Clinical Oncology 32 (2020) e19–e26

Contents lists available at ScienceDirect

Clinical Oncology

journal homepage: www.clinicaloncologyonline.net

Original Article

Medical Oncology Workload in Europe: One Continent, Several Worlds

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Received 22 January 2019; received in revised form 16 April 2019; accepted 23 May 2019

Abstract

Aims: The workload pressure on medical oncologists will increase in the near future. There are no comprehensive data available about the current workload of medical oncologists in Europe. Here we report the European results of a global survey of the workload of medical oncologists.
Materials and methods: An online survey was distributed through a snowball method via national oncology societies to chemotherapy-prescribing physicians in 21 European countries. We compared the workload of medical oncologists in Eastern European countries (EECs) and Western European countries (WECs). The primary measure of workload was the annual number of new cancer patient consults seen per oncologist.
Results: In total, 495 oncologists from 16 European countries completed our survey: 100 from seven EECs and 395 from nine WECs. The median number of annual consults per medical oncologist was 225 in EECs compared with 175 in WECs ($P < 0.001$). The proportion of medical oncologists seeing more than 300 consults/year was 35% (35/100) in EECs compared with 18% (68/395) in WECs. The median number of patients seen in a full day clinic was 25 in EECs and 15 in WECs ($P < 0.001$). Eastern European medical oncologists reported spending a median of 25 min per new consultation compared with 45 min in WECs ($P < 0.001$). The top two reported barriers in both EECs and WECs to patient care were high clinical volumes and insufficient time for reading.
Conclusion: The clinical workload of medical oncologists in EECs was substantially higher than in WECs. European health policymakers and educators need to address existing disparities in the workload of medical oncologist, undertake plans for future workforce supply and consider alternative models of care.

Key words: Europe; medical oncology; workload

Introduction

There were an estimated 3.45 million new cases of cancer and 1.75 million deaths from cancer in 40 European countries in 2012 [1]. GLOBOCAN projects 5.21 million new cancer cases and 2.56 million cancer deaths in Europe in

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https://doi.org/10.1016/j.clon.2019.06.017
0936-6555/

2040 [2]. Despite legislation by the European Union, cancer care still varies substantially among European Union countries [3]. Higher wealth and higher health expenditures are associated with both increased cancer incidence and decreased cancer mortality within the European Union [4]. Inequality in care leads to up to 40% higher cancer survival rates in Western Europe than in Eastern Europe [5].

According to the statement of the European Society of Medical Oncology, medical oncologists play an essential role in the multidisciplinary team, which is required for high-quality cancer care and cancer research [6]. The increasing number of cancer patients within the aging European population and rapidly developing complexity of new systemic anticancer therapy will increase workload pressure on medical oncologists in the near future. The suggested maximum annual caseload of new patient consults per medical oncologist is between 150 and 175 [7,8]. The results of the Australian medical oncologist workforce study showed that there was a shortage of medical oncologists in 2009, which will persist in the future; the average number of new patients seen was 270 [9]. The results of our recent global study showed that a half of medical oncologists internationally exceed the suggested maximum annual case volume even in high-income countries and there is a huge deficit of medical oncologists in lower-income countries [10].

There is a lack of comprehensive workload data for medical oncology in Europe. These data are needed to guide policymakers and educators in anticipation of future workload needs. To address this gap in knowledge, we report the European results of a global study in which we describe the clinical workload of European medical oncologists.

Materials and Methods

Study Population

We have recently reported the results of our study of global medical oncology workload and the Canadian results of the corresponding study [10,11]. The study population of the European substudy included any practicing physician who delivered chemotherapy; trainees were not eligible. The web-based survey was distributed using a modified snowball methodology to oncologists in the 21 European countries. Contact was preferentially directed to established national associations of medical oncologists; if this was not possible, we approached one personal contact per country to invite participation and to distribute the survey via an informal national network (Supplementary Table S1).

Survey Design and Distribution

The details of the survey design and distribution for this study have been previously described [10,11]. An online electronic survey questionnaire was developed via Fluid Surveys. The survey was designed with multidisciplinary input of the study investigators. A complete survey was then piloted and subsequently revised. The final survey included 51 questions and took 10–15 min to complete. Distribution of this survey utilised two primary methods. The senior investigator (CMB) contacted individuals and regional oncology associations in order to create a broad distribution network. Whether the national contact was an association or an individual, they were provided with an electronic link to the survey to distribute to their national membership/network. The survey was distributed in November 2016. A second reminder e-mail was sent via all national contacts in January 2017.

