed significant improvements only in inpatient palliative care service provision.

In Western Europe, home care team and hospital support team reported significant changes, while Central–Eastern European countries showed significant improvements for home care team and inpatient palliative care service. Although there have been significant changes throughout the region, the low ratios of services per 100,000 inhabitants in Central–Eastern European and low-middle-income countries suggest that in order to balance inequalities, the development of more home care

Table 1. Development and trends of HCT provision in the WHO European region from 2005 to 2019.

Country	ISO code	Income group	Total number of HCT identified[a] in the regional studies[b] surveys			Ratio of services per 100,000 inhabitants (population changes considered)			Significance resulting from ANOVA test
			2005	2012	2019	2005	2012	2019	*p*-value[c]
Central and Eastern Europe (*n* = 27)									
Croatia	HR	HI	3	4	10	0.07	0.09	0.24	NS
Czech Republic	CZ		4	4	35	0.04	0.04	0.33	*
Estonia	EE		0	15	15	0.00	1.13	1.14	NS
Hungary	HU		28	69	87	0.28	0.70	0.89	NS
Latvia	LV		0	0	1	0.00	0.00	0.05	NS
Lithuania	LI		3	15	39	0.09	0.50	1.38	*
Montenegro	ME		0	0	0	0.00	0.00	0.00	NS
Poland	PL		232	322	404	0.61	0.85	1.06	NS
Russia	RU		0	0	258	0.00	0.00	0.18	*
Slovakia	SK		0	0	4	0.00	0.00	0.07	NS
Slovenia	SI		2	1	12	0.10	0.05	0.58	*
Albania	AL	LMI	4	2	4	0.13	0.07	0.14	NS
Armenia	AM		8	4	5	0.27	0.14	0.17	NS
Azerbaijan	AZ		1	0	1	0.01	0.00	0.01	NS
Belarus	BY		1	5	11	0.01	0.05	0.12	NS
Bosnia and Herzegovina	BG		NA	0	1	0.00	0.00	0.03	NS
Bulgaria	BA		25	19	44	0.33	0.26	0.62	NS
Georgia	GE		1	13	5	0.03	0.35	0.13	*
Kazakhstan	KZ		2	1	4	0.01	0.01	0.02	NS
Kyrgyzstan	KG		0	0	3	0.00	0.00	0.05	NS
Macedonia	MK		2	4	2	0.10	0.19	0.10	NS
Moldova	MD		13	5	10.5	0.36	0.14	0.30	*
Romania	RO		10	15	9	0.05	0.07	0.05	NS
Serbia	RS		NA	1	2	0.00	0.01	0.03	NS
Tajikistan	TJ		0	1	2	0.00	0.01	0.02	NS
Ukraine	UA		1	3	7.5	0.00	0.01	0.02	NS
Uzbekistan	UZ		0	0	0	0.00	0.00	0.00	NS
Western Europe (*n* = 24)									
Austria	AT	HI	17	49	76	0.21	0.58	0.86	NS
Belgium	BE		15	28	28	0.14	0.25	0.25	NS
Cyprus	CY		2	2	10	0.19	0.18	0.85	NS
Denmark	DK		5	13	13	0.09	0.23	0.23	NS
Finland	FI		10	12	23	0.19	0.22	0.42	NS
France	FR		84	118	90	0.13	0.18	0.13	*
Germany	DE		30	180	283	0.04	0.22	0.34	*
Greece	GR		9	1	2	0.08	0.01	0.02	*
Iceland	IS		3	4	2	1.01	1.25	0.58	NS
Ireland	IE		14	35	34	0.34	0.76	0.71	NS
Israel	IL		14	20	90	0.20	0.25	1.03	*
Italy	IT		153	312	330	0.26	0.52	0.55	NS
Liechtenstein	LT		0	0	0	0.00	0.00	0.00	NS
Luxembourg	LU		2	3	3.5	0.43	0.57	0.59	NS
Malta	MT		0	2	1	0.00	0.48	0.21	NS
Monaco	MC		0	0	1	0.00	0.00	2.58	NS
Netherlands	NL		NA	18	18	0.00	0.11	0.11	NS
Norway	NO		1	20	20	0.02	0.40	0.38	NS
Portugal	PT		3	12	21	0.03	0.11	0.20	NS

