

ORIGINAL RESEARCH

## Has COVID-19 had a greater impact on female than male oncologists? Results of the ESMO Women for Oncology (W4O) Survey

P. Garrido<sup>1\*</sup>, A. A. Adjei<sup>2</sup>, J. Bajpai<sup>3</sup>, S. Banerjee<sup>4</sup>, A. S. Berghoff<sup>5</sup>, S. P. Choo<sup>6</sup>, E. Felip<sup>7</sup>, A. J. S. Furness<sup>8</sup>, E. Garralda<sup>9</sup>, J. Haanen<sup>10</sup>, A. Letsch<sup>11</sup>, H. Linardou<sup>12</sup>, S. Peters<sup>13</sup>, C. Sessa<sup>14</sup>, J. Tabernero<sup>15</sup>, J. Tsang<sup>16</sup>, J. C.-H. Yang<sup>17</sup> & M. C. Garassino<sup>18</sup>

<sup>1</sup>Universidad de Alcalá, Medical Oncology Department, IRYCIS, Hospital Universitario Ramón y Cajal, Madrid, Spain; <sup>2</sup>Mayo Clinic, Rochester, USA; <sup>3</sup>Tata Memorial Centre, Mumbai, India; <sup>4</sup>The Royal Marsden NHS Foundation Trust, Institute of Cancer Research, London, UK; <sup>5</sup>Division of Oncology, Department of Medicine 1, Medical University of Vienna, Vienna, Austria; <sup>6</sup>Curie Oncology Singapore, National Cancer Centre Singapore, Singapore; <sup>7</sup>Medical Oncology Department, Vall d'Hebron University Hospital, Thoracic Oncology and H&N Cancer Unit, Vall d'Hebron Institute of Oncology (VHIO), UVic-UCC, Barcelona, Spain; <sup>8</sup>Royal Marsden NHS Foundation Trust, London, UK; <sup>9</sup>Early Drug Development Unit, VHIO – Vall d'Hebron Institute of Oncology, HUVH – Vall d'Hebron University Hospital, Barcelona, Spain; <sup>10</sup>Division of Medical Oncology, The Netherlands Cancer Institute (NKI), Amsterdam, Netherlands; <sup>11</sup>Department of Medicine II, Hematology and Oncology, University Hospital Schleswig-Holstein, Kiel, Germany; <sup>12</sup>4th Oncology Department, Metropolitan Hospital, Athens, Greece; <sup>13</sup>Oncology Department – CHUV, Lausanne University, Lausanne; <sup>14</sup>Ente Ospedaliero Cantonale, Oncology Institute of Southern Switzerland, Bellinzona, Switzerland; <sup>15</sup>Medical Oncology Department, Vall d'Hebron University Hospital (HUVH), Vall d'Hebron Institute of Oncology (VHIO), UVic-UCC, Barcelona, Spain; <sup>16</sup>Li Ka Shing Faculty of Medicine, The University of Hong Kong, Hong Kong; <sup>17</sup>Department of Medical Oncology, National Taiwan University Cancer Center, Taipei, Taiwan; <sup>18</sup>Thoracic Oncology Unit, Medical Department, Fondazione IRCCS Istituto Nazionale dei Tumori, Milan, Italy



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**Background:** European Society for Medical Oncology Women for Oncology (ESMO W4O) research has previously shown under-representation of female oncologists in leadership roles. As early reports suggested disproportionate effects of the COVID-19 pandemic on women, the ESMO W4O Committee initiated a study on the impact of the pandemic on the lives of female and male oncologists.

**Methods:** A questionnaire was sent to ESMO members and put on the ESMO website between 8 June 2020 and 2 July 2020. Questions focused on the working (hospital tasks, laboratory tasks, science) and home (household management, childcare, parent care, personal care) lives of oncologists during and after COVID-19-related lockdowns.

**Results:** Of 649 respondents, 541 completed the questionnaire. Of these, 58% reported that COVID-19 had affected their professional career, 83% of whom said this was in a negative way (85% of women versus 76% of men). Approximately 86% reported that COVID-19 had changed their personal life and 82% their family life. Women were again significantly more affected than men: personal life (89% versus 78%;  $P = 0.001$ ); family life (84% versus 77%;  $P = 0.037$ ). During lockdowns, women reported increased time spent on hospital and laboratory tasks compared with men (53% versus 46% and 33% versus 26%, respectively) and a significantly higher proportion of women than men spent less time on science (39% versus 25%) and personal care (58% versus 39%). After confinement, this trend remained for science (42% versus 23%) and personal care (55% versus 36%).