Statistical Analysis

Because of the known disparities in cancer care across Europe, we classified participating countries into Eastern and Western European countries (EECs and WECs, respectively). For the purposes of the statistical analysis we included Turkey in the group of EECs. The primary objective was to compare the workload of medical oncologists in EECs with the workload of oncologists practicing in the WECs. The workload of medical oncologists was defined as the annual number of new cancer patient consults seen per oncologist. All data were initially collected in Fluid Surveys and subsequently exported to IBM SPSS (version 24.0 for Windows). Data consisted of categorical, ordinal and continuous formats, occasionally collected as ranges (e.g. <50, 51–100, 101–150, etc.). In the latter case, medians were generated using the midpoint of the categorical range (e.g. a median value of 101–150 would be reported as 125). Pearson chi-square tests were used to test for differences in proportions for categorical variables and the Mann–Whitney U was used to compare ordinal and continuous data between EECs and WECs. $P < 0.05$ was deemed statistically significant. No adjustments for multiple comparisons were made.

Results

Survey Distribution and Response

Medical oncologists from 21 European countries were invited to participate in this global study; 16 (76%) countries agreed to participate. There were 495 complete responses: 100 medical oncologists from seven EECs (Hungary 41, Slovenia 25, Turkey 12, Estonia 10, Romania 5, Serbia 4 and Bosnia 3) and 395 medical oncologists from nine WECs (Spain 134, UK 93, Sweden 41, France 31, Greece 25, Italy 25, Finland 21, Portugal 16 and Switzerland 9). The overall survey response rate among countries for whom a denominator was known was 11% (313/2912) (Supplementary Table S1).

Characteristics of Study Participants

The characteristics of respondents are summarised in Table 1. The median age of respondents was 46 years; 45% (221/495) were men and 86% (423/495) were medical

oncologists. EECs respondents were older than those from WECs (47 years versus 45 years; $P = 0.040$). Twelve per cent (59/495) of all respondents prescribed radiation in addition to chemotherapy. The median years of postgraduate training in EECs and WECs was 7 and 6 years, respectively ($P = 0.001$).

Clinical Practice Setting

The results are reported in Table 1. Eighty-four per cent (418/495) of European medical oncologists reported working exclusively in the public health system and there was no difference between EECs and WECs. Practicing physicians in WECs worked less often in the hospital inpatient setting compared with those in EECs (71% [280/395] versus 87% [87/100]; $P = 0.001$). There were fewer reported oncology inpatient beds at WEC centres as compared with EEC centres ($P < 0.001$); 32% (126/395) medical oncologists from WECs worked at centres with more than 50 oncology beds compared with 61% (61/100) of medical oncologists from EECs. Despite having fewer inpatient beds, the number of chemotherapy-prescribing physicians in WECs was higher than in centres from EECs: 49% (194/395) of WECs centres had more than 15 chemotherapy physicians versus 35% (35/100) of centres in EECs ($P = 0.025$). Medical oncologists in WECs reported greater access to on-site radiation (83% [327/395] versus 69% [69/100]; $P = 0.006$), palliative care (86% [341/395] versus 65% [65/100]; $P < 0.001$] and chemotherapy pharmacists (87% [342/395] versus 76% [76/100]; $P = 0.018$) than medical oncologists in EECs.

Ninety per cent (354/395) of medical oncologists from WECs supervised trainees as compared with 77% (77/100, $P = 0.001$) of medical oncologists from EECs. Eighty-two per cent (342/395) and 76% (76/100) of respondents from WECs and EECs, respectively, reported having medical oncologist training programmes at their centre ($P = 0.425$). Electronic medical records were available to 97% (97/100) of respondents from EECs compared with 85% (333/395) of respondents from WECs ($P = 0.001$). Medical oncologists from EECs were less likely than medical oncologists from WECs to have additional advanced service extenders, including nurse practitioners (47% [47/100] versus 56% [222/395]; $P = 0.099$), medical students (15% [15/100] versus 35% [140/395]; $P < 0.001$) and residents (54% [54/100] versus 68% [270/395]; $P = 0.007$).