(Continued)

Table 1. (Continued)

Country	ISO code	Income group	Total number of HCT identified[a] in the regional studies[b] surveys			Ratio of services per 100,000 inhabitants (population changes considered)			Significance resulting from ANOVA test
			2005	2012	2019	2005	2012	2019	*p*-value[c]
Western Europe (*n* = 24)									
Spain	ES		139	185	104	0.32	0.40	0.22	*
Sweden	SE		50	107	120	0.55	1.12	1.19	NS
Switzerland	CH		14	21	35	0.19	0.26	0.41	NS
United Kingdom	UK		356	389	291	0.59	0.61	0.44	*
Turkey	TR	LMI	0	5	1	0.00	0.01	0.00	NS

HCT: home care teams; WHO: World Health Organization; NS: no significance; NA: not available; LMI: low to medium income; HI: high income; ANOVA: analysis of variance; HST: hospital support teams; EAPC: European Association for Palliative Care.
[a]Denmark, Luxembourg, Moldova, Norway, Spain, and Ukraine reported existence of mixed teams in 2019. These services were divided in two, half was added to the total number of HCT and half to HST. For more information, see "Methods" section and Centeno et al, 2015. article on service provision.[7]
[b]Regional studies refer to the EAPC Atlas studies 2007, 2012, and 2019.
[c]Adjusted reference value after Bonferrroni correction = $p < 0.0009$. For more information, see "Methods" section.
*p-value < 0.001.

Table 2. Development and trends of HST provision in the WHO European region from 2005 to 2019.

Country	ISO code	Income group	Total number of HST identified[a] in the regional studies[b] surveys			Ratio of services per 100,000 inhabitants (population changes considered)			Significance resulting from ANOVA test
			2005	2012	2019	2005	2012	2019	*p*-value[c]
Central and Eastern Europe (*n* = 27)									
Croatia	HR	HI	0	0	16	0.00	0.00	0.39	*
Czech Republic	CZ		1	2	8	0.01	0.02	0.08	NS
Estonia	EE		0	0	2	0.00	0.00	0.15	NS
Hungary	HU		4	3	3	0.04	0.03	0.03	NS
Latvia	LV		0	7	2	0.00	0.34	0.10	NS
Lithuania	LI		1	1	0	0.03	0.03	0.00	NS
Montenegro	ME		0	0	0	0.00	0.00	0.00	NA
Poland	PL		2	9	3	0.01	0.02	0.01	NS
Russian Federation	RU		17	0	0	0.01	0.00	0.00	*
Slovakia	SK		0	0	1	0.00	0.00	0.02	NS
Slovenia	SI		2	17	1	0.10	0.83	0.05	*
Albania	AL	LMI	0	1	0	0.00	0.03	0.00	NS
Armenia	AM		10	0	0	0.34	0.00	0.00	*
Azerbaijan	AZ		0	0	0	0.00	0.00	0.00	NA
Belarus	BY		1	0	0	0.01	0.00	0.00	NS
Bosnia and Herzegovina	BG		NA	0	0	0.00	0.00	0.00	NA
Bulgaria	BA		0	9	9	0.00	0.12	0.13	NS
Georgia	GE		0	1	5	0.00	0.03	0.13	NS
Kazakhstan	KZ		0	0	5	0.00	0.00	0.03	NS
Kyrgyzstan	KG		0	0	0	0.00	0.00	0.00	NA
Macedonia	MK		2	7	0	0.10	0.34	0.00	*
Moldova	MD		0	1	1.5	0.00	0.03	0.04	NS
Romania	RO		2	2	3	0.01	0.01	0.02	NS
Serbia	RS		0	1	1	0.00	0.01	0.01	NS
Tajikistan	TJ		0	0	3	0.00	0.00	0.03	NS
Ukraine	UA		0	0	1.5	0.00	0.00	0.00	NS
Uzbekistan	UZ		0	0	0	0.00	0.00	0.00	NA

