



Indicators of integration at ESMO Designated Centres of Integrated Oncology and Palliative Care

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ABSTRACT

Background A recent international consensus panel identified 13 major indicators to assess the level of integration between oncology and palliative care. We examined these indicators among European Society for Medical Oncology (ESMO) Designated Centres (ESMO-DCs) of Integrated Oncology and Palliative Care (PC) and determined the centre characteristics associated with greater integration.

Methods This is a preplanned secondary analysis of a recent survey to characterise the structure, processes and outcomes of the palliative care programmes at ESMO-DCs. We assessed the level of integration using 13 major indicators. We calculated two Palliative Care and Oncology Integration Indexes consisting of all 13 indicators (PCOI-13, range 0–13) and 9 of the 13 indicators (PCOI-9, range 0–9), with a higher index indicating greater integration.

Results The survey response rate was 152/184 (83%). Among the 13 major indicators, interdisciplinary team was most likely to be achieved (95%), while early referral to palliative care (median time from referral to death >6 months before death) was only present in 24 (20%) of ESMO-DCs. The median PCOI-13 was 7.8 (IQR 6.4–9.6) and the median PCOI-9 was 6 (IQR 5–7). The presence of dually trained palliative oncologists was associated with higher PCOI-13 (median 8.4 vs 7.0; $p=0.01$) and PCOI-9 (median 6 vs 5; $p=0.03$). Non-tertiary hospitals generally had higher PCOI-13 (median 8.6 vs 7.2; $p=0.01$) and ESMO-DCs outside of Europe had higher PCOI-9 (median 7 vs 6; $p=0.03$).

Conclusions Assessment of the level of integration at ESMO-DCs with PCOIs highlighted strengths, areas for further development and how double-boarded palliative oncologists may promote integration.

INTRODUCTION

Over the past decade, multiple randomised controlled trials have demonstrated that timely involvement specialist palliative care concurrent with oncological care can improve health outcomes, including quality of life, mood, quality of end-of-life care, illness understanding, patient and caregiver satisfaction and cost of care.^{1–3} Based on this evidence, multiple professional organisations have promoted stronger integration of palliative care and oncology. Institutions worldwide

Key questions

What is already known about this subject?

Multiple professional organizations and guidelines promote integration of oncology and palliative care; however, it is unclear how integration can be assessed.

What does this study add?

For the first time, this study applied 13 pre-defined indicators to quantitatively assess the level of integration among an established cohort of ESMO Designated Centres of Integrated Oncology and Palliative Care.

How might this impact on clinical practice?

This study illustrates how standardized indicators may be used to measure the level of integration of palliative care in cancer hospitals. The ability to quantitatively assess integration may have implications for patients, healthcare professionals, hospital administrators, policy makers and researchers in terms of hospital selection, program development, quality improvement, resource allocation, and benchmarking.

have invested in strengthening their palliative care programmes and developed novel initiatives to enhance collaboration between oncology and palliative care teams.⁴

Since 2003, the European Society for Medical Oncology (ESMO) has awarded the status ‘Designated Centre of Integrated Oncology and Palliative Care (ESMO-DC)’ to over 200 institutions around the world based on a list of 13 *qualitative* criteria related to programme infrastructure, clinical processes, education and research⁵ (table 1). To qualify for this ESMO-DC status, self-nominating hospitals needed to complete an application which were reviewed anonymously by members of the ESMO Designated Centres Working Group. In a recent survey, ESMO-DCs reported a high level of infrastructure and palliative care access.⁶

Given the growing number of centres worldwide providing access to both primary palliative care (delivered by oncology teams