Delivery of Clinical Care

The results are presented in Table 2. Overall, respondents in both WECs and EECs reported working a median of 5 days per week and 45 h per week. Medical oncologists from both regions had a median of 5 weeks of annual vacation. Although medical oncologists in WECs had a median of 2 weeks of annual conference leave, those in EECs had a median of 1 week of annual conference leave ($P = 0.030$). Medical oncologists in EECs and WECs reported being on-call a median of 4 and 3 nights per month, respectively ($P = 0.005$). As compared with medical oncologists in WECs, those in EECs were more likely to be on-call every night (27% versus 10%, $P < 0.001$). Twenty-three per cent (23/100) of medical oncologists in EECs and 17% (66/395) of medical oncologists in WECs reported treating all tumour sites ($P = 0.143$).

Clinical Volumes

The results are summarised in Table 3. The median number of new consults per year among medical oncologists in EECs was 225 as compared with 175 for medical oncologists in WECs ($P < 0.001$). The proportion of medical oncologists seeing more than 300 consults/year was 37% (37/100) and 18% (68/395) in EECs and WECs, respectively ($P < 0.001$). It is notable that 22% (22/100) of medical oncologists in EECs and 8% (33/395) in WECs reported more than 500 new consults/year. The median number of new consults per year among all countries (in decreasing order) was: Turkey 475, Switzerland 425, Italy 375, Bosnia-Herzegovina 225, Hungary 225, Slovenia 225, Estonia 175, Finland 175, France 175, Greece 175, Portugal 175, Romania 175, Sweden 175, UK 175, Serbia 125 and Spain 125 (Supplementary Table S2).

The median number of patients seen in a full day clinic was 25 in EECs and 15 in WECs ($P < 0.001$). The proportion of medical oncologists seeing more than 30 patients per clinic day was 35% (35/100) in EECs and 8% (32/395) in WECs ($P < 0.001$). There were no differences in the median waiting time for a referred patient to be seen in consultation between the two groups (4–7 days for both). Medical oncologists in EECs reported spending a median of 25 min with each new patient compared with 45 min for medical oncologists in WECs ($P < 0.001$). In both groups, physicians spent 15 min with patients who were already on treatment.

Satisfaction, Barriers and Challenges

The median job satisfaction score on a 10-point Likert scale (higher scores represent higher satisfaction) was 8 in both European regions. The proportion of medical oncologists who were the least satisfied (median job satisfaction score ≤ 5) was 20% (20/100) in EECs and 8% (31/395) in WECs ($P = 0.013$). The proportion of medical oncologists who were the most satisfied (median job satisfaction score ≥ 9) was 23% (23/100) in EECs and 31% (122/395) in WECs ($P = 0.013$). The top five reported barriers to patient care are shown in Supplementary Table S3.

Discussion

Here we describe the workload among European medical oncologists. Given the known disparities in care within Europe, we conducted a comparative analysis between EECs and WECs. Several important findings have emerged. First, the median number of new patients reported per year was 175 in WECs as compared with 225 in EECs. Second, as compared with those in EECs, medical oncologists in WECs saw fewer patients per day but spent more time with each patient. Third, medical oncologists in WECs had more

Table 1
Demographics and clinical practice setting of respondents to a global medical oncology workload survey for Eastern European countries (EECs) compared with Western European countries (WECs)*