**Conclusions:** The COVID-19 pandemic has adversely affected the professional and home lives of oncologists, especially women. Reduced research time for female oncologists may have long-lasting career consequences, especially for those at key stages in their career. The gender gap for promotion to leadership positions may widen further as a result of the pandemic.

**Key words:** gender, COVID-19, oncology, survey, woman, inequalities

### INTRODUCTION

The gender gap in leadership roles in science and medicine is well documented,<sup>1-4</sup> and early investigations of the impact of the COVID-19 pandemic and associated lockdowns on clinicians, academics and researchers showed disproportionate effects on women.<sup>5-7</sup> Reports showed a declining proportion of women posting studies on preprint servers in the early months of the pandemic, and women registering a smaller proportion of research projects on major registries than

\*Correspondence to: Pilar Garrido, Universidad de Alcalá, Medical Oncology Department, IRYCIS, Hospital Universitario Ramón y Cajal, Carretera de Colmenar Viejo, km. 9,1, 28034, Madrid, Spain. Tel: +34 91 336 8263  
E-mail: [pilargarrido@gmail.com](mailto:pilargarrido@gmail.com) (P. Garrido).

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previously.<sup>5</sup> Gender bias was also reported to be affecting COVID-19 research, with women under-represented as authors of COVID-19-related papers.<sup>6,7</sup>

Concerns were raised that the pandemic could be perpetuating gender inequalities to the detriment of career progression for women. As lockdowns were imposed and workplaces, schools and childcare facilities closed, questions were raised over whether women were increasingly burdened with household and family demands, with less time for work-related activities.

The European Society for Medical Oncology Women for Oncology (ESMO W4O) Committee recognised the importance of investigating the impact of COVID-19 on the working and home lives of oncologists, a large proportion of whom are women.

A survey was therefore carried out between 8 June 2020 and 2 July 2020 to find out whether oncologists were spending more or less time than usual on a wide range of work and home activities during and after periods of lockdown due to the COVID-19 pandemic.

## METHODOLOGY

A questionnaire was developed to address the potential effects of the COVID-19 pandemic on the working and home lives of oncologists during and after they were subject to relevant confinement regulations (lockdown, where people were asked to stay at home except to shop for food, and all but essential services were closed, and after lockdown, where restrictions to stay at home were at least partially lifted and more services were open). The questionnaire consisted of 30 questions (Supplementary Appendix 1 available at <https://doi.org/10.1016/j.esmoop.2021.100131>) and was designed to be completed in <10 min.

An email was sent to 11 956 ESMO members which contained a link to the survey. Email recipients were not restricted from forwarding the link to colleagues, and the survey was also available on the ESMO website and via social media channels. All responses were anonymised.

Descriptive statistics (i.e. absolute and relative frequencies) were provided for all demographics and personal information collected, as well as for variables on the impact of COVID-19 and changes in time dedicated to activities during and after COVID-19 confinement, overall and by gender. Chi-square tests were used to assess the statistical significance (at the 5% level) of the differences between women and men for all variables of interest. All the analyses were conducted with the software SAS Version 9.4 (SAS Institute Inc., Cary, NC).

## RESULTS

Six hundred and forty-nine individuals responded to the survey, 72% of whom were women. Demographic and personal data for the 541/649 (83%) respondents who completed the survey are shown in Table 1. Responses from the remaining 108 (17%) respondents with incomplete surveys were excluded. Of the total respondents ( $n = 541$ ),