**Table 1** Criteria for ESMO Designated Centre and indicators of integration*

Criteria for accreditation as ESMO Designated Centre in integrated oncology and palliative care	Indicators of integration
1. The Centre is a cancer Centre which provides closely integrated oncology and palliative care clinical services	1. Presence of palliative care inpatient consultation team
2. The Centre is committed to a philosophy of continuity of care and non-abandonment	2. Presence of palliative care outpatient clinic
3. The Centre incorporates expert medical and nursing care in the evaluation and relief of pain and other physical symptoms	3. Presence of interdisciplinary palliative care team
4. The Centre incorporates expert care in the evaluation and relief of psychological and existential distress.	4. Routine symptoms screening
5. The Centre provides routine patient assessment of physical and psychological symptoms and social supports and has an infrastructure that responds with appropriate interventions in a timely manner	5. Early referral to palliative care (>6 months)
6. The Centre provides emergency care of inadequately relieved physical and psychological symptoms	6. Proportion of routine documentation of advance care plan, median (IQR)
7. The Centre provides facilities and expert care for inpatient symptom stabilisation	7. Proportion of outpatients with pain assessed before death, median (IQR)
8. The Centre incorporates programmatic support of family members	8. Proportion of patients with two or more emergency room visits in last 30 days of life, median (IQR)
9. The Centre provides high level home care with expert back-up and coordination of home care with primary cancer clinicians	9. Proportion of place of death consistent with patient's preference, median (IQR)
10. The Centre provides respite care for ambulatory patients for patients unable to cope at home or in cases of family fatigue	10. Didactic palliative care curriculum
11. The Centre provides facilities and expert care for inpatient end-of-life (terminal) care and is committed to providing adequate relief of suffering for dying patients	11. Continuing education in palliative care
12. The Centre participates in basic or clinical research related to palliative care and the quality of life of patients with cancer and their families	12. Combined palliative care and oncology educational activities
13. The Centre is involved in clinician education to improve the integration of oncology and palliative care	13. Routine rotation in palliative care for oncology fellows

ESMO, European Society for Medical Oncology.

*The criteria for ESMO Designated Centre and indicators of integration were developed independently. Although they both have 13 items, the item numbers do not correspond to each other.

and/or primary care) and secondary palliative care (delivered by specialist palliative care teams),^{7 8} it is important to be able to *quantify* the level of integration at each centre. A better understanding of the extent of integration at the institution level would allow patients and clinicians to identify centres of excellence for palliative care delivery, policy makers and hospital administrators to triage resources and identify quality improvement opportunities and researchers to quantify the level of integration and measure progress in different regions and across time.

Using the Delphi methodology, we recently developed a set of 13 major indicators of integration of palliative care and oncology programmes for patients with advanced cancer in hospitals with ≥ 100 beds, including 2 related to structure, 4 on processes, 3 on outcomes and 4 on education⁹ (table 1). These indicators achieved high level of consensus (70%–100%) among a cohort of international experts. However, this set of indicators has

not been tested empirically. The ESMO-DCs represent a cohort selected for meeting predefined standards of integration. The objective of this study is to characterise the level of integration among ESMO-DCs by applying this set of 13 indicators and to examine centre characteristics associated with a higher level of integration.

METHODS

Survey

This is a preplanned secondary analysis to examine the level of integration among ESMO-DCs using 13 indicators. Details of this survey have been described in a previous publication.⁶ Briefly, we sent a 78-question survey all 184 ESMO-DCs that were active at the time of study to inquire about the clinical delivery of palliative care, the level of primary palliative care delivery by oncologists, education, research and attitudes and beliefs towards the ESMO designation. This survey was conducted by

Table 2 Responses to questions on major indicators of integration

Major indicators	Response	Number of responses* N (%)	Number of affirmative responses†, N (%)‡
1. Presence of palliative care inpatient consultation team	Yes/No	151 (99)	136 (90)
2. Presence of palliative care outpatient clinic	Yes/No	151 (99)	135 (89)
3. Presence of interdisciplinary palliative care team§	Yes/No	152 (100)	144 (95)
4. Routine symptoms screening	Yes/No	151 (99)	118 (78)
5. Early referral to palliative care (>6 months)¶	Yes/No	121 (80)	24 (20)
6. Proportion of routine documentation of advance care plan, median (IQR)	0%–100%	92 (61)	20 (10, 38)
7. Proportion of outpatients with pain assessed before death, median (IQR)	0%–100%	134 (88)	90 (70, 100)
8. Proportion of patients with two or more emergency room visits in last 30 days of life, median (IQR)**	0%–100%	112 (74)	20 (10, 40)
9. Proportion of place of death consistent with patient's preference, median (IQR)	0%–100%	109 (72)	70 (50, 80)
10. Didactic palliative care curriculum	Yes/No	150 (99)	78 (52)
11. Continuing education in palliative care	Yes/No	150 (99)	109 (73)
12. Combined palliative care and oncology educational activities	Yes/No	150 (99)	109 (73)
13. Routine rotation in palliative care for oncology fellows	Yes/No	147 (97)	47 (32)

*The number of responses obtained from the 152 respondents for each major indicator.