	EECs $n = 100$ (%)	WECs $n = 395$ (%)	*P*-value
Demographics			
Gender			
Male	39 (39)	182 (46)	0.224
Female	60 (60)	212 (54)	
Age (median)	47	45	0.040
Years in practice (median)	12	11	0.313
Specialty			
Medical oncologist	82 (82)	341 (86)	0.170
Clinical oncologist	12 (12)	45 (11)	
Paediatric oncologist	0 (0)	2 (1)	
Haematologist	2 (2)	3 (1)	
Other	4 (4)	4 (1)	
Years of postgraduate training (median)	7	6	0.001
Completed training in home country			
Yes	97 (97)	373 (94)	0.126
No	1 (1)	19 (5)	
No response	2 (2)	3 (1)	
Treatment offered			
Chemotherapy only	88 (88)	348 (88)	0.978
Chemotherapy and radiation	12 (12)	47 (12)	
Clinical practice setting system			
Public	89 (89)	329 (83)	0.107
Private	6 (6)	18 (5)	
Both	5 (5)	48 (12)	
Setting (can select more than one)			
Hospital inpatient	87 (87)	280 (71)	0.001
Hospital outpatient	86 (86)	364 (92)	0.056
Other outpatient	10 (10)	25 (6)	0.201
Hospital type			
General hospital	57 (57)	278 (70)	0.030
Cancer hospital	43 (43)	116 (29)	
Not in hospital setting	0 (0)	1 (0)	
Oncology inpatient beds in centre			
0	0 (0)	14 (4)	<0.001
1–9	1 (1)	25 (6)	
10–20	14 (14)	51 (13)	
21–50	24 (24)	178 (45)	
51–100	30 (30)	77 (20)	
>100	31 (31)	49 (12)	
Number of chemotherapy-prescribing doctors in centre/clinic			
1	2 (2)	5 (1)	<0.001
2–4	23 (23)	31 (8)	
5–7	20 (20)	53 (13)	
8–10	13 (13)	41 (10)	
11–14	7 (7)	71 (18)	
>15	35 (35)	194 (49)	
Radiotherapy on-site			
Yes	69 (69)	327 (83)	0.006
No	31 (31)	67 (17)	
Palliative care on-site			
Yes	65 (65)	341 (86)	<0.001
No	35 (35)	53 (13)	
Chemotherapy pharmacist on-site			
Yes	76 (76)	342 (87)	0.018
No	24 (24)	51 (13)	
Training programme in centre			
Yes	78 (78)	322 (82)	0.425
No	22 (22)	73 (19)	

Table 1 (*continued*)

	EECs $n = 100$ (%)	WECs $n = 395$ (%)	*P*-value
Supervise trainees			
Yes	77 (77)	354 (90)	0.001
No	23 (23)	41 (10)	
Electronic medical record			
Yes	97 (97)	333 (85)	0.001
No	3 (3)	58 (15)	
Clinic notes (can select more than one)			
Dictated	39 (39)	194 (49)	0.070
Hand-written	29 (29)	123 (31)	0.679
Typed	63 (63)	206 (52)	0.052
Clinic assistants			
Nurse	83 (83)	268 (68)	0.003
Nurse practitioner	47 (47)	222 (56)	0.099
Medical students	15 (15)	140 (35)	<0.001
Residents	54 (54)	270 (68)	0.007
Other physicians	26 (26)	100 (25)	0.889

Percentages do not always equal 100 due to rounding; data were missing for one radiotherapy on-site; one palliative care; two chemotherapy pharmacist responses.

* EECs include Bosnia (3), Estonia (10), Hungary (41), Romania (5), Serbia (4), Slovenia (25) and Turkey (12); WECs include Finland (21), France (31), Greece (25), Italy (25), Portugal (16), Spain (134), Sweden (41), Switzerland (9) and the UK (93).

service extenders, a greater number of on-site colleagues and greater access to on-site radiation, palliative care and chemotherapy pharmacists. Finally, the top two challenges to clinical care reported by European medical oncologists from both groups were high clinical volumes and insufficient time for reading.

According to our data, half of oncologists in WECs and even a higher proportion of medical oncologists in EECs exceed a proposed optimal international standard of 150–175 annual caseload per medical oncologist [7,8]. Although workload in WECs concurs with workload previously reported for other high-income countries, workload in EECs is substantially greater [10,11]. Although a half of medical oncologists in most of Eastern Europe see reasonable case volumes (175–225 new consults per year), the other half sees up to several hundred new consults per year. In the last three decades, post-communist political, economic and social transformation has led to a gradual improvement in health system outcomes in EECs [12]. However, these positive overall trends in health system outcomes may occur at the cost of the overwhelming workload pressure on health professionals, including oncologists, and on the corresponding health care infrastructure. Unfortunately, the future prospect for EECs is dire. An analysis of the European Commission found that the migration of health professionals is especially pronounced from Eastern and Southern Europe to wealthier Western and Northern European countries [13]. It is also concerning

Table 2
Delivery of clinical care reported by respondents to a global medical oncology survey showing results for Eastern European countries (EECs) compared with Western European countries (WECs)*

	EECs $n = 100$ (%)	WECs $n = 395$ (%)	*P*-value
Work week			
No. days worked/week (median)	5	5	0.079†
No. hours worked/week (median)	41–50	41–50	0.956
Leave			
No. annual weeks of vacation (median)	5	5	0.681
No. annual weeks conference leave (median)	1	2	0.030
On-call duties			
No. days on-call/month (median)	4	3	0.005
Respondents on-call every night (*n* (%))	19 (27)	25 (10)	<0.001
Allocation of duties			
% time on clinical duties (mean)	62	64	0.333
% time on research (mean)	9	14	<0.001
% time on teaching (mean)	9	7	0.036
% time on administration (mean)	19	14	0.001

* EECs include Bosnia (3), Estonia (10), Hungary (41), Romania (5), Serbia (4), Slovenia (25) and Turkey (12); WECs include Finland (21), France (31), Greece (25), Italy (25), Portugal (16), Spain (134), Sweden (41), Switzerland (9) and the UK (93).