	Total N (%)	Women N (%)	Men N (%)	P value
Gender	541 (100)	387 (71.53)	154 (28.47)	
Age (years)		5	6	
21-25	11	30	9	
26-30	39	48	14	
31-35	62	37	15	
36-40	52	20	6	
41-45	26	19	8	
46-50	27	11	3	
51-55	14	217	93	
N/A	310			
Ethnicity				0.04
White	385 (71.16)	289 (74.68)	96 (62.34)	
Black	10 (1.85)	9 (2.33)	1 (0.65)	
Asian	91 (16.82)	55 (14.21)	36 (23.38)	
Arab	13 (2.40)	7 (1.81)	6 (3.90)	
Mixed	20 (3.70)	14 (3.62)	6 (3.90)	
Other	19 (3.51)	11 (2.84)	8 (5.19)	
Prefer not to say	3 (0.55)	2 (0.52)	1 (0.65)	
Area				0.0195
Africa	18 (3.33)	13 (3.36)	5 (3.25)	
Americas	45 (8.32)	32 (8.27)	13 (8.44)	
Asia	92 (17.01)	52 (13.44)	40 (25.97)	
Australia	8 (1.48)	6 (1.55)	2 (1.30)	
Europe	359 (66.36)	268 (69.25)	91 (59.09)	
North America	19 (3.51)	16 (4.13)	3 (1.95)	
Place of work				0.08
Cancer centre	88 (16.27)	59 (15.25)	29 (18.83)	
General hospital	131 (24.21)	91 (23.51)	40 (27.97)	
Other				
Missing	38 (7.02)	34 (8.79)	4 (2.60)	
	284 (52.50)	203 (52.45)	81 (52.60)	
ESMO member				0.04
Yes	462 (85.40)	323 (83.46)	139 (90.26)	
No	79 (14.60)	64 (16.54)	15 (9.74)	
Children				0.06
Yes	295 (54.53)	201 (51.94)	94 (61.04)	
No	246 (45.47)	186 (48.06)	60 (38.96)	
Number				0.008
0	246 (45.56)	186 (48.19)	60 (38.96)	
1	112 (20.74)	84 (21.76)	28 (18.18)	
2	126 (23.33)	81 (20.98)	45 (29.22)	
>3	56 (10.37)	35 (9.07)	21 (13.64)	
Single parent				0.17
Yes	29 (5.36)	24 (6.20)	5 (3.25)	
No	512 (94.64)	363 (93.80)	149 (96.75)	
Live alone				0.69
Yes	97 (17.93)	71 (18.35)	26 (16.88)	
No	444 (82.07)	316 (81.65)	128 (83.12)	

295 (54.53%) had children (52% women and 61% men). Only 18% lived alone (18% women and 17% men). Of 231 respondents who provided information about their age, 164 were <40 years of age.

More than half of respondents (58%) reported that COVID-19 had affected their professional career, 83% of whom said this was in a negative way (85% of women versus 76% of men) (Table 2). Respondents reported that COVID-19 changed both their personal and family life (86% and 82%, respectively). Women were significantly more affected than men: personal life (89% versus 78%;  $P = 0.001$ ) and family life (84% versus 77%;  $P = 0.037$ ), respectively (Table 2).

The changes in time dedicated to activities during and after COVID-19 confinement are summarised in Table 3.

Table 2. Impact of COVID-19, including by gender (N = 541)				
	Total N (%)	Women N (%)	Men N (%)	P value
COVID-19 affected your professional career				0.0003
Yes	312 (57.67)	242 (62.53)	70 (45.45)	
No	229 (42.33)	145 (37.47)	84 (54.55)	
How COVID-19 pandemic affected your professional career				0.0003
No change	229 (42.33)	145 (37.47)	84 (54.55)	
Positively in those reporting a change	53/312 (16.98)	36/242 (14.88)	17/70 (24.29)	
Negatively in those reporting a change	259/312 (83.01)	206/242 (85.12)	53/70 (75.71)	
COVID-19 changed your personal life				0.001
Yes	464 (85.77)	344 (88.89)	120 (77.92)	
No	77 (14.23)	43 (11.11)	34 (22.08)	
COVID-19 changed your family life				0.037
Yes	444 (82.07)	326 (84.24)	118 (76.62)	
No	97 (17.93)	61 (15.76)	36 (23.38)	
Participation in Advisory Committee/Group on COVID-19				<0.0001
Yes	221 (40.85)	138 (35.66)	83 (53.90)	
No	320 (59.15)	249 (64.34)	71 (46.10)	
If yes (>1 answer allowed)				
At hospital level	143 (26.43)	86 (22.22)	57 (37.01)	0.0004
At regional level	40 (7.39)	25 (6.46)	15 (9.74)	0.19
At national level	60 (11.09)	39 (10.08)	21 (13.64)	0.23
At international level	49 (9.06)	31 (8.01)	18 (11.69)	0.18

Overall, respondents said that they spent more rather than less time on hospital tasks (e.g. patient care, meetings, administrative work, managerial tasks), science (e.g. self-study, preparing papers, preparing grants, teaching), household management, childcare and parent care during confinement than before COVID-19. Also during confinement, a similar proportion of individuals said that they dedicated more or less time to laboratory tasks (e.g. research, interpretation of results, meetings, managerial tasks), while a lower proportion said that they spent more time looking after themselves than those who said they spent less time.