(Continued)

Table 2. (Continued)

Country	ISO code	Income group	Total number of HST identified[a] in the regional studies[b] surveys			Ratio of services per 100,000 inhabitants (population changes considered)			Significance resulting from ANOVA test
			2005	2012	2019	2005	2012	2019	*p*-value[c]
Western Europe (*n* = 24)									
Austria	AT	HI	10	29	80	0.12	0.34	0.91	*
Belgium	BE		77	116	116	0.73	1.04	1.02	NS
Cyprus	CY		0	0	0	0.00	0.00	0.00	NA
Denmark	DK		6	13	13	0.11	0.23	0.23	NS
Finland	FI		10	1	2	0.19	0.02	0.04	*
France	FR		309	260	424	0.49	0.40	0.63	*
Germany	DE		56	59	63	0.07	0.07	0.08	NS
Greece	GR		20	0	2	0.18	0.00	0.02	*
Iceland	IS		1	1	2	0.34	0.31	0.58	NS
Ireland	IE		22	39	45	0.53	0.85	0.94	NS
Israel	IL		3	3	19	0.04	0.04	0.22	*
Italy	IT		0	0	10	0.00	0.00	0.02	*
Liechtenstein	LT		0	0	0	0.00	0.00	0.00	NA
Luxembourg	LU		1	3	2.5	0.21	0.57	0.42	NS
Malta	MT		1	2	0	0.25	0.48	0.00	NS
Monaco	MC		1	1	1	2.96	2.65	2.58	NS
Netherlands	NL		50	56	62	0.31	0.33	0.36	NS
Norway	NO		16	19	20	0.35	0.38	0.38	NS
Portugal	PT		1	20	44	0.01	0.19	0.43	*
Spain	ES		27	78	92	0.06	0.17	0.20	*
Sweden	SE		10	13	10	0.11	0.14	0.10	NS
Switzerland	CH		7	16	32	0.09	0.20	0.38	*
United Kingdom	UK		305	360	346	0.50	0.57	0.52	*
Turkey	TR	LMI	10	55	5	0.01	0.07	0.01	*

HST: hospital support teams; WHO: World Health Organization; NS: no significance; NA: not available; LMI: low to medium income; HI: high income; ANOVA: analysis of variance; HCT: home care teams; EAPC: European Association for Palliative Care.
[a]Denmark, Luxembourg, Moldova, Norway, Spain, and Ukraine reported existence of mixed teams in 2019. These services were divided into two, half was added to the total number of HCT and half to HST. For more information, see "Methods" section and Centeno et al, 2015. article on service provision.[7]
[b]Regional studies refer to the EAPC Atlas studies 2007, 2012, and 2019.
[c]Adjusted reference value after Bonferrroni correction = $p < 0.0009$. For more information, see "Methods" section.
*$p < 0.001$.

Table 3. Development and trends of IPCS provision in the WHO European region from 2005 to 2019.

Country	ISO code	Income	Number of IPCS identified in regional studies[a] surveys			Ratio of services per 100,000 inhabitants (population changes considered)			Significance resulting from ANOVA test
			2005	2012	2019	2005	2012	2019	*p*-value[b]
Central and Eastern Europe (*n* = 27)									
Croatia	HR	HI	0	0	6	0.00	0.00	0.15	NS
Czech Republic	CZ		10	17	20	0.10	0.16	0.19	NS
Estonia	EE		0	0	1	0.00	0.00	0.08	NS
Hungary	HU		11	13	22	0.11	0.13	0.22	NS
Latvia	LV		5	6	9	0.22	0.29	0.46	NS
Lithuania	LI		6	9	10	0.18	0.30	0.35	NS
Montenegro	ME		0	0	0	0.00	0.00	0.00	NA
Poland	PL		128	145	180	0.34	0.38	0.47	NS

(Continued)

Table 3. (Continued)