†For questions with a dichotomised response (ie, questions #1–5, #10–13), 1 point was given for an affirmative response (ie, 'present' or 'yes'). For questions with continuous variable as response (ie, questions #6–#9), we assigned a score between 0 and 1 based on the proportion of patients.

‡Unless otherwise specified.

§Defined as of at least one physician, one nurse and one psychosocial team member, such as psychologist/counsellor, chaplain or social worker.

¶Defined as median interval between referral to outpatient palliative care to death of ≥ 6 months. Centres without outpatient palliative care were coded as no.

**This variable was reverse coded for integration index calculation (ie, 100%–response).

the ESMO Designated Centre Working Group leadership after receiving approval from ESMO.

Data collection

The questions and possible responses for the 13 major indicators of integration are shown in [table 2](#). We also prespecified several key ESMO-DC characteristics to examine institutional factors associated with a higher level of integration. These included continent (Europe vs non-Europe), hospital type (tertiary care vs non-tertiary care), centre type (cancer centre vs non-cancer centre), hospital size (≥ 500 beds vs < 500 beds), years of palliative care programme (< 5 years vs 5–10 years vs > 10 years), dually trained palliative oncologists (present vs absent) and fellowship programme in palliative care (present vs absent).

Statistical considerations

We used standard descriptive statistics including means, SD, medians, ranges, IQRs, frequencies and proportions to summarise the data.

We calculated a Palliative Care and Oncology Integration Index (PCOI-13) from 0 to 13 by adding the individual

items, with a higher index indicating a greater level of integration. For questions with a dichotomised response, 1 point was given for an affirmative response. For questions with continuous variable as response (ie, questions #6–#9), we assigned a score between 0 and 1 based on the proportion of patients (eg, 78%=0.78; except for question 8 which was reverse scored 78%=0.22). Due to the lack of a gold standard to assess the relative importance of each indicator, weighing was not conducted. Lack of response was assigned a score of 0. For both PCOI-13 and PCOI-9, missing data were assigned a score of 0, which was the worst-case scenario.

Because the responses to three questions related to outcomes data (#7, #8, #9) and one question related to advance care plans (#5) were proportions that were based on estimations, we developed a shortened version, Palliative Care and Oncology Integration Index (PCOI-9), by omitting these four questions to simplify scoring. Thus, PCOI-9 focuses on structures, processes and educational aspects of integration, and the index score ranges from 0 to 9.

The Wilcoxon rank-sum test or Kruskal-Wallis test were used to examine the association between ESMO-DC characteristics and the PCOI scores. As part of sensitivity analysis, we also conducted multiple imputation for missing data by assuming multivariate normal distribution.

The Statistical Analysis System (SAS V.9.4, SAS, Cary, North Carolina, USA) was used for statistical analysis. A *p* value of <0.05 was considered to be statistically significant.

RESULTS

Centre characteristics

Of the 184 ESMO-DCs invited to participate in this survey, 152 (83%) responded and their characteristics have been reported previously.⁶ Briefly, a majority of respondents were from Europe (*n*=115, 76%). Eighty-seven (57%) were tertiary care hospitals and 65 (49%) identified themselves as cancer centres. The median number of inpatient beds was 555 (IQR 272–976). Over half of the palliative care programmes (*n*=82, 54%) had been operating for or more than 10 years. These programmes were well-staffed with interdisciplinary teams that included physicians (97%), nurses (98%), psychologists/counsellors (81%), social workers (80%), chaplains (79%), dieticians (76%), physiotherapists/occupational therapists (69%) and other allied health professionals. Approximately two-thirds had specialists who were dually board certified in both oncology and palliative care (*n*=99, 65%) and one-third had palliative care fellowship programmes (*n*=59, 39%).

Integration indicators and indexes

Figure 1 and table 2 show the availability of data and level of each individual indicator. The frequency of missing data ranged from 0% to 39%. Specifically, fewer centres were able to provide answers to questions on advance care plans and the outcomes ‘place of death’ and ‘emergency visits’. Among the 13 major indicators, interdisciplinary team was most likely to be achieved (95%), while early referral to palliative care (median time from referral to death >6 months before death) was only present in 24 (20%) of ESMO-DCs (figure 1).