After confinement, the proportion of respondents who said they spent more rather than less time on hospital tasks, laboratory tasks, household management, childcare and parent care remained higher than before COVID-19. However, this was not the case for science or for personal care.

During confinement, there were no significant differences in time dedicated to household management, childcare or parent care between women and men, but there were significant differences in time dedicated to hospital tasks, laboratory tasks (although of borderline statistical significance), science and personal care (Table 3). Women reported increased time spent on hospital and laboratory tasks compared with men (53% versus 46%, respectively;  $P = 0.002$  and 33% versus 26%, respectively;  $P = 0.056$ ). However, women were significantly less likely to report increased time spent on science (46% versus 55%, respectively;  $P = 0.0015$ ) or personal care (28% versus 41%, respectively;  $P = 0.0002$ ) than men. Less marked differences between women and men were found in responses after confinement.

During confinement, women were also significantly more likely to report less time spent on science (39% versus 25%, respectively;  $P = 0.0024$ ) and personal care (58% versus 39%, respectively;  $P < 0.0001$ ) than men (Table 4). After confinement, this trend remained for science (42% versus

23%, respectively;  $P = 0.0001$ ) and personal care (55% versus 36%, respectively;  $P < 0.0001$ ).

As a result of the pandemic, 41% of individuals reported participation in an Advisory Committee of Group on COVID-19, although the proportion of women was also significantly lower in comparison to men (36% versus 54%, respectively;  $P < 0.0001$ ).

Significant associations between changes in time spent on work and personal activities and personal characteristics during and after COVID-19 confinement are summarised in Supplementary Tables S1 and S2, available at <https://doi.org/10.1016/j.esmoop.2021.100131>.

## DISCUSSION

Our survey showed that the COVID-19 pandemic had a significant impact on the professional and home lives of survey respondents during and after confinement, especially women. Women spent more time on hospital and laboratory tasks and had less time available for scientific research and for personal care both during and after COVID-19-related confinement.

Our findings are supported by other studies reflecting under-representation of women in research during the pandemic.<sup>6-8</sup> A systematic search of PubMed showed that, as of 1 May 2020, 34% of authors of 1370 COVID-related publications were women.<sup>6</sup> The percentage of women as first and last authors was 29% and 26%, respectively. These findings are reinforced by the results of an analysis of female authorship of COVID-19 papers in *The Lancet* which showed overall, first, last and corresponding female first authorship was 30.8%, 24.2%, 25.8% and 22.9% respectively.<sup>7</sup>

In another study, of US authors of 1893 papers related to the pandemic, there was a 19% fall in female first authors compared with female first authors of papers published in the same journals in 2019.<sup>8</sup> Female first authorship of

**Table 3. Tasks where changes in time dedicated to activities during and after COVID-19 confinements were different between women and men (N = 541)**