Country	ISO code	Income	Number of IPCS identified in regional studies[a] surveys			Ratio of services per 100,000 inhabitants (population changes considered)			Significance resulting from ANOVA test
			2005	2012	2019	2005	2012	2019	*p*-value[b]
Central and Eastern Europe (*n* = 27)									
Russian Federation	RU		107	62	63	0.07	0.04	0.04	*
Slovakia	SK		6	11	15	0.11	0.20	0.28	NS
Slovenia	SI		4	6	10	0.20	0.29	0.48	NS
Albania	AL	LMI	1	0	23	0.03	0.00	0.80	*
Armenia	AM		6	0	2	0.20	0.00	0.07	*
Azerbaijan	AZ		0	0	1	0.00	0.00	0.01	NS
Belarus	BY		0	15	9	0.00	0.16	0.09	*
Bosnia and Herzegovina	BG		NA	1	2	0.00	0.03	0.06	NS
Bulgaria	BA		16	22	47	0.21	0.30	0.66	NS
Georgia	GE		1	2	12	0.03	0.05	0.32	NS
Kazakhstan	KZ		5	5	8	0.03	0.03	0.04	NS
Kyrgyzstan	KG		0	0	9	0.00	0.00	0.15	*
Macedonia	MK		2	12	5	0.10	0.58	0.24	NS
Moldova	MD		0	2	6	0.00	0.06	0.17	NS
Romania	RO		9	25	110	0.04	0.12	0.56	*
Serbia	RS		0	0	13	0.00	0.00	0.19	*
Tajikistan	TJ		0	5	4	0.00	0.06	0.04	NS
Ukraine	UA		14	0	57	0.03	0.00	0.13	*
Uzbekistan	UZ		0	0	0	0.00	0.00	0.00	NA
Western Europe (*n* = 24)									
Austria	AT	HI	25	37	55	0.30	0.44	0.63	NS
Belgium	BE		29	51	53	0.28	0.46	0.47	NS
Cyprus	CY		1	1	1	0.10	0.09	0.08	NS
Denmark	DK		7	28	28	0.13	0.50	0.49	NS
Finland	FI		6	10	14	0.11	0.18	0.25	NS
France	FR		78	107	139	0.12	0.16	0.21	NS
Germany	DE		245	420	568	0.30	0.52	0.69	*
Greece	GR		0	1	1	0.00	0.01	0.01	NS
Iceland	IS		2	2	1	0.67	0.62	0.29	NS
Ireland	IE		8	9	13	0.19	0.20	0.27	NS
Israel	IL		9	10	10	0.13	0.13	0.11	NS
Italy	IT		95	175	240	0.16	0.29	0.40	NS
Liechtenstein	LT		3	3	3	8.61	8.21	7.91	NS
Luxembourg	LU		1	5	5	0.21	0.94	0.84	NS
Malta	MT		0	1	1	0.00	0.24	0.21	NS
Monaco	MC		0	0	1	0.00	0.00	2.58	NS
Netherlands	NL		88	70	70	0.54	0.42	0.41	*
Norway	NO		14	17	21	0.30	0.34	0.40	NS
Portugal	PT		4	22	31	0.04	0.21	0.30	NS
Spain	ES		96	112	64	0.22	0.24	0.14	*
Sweden	SE		45	38	35	0.50	0.40	0.35	*
Switzerland	CH		17	25	53	0.23	0.31	0.63	NS
United Kingdom	UK		221	220	223	0.37	0.35	0.34	*
Turkey	TR	LMI	11	25	158	0.02	0.03	0.20	*

IPCS: inpatient palliative care services; WHO: World Health Organization; NS: no significance; NA: not available; LMI: low to medium income; HI: high income; ANOVA: analysis of variance; EAPC: European Association for Palliative Care.

[a]Regional studies refer to the EAPC Atlas studies 2007, 2012, and 2019.

[b]Adjusted reference value after Bonferrroni correction = $p < 0.0009$. For more information, see "Methods" section.

*$p < 0.001$.

team, inpatient palliative care service, and hospital support team should be supported within these countries.