The median PCOI-13 was 7.8 (IQR 6.4–9.5, range 1–11.8) and the median PCOI-9 was 6 (IQR 5–7, range 1–9) (figure 2). The indexes were similar with multiple imputation (PCOI-13: median 8.0 (IQR 6.7–9.2, range 3.6–11.4); PCOI-9: median 6 (IQR 5–7, range 1.9–9)).

Association between integration indexes and centre characteristics

As shown in table 3, a higher PCOI-13 index was significantly associated with presence of dually trained palliative oncologists (median 8.4 vs 7.0; *p*=0.01) and non-tertiary hospitals (median 8.6 vs 7.2; *p*=0.01). PCOI-13 was not significantly associated with continent, cancer centre designation, hospital size, years of palliative care programme or the presence of palliative care fellowship among ESMO-DCs.

PCOI-9 was also significantly associated with presence of dually trained palliative oncologists (median 6 vs 5; *p*=0.03) and non-European centres (median 7 vs 6; *p*=0.03), but not hospital type, cancer centre designation,

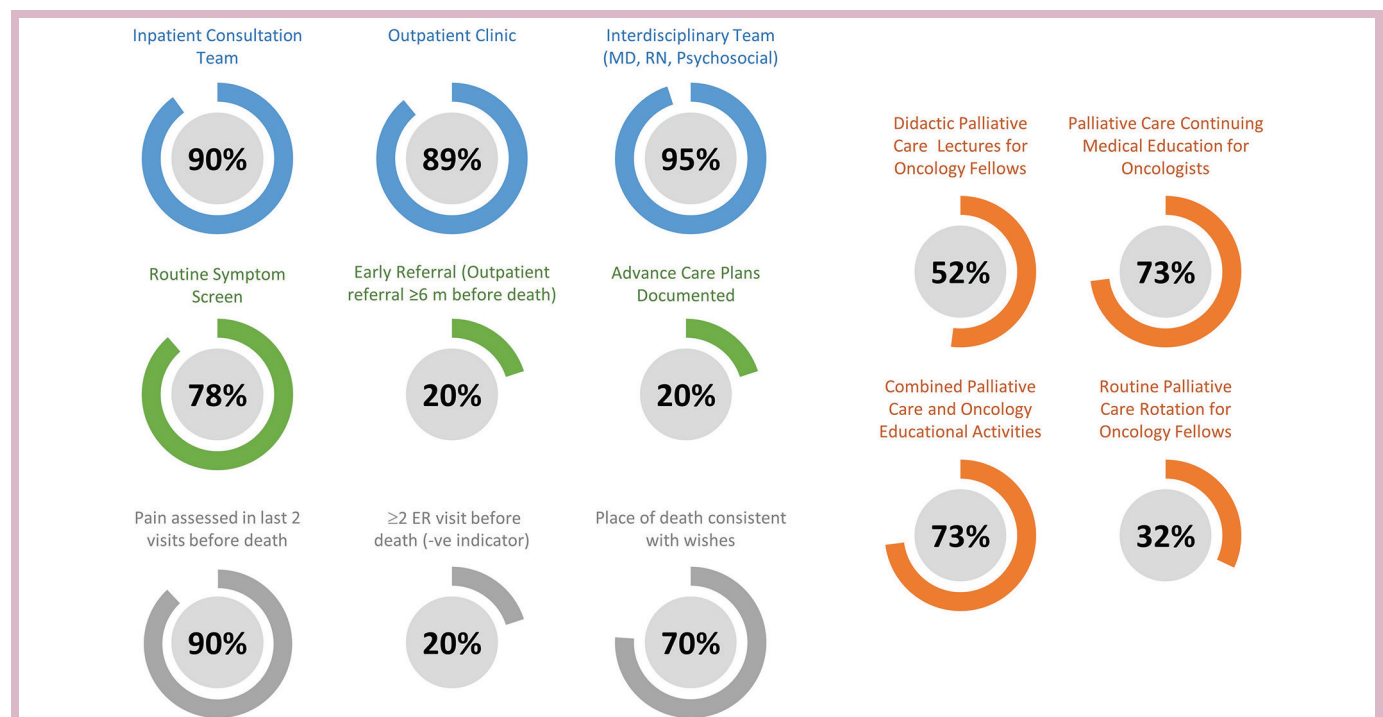


Figure 1 Graphic display of integration indicators. The indicators were colour-coded by categories: structures of palliative care programmes in blue (*n*=3), processes in green (*n*=3), outcomes in grey (*n*=3) and education in orange (*n*=4).