	During confinement						After confinement											
	Overall		Women		Men		Overall		Women		Men							
	N	%	N	%	N	%	N	%	N	%	N	%						
<b>Hospital tasks</b>							<b>0.002</b>						<b>0.020</b>					
More time	277	51.20	206	53.23	71	46.10	269	49.72	196	50.65	73	47.40						
Less time	133	24.58	93	24.03	40	25.97	56	10.35	40	10.34	16	10.39						
No change	94	17.38	55	14.21	39	25.32	152	28.10	97	25.06	55	35.71						
N/A	37	6.84	33	8.53	4	2.60	64	11.83	54	13.95	10	6.49						
<b>Laboratory tasks</b>							<b>0.056</b>						<b>0.074</b>					
More time	169	31.24	129	33.33	40	25.97	157	29.02	110	28.42	47	30.52						
Less time	169	31.24	119	30.75	50	32.47	113	20.89	87	22.48	26	16.88						
No change	105	19.41	65	16.80	40	25.97	157	20.02	102	26.36	55	35.71						
N/A	98	18.11	74	19.12	24	15.58	114	21.07	88	22.74	26	16.88						
<b>Science</b>							<b>0.0015</b>						<b>0.0002</b>					
More time	262	48.43	178	45.99	84	54.55	167	30.87	109	28.17	58	37.66						
Less time	186	34.38	147	37.98	39	25.32	182	33.64	147	37.98	35	22.73						
No change	81	14.97	50	12.92	31	20.13	154	28.47	98	25.32	56	36.36						
N/A	12	2.22	12	3.10	—	—	38	7.02	33	8.53	5	3.25						
<b>Household management</b>							0.12						0.085					
More time	335	61.92	243	62.79	92	59.74	170	31.42	126	32.56	44	28.57						
Less time	78	14.42	61	15.76	17	11.04	130	24.03	101	26.10	29	18.83						
No change	118	21.81	78	20.16	40	25.97	206	38.08	135	34.88	71	46.10						
N/A	10	1.85	5	1.29	5	3.25	35	6.47	25	6.46	10	6.49						
<b>Taking care of children</b>							0.77						0.73					
More time	183	33.83	127	32.82	56	36.36	126	23.29	90	23.26	36	23.38						
Less time	32	5.91	22	5.68	10	6.49	52	9.61	36	9.30	16	10.39						
No change	68	12.57	48	12.40	20	12.99	96	17.74	65	16.80	31	20.13						
N/A	258	47.69	190	49.10	68	44.16	267	49.35	196	50.65	71	46.10						
<b>Taking care of ageing parents</b>							0.58						0.67					
More time	111	20.52	83	21.45	28	18.18	88	16.27	64	16.54	24	15.58						
Less time	68	12.57	47	12.14	21	13.64	60	11.09	42	10.85	18	11.69						
No change	160	29.57	109	28.17	51	33.12	178	32.90	122	31.52	56	36.36						
N/A	202	37.34	148	38.24	54	35.06	215	39.74	159	41.09	56	36.36						
<b>Taking care of yourself</b>							<b>0.0002</b>						<b>0.0008</b>					
More time	172	31.79	109	28.17	63	40.91	95	17.56	58	14.99	37	24.03						
Less time	286	52.87	226	58.40	60	38.96	256	47.32	202	52.20	54	35.06						
No change	83	15.34	52	13.44	31	20.13	161	29.76	104	26.87	57	37.01						
N/A	—	—	—	—	—	—	29	5.36	23	5.94	6	3.90						

In bold those tasks where changes in time dedicated to activities during and after COVID-19 confinements were significantly different between women and men.

COVID-19 papers was particularly low for those published in March and April 2020. Comparisons of overall female authorship and female last authorship were inconclusive, with reductions of 8% and 5%, respectively. The authors of the paper suggested that research productivity of women,

especially those at an early stage of their career, had been affected more than that of men.

Significant disparities in academic productivity during the early stages of the pandemic in US science, technology, engineering, mathematics and medicine (STEMM) faculties

**Table 4. Associations between changes in times (less time versus more time/no change) spent on various activities and gender during and after COVID-19 confinement (N = 541)**

	Number and percentage of individuals spending less time						
	Hospital tasks	Laboratory tasks	Science	Household management	Taking care of children	Taking care of parents	Taking care of yourself
	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)
<b>During confinement</b>							
Gender							
Women	93 (26.27)	119 (38.02)	147 (39.20)	61 (15.97)	47 (19.67)	22 (11.17)	226 (58.40)
Men	40 (26.67)	50 (38.46)	39 (25.32)	17 (11.41)	21 (21.00)	10 (11.63)	60 (38.96)
P value <sup>a</sup>	0.9266	0.0930	0.0024	0.1824	0.7796	0.9104	<0.0001
<b>After confinement</b>							
Gender							
Women	40 (12.01)	87 (29.10)	147 (41.53)	101 (27.90)	42 (18.42)	36 (18.85)	202 (55.49)
Men	16 (11.11)	26 (20.31)	35 (23.49)	29 (20.14)	18 (18.37)	16 (19.28)	54 (36.49)
P value <sup>a</sup>	0.7790	0.0594	0.0001	0.0714	0.9908	0.9337	<0.0001