However, there were specific changes occurring in Central–Eastern European and low-middle-income countries that were positive for the whole region. These subregions and income groups have struggled with developing palliative care and account for those countries burdened especially by health inequalities. Changes reported in Eastern countries such as Russia, Albania, Armenia, Kazakhstan, Kyrgyzstan, Moldova and Ukraine (countries accounting for 15% of the region's population) were hopeful and should be supported.

Yet, 24% of the countries in the region only reported increases of all types of specialized services in the first period, dropping their provision or remaining stagnant in the second period. Causes to remain stagnant can be, for instance, political inactivity related to palliative care or countries achieving a saturation of services covering their need. In the latest, the plateau of specialized services should be accompanied by increasing provision of palliative care at the primary care level. The Astana declaration[11] highlighted palliative care provision at the primary health care level as a relevant component of Universal Health Coverage, recognizing the importance of transcending the specialized service paradigm and broadening palliative care access into primary care to ensure health for all. However, the scope of this study did not include primary palliative care, which should be examined in further studies.

In high-income countries, the most prominent type of service was home care team, reflecting the need for expanding service provision to patients' homes rather than confining them in institutionalized palliative care in specialized facilities. The rise in home care team provision might be showing a regional shift toward bringing closer the services to the patients, which can be indicating the need of expanding palliative care to the primary health care level. This seems to be a natural development with the realization that all patients cannot be, and arguably should not be, taken care of within institutions. In 2012, inpatient palliative care service was the most prominent type of service within high-income countries. Low-middle-income countries found themselves in 2019 in the same position as high income in 2012. In the last period, low-middle-income countries have responded to the growing need of palliative care by creating more inpatient palliative care service, which is the leading service in this group. In low-middle-income countries, changes in home care team have also been significant. This suggests that the natural evolution of palliative care services happens first by increasing numbers of inpatient palliative care service and then expanding care through home care team. This may also be a prerequisite step to the integration of services into primary care.

Hospital support teams were scarce throughout Europe. The fact that these services are not common in Europe could be due to low priority when comparing them with home care teams and inpatient palliative care services. In addition, some inpatient palliative care services act as hospital support services themselves, but according to their tasks, they are not solely hospital support teams. With this regard, hospital support teams might not be either well organized, causing them to mix with other specialized services, or they are included into other streams of service provision as an additional asset.

Although specialized service provision in the region developed in the positive direction, there are many countries that have not achieved EAPC's suggested goals of services per population. In order to continue improving access to palliative care, stakeholders should advocate for the implementation of specialized services and the integration of palliative care into the primary care level.

Strengths

This study builds on the most reliable data on the topic. In light of the absence of official national or regional registers, the data presented in this study are the only largest currently available to depict regional status of specialized palliative care specialized service provision of home care team, hospital support team, and inpatient palliative care service. In addition, this study provides the first regional evaluation using two periods of time for information on the development of specialized palliative care service provision in Europe.

Limitations

Since data can only be approximated, it is also possible that in some countries, the results may be inaccurate. To diminish this possibility, the research team reviewed all databases and discussed data available, country by country and year by year. The data used were the most accurate, to the best of our knowledge. However, the data could not be verified with official registrars. Additionally, the approach of this study did not include the assessment of the quality of the services, which could have provided meaningful complementary information. Further studies should focus on analyzing the quality of the provided services.

Author contributions

N.A-C., E.G., and C.C. made a substantial contribution to the concept or design of the work, or acquisition, analysis, or interpretation of data. J.J.P. and J.L.-F. made substantial contribution to data analysis and its representation. L.D.L., J.Y.R., and R.L. revised the article critically.

Data management and sharing

All EAPC Atlases data can be accessed from http://dadun.unav.edu/handle/10171/56787 or can be asked from egarralda@unav.es.

Declaration of conflicting interests

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Ethical approval

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ORCID iDs

Jesús López-Fidalgo https://orcid.org/0000-0001-7502-8188
John Y Rhee https://orcid.org/0000-0002-2081-5667
Natalia Arias-Casais https://orcid.org/0000-0001-6979-293X

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