† The number of days worked had an identical median but the WECs group had a wider range, resulting in a near-significant difference.

that 39–85% of medical students from Eastern Europe plan to seek employment abroad after their graduation [14–16]. These observations may not only negatively affect medical oncology directly but also indirectly, as contemporary cancer care is becoming strongly dependent on other segments of health care. The European Commission and national governments will have to take significant action to protect EECs from a worsening shortage of health care professionals.

Although the overall situation is better in WECs, these countries are not immune to deficits of medical oncologists. The most comprehensive data are available for Spain; with

Table 3
Patient care case volumes reported by respondents to a global medical oncology survey showing results for Eastern European countries (EECs) compared with Western European countries (WECs)*

	EECs $n = 100$ (%)	WECs $n = 395$ (%)	*P*-value
No. annual new consults (median)	225	175	<0.001
<50	0 (0)	17 (4)	
51–100	20 (20)	81 (21)	
101–150	13 (13)	84 (21)	
151–200	12 (12)	63 (16)	
201–250	9 (9)	48 (12)	
251–300	8 (8)	31 (8)	
301–350	1 (1)	10 (3)	
351–400	7 (7)	10 (3)	
401–450	1 (1)	7 (2)	
451–500	6 (6)	8 (2)	
>500	22 (22)	33 (8)	
No. patients seen per clinic day (median)	25	15	<0.001
<10	2 (2)	53 (14)	
10–20	27 (27)	183 (47)	
21–30	35 (35)	124 (32)	
31–40	25 (25)	19 (5)	
41–50	7 (7)	9 (2)	
>50	3 (3)	4 (1)	
Disease sites treated			
All cancers	23 (23)	66 (17)	0.143
Head and neck	23 (23)	46 (12)	0.003
Breast	51 (51)	146 (37)	0.010
Brain	9 (9)	41 (10)	0.683
Endocrine/neuroendocrine	25 (25)	60 (15)	0.020
Gastrointestinal	41 (41)	137 (35)	0.240
Genitourinary	39 (39)	105 (27)	0.015
Gynaecological	31 (31)	77 (20)	0.013
Haematological	1 (1)	1 (0)	0.866
Lung	31 (31)	87 (22)	0.060
Skin	19 (19)	58 (15)	0.287
Sarcoma	24 (24)	61 (15)	0.043
Lymphoma	9 (9)	27 (7)	0.457
Time spent per patient (median minutes)			
New consult	25	45	<0.001
Chemotherapy treatment patient	15	15	<0.001†
No. days new consult wait time (median)	4–7 days	4–7 days	0.145
Tumour board participation			
≤1/week	10 (10)	17 (4)	0.025
>1/week	90 (90)	378 (96)	
Job satisfaction (Likert scale) (median)	8	8	0.013†
≤5	20 (20)	31 (8)	
6	10 (10)	35 (9)	
7	15 (15)	80 (20)	
8	32 (32)	127 (32)	
9	17 (17)	88 (22)	
10	6 (6)	34 (9)	

* EECs include Bosnia (3), Estonia (10), Hungary (41), Romania (5), Serbia (4), Slovenia (25) and Turkey (12); WECs include Finland (21), France (31), Greece (25), Italy (25), Portugal (16), Spain (134), Sweden (41), Switzerland (9) and the UK (93).

† Although the median values for time spent with a chemotherapy patient are identical, the range is different and therefore there is a statistically significant difference overall. The same applies to the median for job satisfaction.