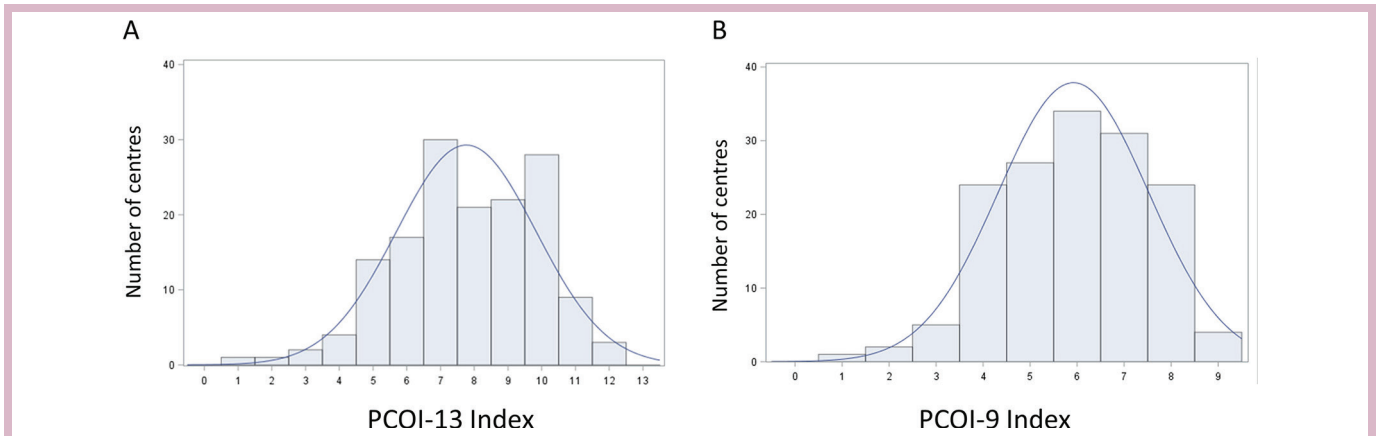


Figure 2 Distribution of PCOIs. (A) PCOI-13 index, (B) PCOI-9 index. PCOI, Palliative Care and Oncology Integration Index.

Table 3 Association between integration indexes and centre characteristics

	PCOI-13 (0–13 points)*			PCOI-9 (0–9 points)†		
	N	Median (IQR)	P values	N	Median (IQR)	P values
Continent						
Europe	115	7.7 (6.3–9.4)	0.30	115	6 (5–7)	0.03
Non-Europe	37	8.4 (6.6–9.8)		37	7 (6–7)	
Hospital type						
Non-tertiary	65	8.6 (6.9–9.8)	0.01	65	6 (5–7)	0.13
Tertiary	87	7.2 (6.1–8.9)		87	6 (5–7)	
Cancer centre type						
Cancer centre	74	7.9 (6.31–9.4)	0.60	74	6 (5–7)	0.62
Non-cancer centre	78	7.8 (6.4–9.6)		78	6 (4–7)	
Hospital size						
Beds≥500	83	7.8 (6.5–9.5)	0.96	83	6 (5–7)	0.99
Beds<500	69	7.8 (6.3–9.6)		69	6 (5–7)	
Years of palliative care programme						
<5 years	26	7.3 (6–8.84)	0.55	26	5.5 (4–7)	0.31
5–10 years	44	7.9 (6.3–9.5)		44	6 (5–7)	
>10 years	82	8.2 (6.4–9.6)		82	6 (5–7)	
Specialists dually board certified in palliative care and oncology						
Present	99	8.4 (6.7–9.7)	0.01	99	6 (5–7)	0.03
Absent	53	7.0 (5.9–8.5)		53	5 (5–7)	
Fellowship in palliative care						
Present	59	8.1 (6.8–9.6)	0.38	59	6 (5–7)	0.15
Absent	91	7.7 (6.1–9.6)		91	6 (4–7)	

*This represents a composite score based on all 13 major criteria. For questions with a dichotomised response, 1 point was given for an affirmative response. For questions with continuous variable as response (ie, questions #6–#9), we assigned a score between 0 and 1 based on the proportion of patients. Lack of response was assigned a score of 0. The total score ranges from 0 to 13, with a higher index indicating a greater level of integration.