1141 full-time equivalent (FTE) medical oncologists there was already a projected deficit of 211 FTE medical oncologists in 2015 in Spain (with an optimal case volume of 158 new cases per year) [17]. To attain the optimal number of 1881 FTE medical oncologists by 2035, the medical oncology workforce should present an annual average growth of 2.5% in Spain. This estimated growth rate is within the range previously presented for 12 other, mostly western, European countries [18]. In the same study, investigators also reported substantial differences in the ratio of new cancer cases (incidence) versus the number of medical oncologists available in 2008 among participating countries; it was lowest in Hungary (113), Austria (125) and Sweden (136) and highest in the UK (1067) [18]. The Association of Cancer Physicians recently acknowledged a shortage of medical oncologists in the UK [19]. Although the ratio of 1 medical oncologist/100 000 population is standard in other WECs, this goal still needs to be achieved in the UK [20]. For comparison, according to the results of the abovementioned study by Rivera *et al.* [17], in 2015 there were 2.5 FTE medical oncologists per every 100 000 population in Spain. The country-level median number of new consults per year in our study concur with the observation that the situation in Spain is better than in the UK; however, it is possible that the presented workload for both Spain and the UK is underestimated due to selection bias (Supplementary Table S2). As availability of medical oncologists greatly varies among European countries, health policymakers and national governments should work on the implementation of recommended international workload standards for medical oncologists. When planning chemotherapy services on a population basis the optimal chemotherapy utilisation rate could serve as a useful benchmark in this process [21].

In the coming years the workforce needs across Europe may also further increase due to professional burnout. According to the results of a recent European survey, 71% of young oncologists reported evidence of burnout [22]. In this study's best- and worst-case scenarios, 52% (i.e. Northern Europe and the British Isles) and 84% (i.e. Central Europe) of young oncologists reported burnout, respectively. Furthermore, published data suggest that the rate of burnout has been increasing among physicians over time [23]. It is also worrying that the proportion of oncologists who would choose oncology again as their specialty is decreasing over time (79% in 2011 and 51% in 2015) [24]. Similarly, a report of the American Society of Clinical Oncology indicated that 45% of oncologists/haematologists in the USA reported burnout and 34% would consider leaving their current job [25]. In our study we did not ask participants about these pressing issues. Although median job satisfaction was comparable between both groups, the proportion of medical oncologists who were highly unsatisfied with their job was higher in a group of EECs than in WECs. Strategies to enhance job satisfaction should be a priority of health policymakers in Europe.

Our study results should be considered in light of important methodological limitations. First, due to potential selection (volunteer) bias, our results may not be generalisable to all European medical oncologists. The estimated response rate for countries with a known denominator was 11%. As a result of the cultural differences and other unknown factors, the direction of the bias may be uncertain and can differ between European countries. Second, in both groups most oncologists worked in general hospitals and not in cancer centres, which may to some extent underestimate the reported workload, as respondents might have other non-cancer clinical duties. Furthermore, as a great majority of medical oncologists supervised trainees, our results may disproportionately reflect academic medical oncology; this may further underestimate workload as we did not quantify efforts spent on research and scholarship. Third, our data are self-reported and therefore may or may not represent true clinical volumes, as respondents may overestimate workload. Finally, a substantial variation in workloads among countries may render comparisons between EECs and WECs difficult to interpret.

In summary, this study offers high-level insight into the workload of medical oncologists and the delivery of clinical cancer care in Europe. A substantial proportion of medical oncologists exceeds recommended workload targets; this is especially pronounced in EECs. European health policymakers and national governments should jointly initiate appropriate activities to reduce disparities between WECs and EECs to ensure a sustainable future of the medical oncologist workforce in Europe.

Conflicts of Interest

The authors report no conflicts of interest.

Acknowledgements

C.M. Booth is supported as the Canada Research Chair in Population Cancer Care. R. Sullivan acknowledges the support of the NCI Centre for Global Health. B. Seruga acknowledges the support of the Slovenian Research Agency. The authors gratefully acknowledge the following individuals who facilitated the distribution of this global survey in Europe: Dr Semir Beslija (Bosnia), Dr Anneli Elme (Estonia), Dr Heikki Joensuu (Finland), Dr Christophe Le Tourneau (France), Dr Evangelia Razis (Greece), Gyorgy Bodoky (Hungary), Dr Carmine Pinto (Italy), Dr Lius Da Costa (Portugal), Dr Alexandr Eniu (Romania), Dr Sinisa Radulovic (Serbia), Dr Alberto Ocana (Spain), Dr Martin Erlanson (Sweden), Dr Armoud Templeton (Switzerland), Dr Mehmet Artac (Turkey), Dr Johnathan Joffe (UK), Dr Jeanette Dickson (UK).

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.clon.2019.06.017.

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