†This represents a composite score based 9 of the 13 major criteria (excluding items 6, 7, 8 and 9). For questions with a dichotomised response, 1 point was given for an affirmative response. Lack of response was assigned a score of 0. The total score ranges from 0 to 9, with a higher index indicating a greater level of integration.

PCOI-13, Palliative Care and Oncology Integration Index-13; PCOI-9, Palliative Care and Oncology Integration Index-9.

hospital size, years of palliative care programme or the presence of palliative care fellowship among ESMO-DCs. Sensitivity analyses with multiple imputation showed highly consistent findings (online supplementary appendix table).

DISCUSSION

We quantitatively assessed the level of integration of oncology and palliative care in a well-defined cohort of ESMO-DCs using a list of 13 major indicators that has been proposed previously.⁹ Examination of the individual major indicators offered important insights into the level of integration at ESMO-DCs. These centres generally had high levels of palliative care programme infrastructure and interprofessional staffing. Timing of referral, documentation of advance care plans and education represent some aspects for further development. Interestingly, higher levels of integration were reported in centres that incorporated dually trained palliative oncologists and non-tertiary medical centres. There was also a trend for higher integration in ESMO-DCs outside of Europe. Our findings highlight important progress among ESMO-DCs to date, underscore opportunities for further integration and facilitate benchmarking with other health systems.

Individual major indicators

One important marker of integration is timely referral (indicator #5). While the optimal timing of outpatient palliative care referral is a topic of debate, a recent international panel of oncologists and palliative care specialists reached a consensus of at least 6 months prior to death,¹⁰ which is supported by existing studies.^{11–13} Indeed, many of the palliative care interventions, such as symptom management, counselling, advance care planning and prognostic discussions, are longitudinal processes that necessitate timely initiation and proper follow-up with repeated visits. In this survey, only 20% of ESMO-DCs met this 6-month referral threshold. Some institutions may feel that this threshold is too rigid, especially if a high level of primary palliative care is already provided by oncology team. The optimal level of primary palliative care remains a subject of active investigation.^{7,14}

Documentation of advance care plan was not routinely conducted even among ESMO-DCs (indicator #6). Previous studies documented multiple barriers to advance care planning, including insufficient preparation and uptake of advance care plan by healthcare professionals,¹⁵ poor communication skills,¹⁶ religion,¹⁷ culture¹⁸ and country.¹⁹ Patients may also wish to focus on the process of addressing end-of-life issues without necessarily completing legal documents.²⁰ Together with late referral to specialist palliative care, the lack of advance care planning may suggest that many ESMO-DCs can focus on earlier integration to include palliative interventions beyond symptom control.

Only 32% of centres reported that they had routine rotations in palliative care for oncology fellows (indicator

#13). A dedicated clinical rotation provides the opportunity for the next generation of oncologists to acquire knowledge related to palliative care domains and develops their clinical and communication skills,¹⁴ understands when and why patients should be referred to specialist palliative care team¹⁰ and cultivates the professional relationship with palliative care team members. In some countries, this may be limited by curriculum demands that are out of control of individual training programmes. As palliative care becomes accredited in more countries, this number will likely grow as well.

Assessing integration in the real world context

Integration is an abstract and ill-defined concept. Based on a recent systematic review that examined 38 aspects of integration, it can be defined as ‘shared vision between oncology and palliative care to improve the processes and outcomes of patient care through enhanced communication, coordination and resources’.⁴ It is important to point out that the criteria for accreditation of ESMO-DCs differed substantially from the indicators for integration (table 1). The criteria for accreditation were qualitative in nature and assessed major themes of integration more globally based on descriptive free-text; in contrast, the 13 indicators were quantitative in nature and focused on specific aspects of integration that were selected by an international panel of experts in a Delphi consensus process.⁹ Thus, the ESMO-DCs accreditation criteria and indicators of integration are complementary to each other.

Application of the proposed integration index in this real-world cohort has been instructive in multiple ways. First, data for the 13 major indicators were not always available. Imputation analyses showed similar findings. Second, few ESMO-DCs fulfilled all indicators—the median PCOI-13 index was 8/13, suggesting that there may be multiple paths to achieve the high international standards established by ESMO.⁵ Third, the indexes set a relatively high standard and some of the criteria may be ‘aspirational’. This highlights opportunities for further development to promote high-quality integrated care. Fourth, the ESMO-DCs data may be used for benchmarking in future studies assessing the level of integration over time and in other regions/countries. Future studies should examine if cancer centres with higher PCOI scores have improved patient outcomes (eg, quality of life).

Factors associated with integration

We identified several characteristics associated with higher level of integration, providing support for discriminatory ability of these integration indexes even among highly integrated centres.

The presence of dually trained palliative oncologists was associated with higher integration indexes. These individuals have invested in extended training to be proficient in both specialties and have acquired an in-depth understanding of the complexities of both fields.

Uniquely qualified, palliative oncologists are particularly well-positioned to catalyse the cross-pollination between the disciplines, stimulate interest in palliative care among oncologists and vice versa and facilitate the development of clinical initiatives, education and research aimed at promoting integration.²¹ We did not inquire about practices in management of anticancer treatment toxicities at ESMO-DCs; however, palliative oncologists may also be actively involved in this aspect.²² Indeed, the presence of palliative oncologists may indicate commitment of institutional leaders in advancing palliative care at their institutions. Furthermore, because dual certification requires a formal training programme and specialty accreditation, palliative oncologists may be more likely to be present in countries with more mature palliative care programmes. As more countries formalise the accreditation process for palliative care, the number of palliative oncologists worldwide is likely to grow. More research is needed to understand the role and function of palliative oncologists in different countries.

ESMO-DCs outside of Europe had a trend towards higher PCOI scores. One potential explanation is that centres in non-European countries had a higher threshold before applying for the ESMO designation. Also, the definitions of the 13 criteria may have been read variable in different countries (eg, routine symptom screening may include toxicity documentation or full symptom checklists). Another reason is that European centres had different models of palliative care delivery that were not fully reflected by the major indicators, and the use of minor indicators⁹ may be considered. However, it should be noted that European representatives were actively involved (5/10 (50%) of steering committee members and 11/60 (18%) of panellists) in the development of the major indicators⁵ and a high level of consensus ($\geq 70\%$) was reached. Finally, the timing of referral and palliative care educational programmes are particularly heterogeneous among European countries, which could explain the lower integration indexes. Further research is needed to differentiate among these possibilities.

Interestingly, non-tertiary care hospitals were also more likely to have a higher integration index than tertiary care centres among ESMO-DCs. This observation is somewhat surprising because larger academic centres often have more resources. We postulate that in smaller centres it may be easier to integrate oncology and palliative care teams because of closer working relationships and less complex organisational and administrative structures.

Limitations

This study has several limitations. First, ESMO-DC are, by definition, models of integration. This may contribute to a lack of observed statistical significance in between-group comparisons because of the relatively homogeneous sample. Indeed, the magnitude of between-group differences in this study was relatively small even when statistically significant. Future studies should examine other more diverse samples. Second, we were unable to

collect information on 24% of ESMO-DCs; however, the relatively high response rate implies that our data should be representative of this group of cancer centres. Third, we conducted multiple testing in this small sample size. Thus, the factors associated with higher level of integration need to be considered as hypothesis-generating because of potential false-negative and false-positive findings. Fourth, the data obtained were by self-report only, which may contribute to reporting bias. Fifth, the integration indexes had some missing data, particularly for centre outcomes and advance care planning. We addressed missing data with both the worst-case scenario analysis and multiple imputation. Sixth, to minimise study burden, we were only able to assess the 13 major indicators in this study and not the 30 minor indicators.⁹

Summary

The 13 major indicators and associated indexes were used to quantitatively assess the level of integration at ESMO-DCs. This study highlighted the need to improve on timely referral, integration of palliative interventions beyond symptom management and education programmes among ESMO-DCs and highlighted how palliative oncologists may help to accelerate the process of integration. The use of these indicators and indexes has the potential to facilitate identification of centres of excellence in palliative care delivery, identify gaps in programme development and measure progress in integration across time and regions.

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Provenance and peer review Not commissioned; externally peer reviewed.

Data sharing statement Data available on request.

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