<sup>a</sup> P value for the difference between women and men.

have also been related to gender and child age, highlighting the potentially greater impact of the pandemic on women at an early stage of their career.<sup>9</sup> Women, but not men, submitted significantly fewer articles in the first 2 months of the pandemic than previously, and faculty members of both sexes with children 0-5 years of age reported working significantly fewer hours compared with other groups. Women in the study reported providing significantly more childcare than men, suggesting that the impact of care responsibilities for very young children during the pandemic may be falling disproportionately on women, exacerbating the gender imbalance and pushing women back to their traditional roles.

In our survey, only one-third of female oncologists reported taking a leadership role through participation in a COVID-19 Advisory Committee or Group. Among these, participation was generally at a hospital level rather than at a regional, national or international level. Such underrepresentation mirrors that seen on the world stage. For example, just 2 of 27 members of the US White House Coronavirus Task Force were women.<sup>10,11</sup> This occurred despite recommendations from the World Health Organization earlier this year to include women in decision making for outbreak preparedness and response to health emergencies.<sup>11</sup> On the UK's Scientific Advisory Group for Emergencies (SAGE) which provided COVID-19 advice to government, ~30% of members were women.<sup>12</sup>

Previous ESMO surveys have shown underrepresentation of female oncologists in leadership roles,<sup>2,3</sup> as did a recently reported, similar survey carried out among oncologists in India.<sup>13</sup> In addition, a recent analysis of more than half a million graduates from 134 US medical schools showed fewer women are promoted to senior faculty ranks (and much more slowly). The gap was not narrowed in the 35-year time frame of the study.<sup>4</sup>

During the pandemic, women have paid a high price. In addition to the high welfare burdens, they have had to care for children and elderly parents more often than men. This may have further reduced the time for research activities and their personal well-being. Any setbacks in career progression occurring during the COVID-19 pandemic may have long-lasting consequences, especially for those at key stages in their career and also highlight the fragility of earlier gender achievements. If female oncologists have to delay scientific research due to family or household tasks, they may fall behind in submitting their research for publication, potentially with a loss of subsequent funding and/or visibility opportunities linked to invitations to present their findings at influential meetings. This in turn may adversely affect their ability to compete for more senior roles, confirming that in times of crisis women are more vulnerable.

The impact of the pandemic on time available for personal care for female oncologists is also concerning. If women are making time to respond to the increased demands of their work and home lives at the expense of taking time for themselves, this is likely to impact on multiple aspects of their performance and risks leading to burn-

out. It would therefore be a significant backward step if they now feel pressured into previous stereotypic roles or are encouraged to take on an unrealistic workload as a result of the pandemic.

The findings of our survey have immediate implications for how the oncology workforce moves forward over the next 12 months. Diagnostic and treatment delays for patients with cancer during 2020 were common<sup>14</sup> and oncologists will be doing all they can to expedite patient care. Every effort must be made to ensure that 'catch up' initiatives do not adversely affect the work or home lives of any sector of the oncology community.

Our findings have important implications for the oncology workforce in terms of preparedness and response to future health and other crisis situations. They underline the importance of gender balance in considering how best to maintain patient care while minimising detrimental effects on activities related to research and personal time. Gender balance in leadership roles can facilitate collaborative decision making that recognises both shared and contrasting challenges facing female and male oncologists at different stages of their career, especially during the most stressful scenarios.

With this in mind, the ESMO W4O Committee continues to raise awareness of gender inequalities in oncology and promotes equal access to career development opportunities for female oncologists. Through discussions and debate, mentoring and leadership training, we are supporting female oncologists at all stages of career progression and implementing gender balance strategies across all our activities—during the COVID-19 pandemic and beyond. But this will not be enough unless we all work together as one global community. As well as developing gender transformative policies, we need the personal commitment of all those currently in positions of influence to drive real change for the future.

### Limitations

More than two-thirds of those who completed the survey were women and this may have introduced some bias into the findings. However, the greater female response may reflect contrasting experiences of the impact of the pandemic; those most affected by lockdown may have felt more motivated to complete the survey. The age of respondents may have affected responses, but as age was known in only 231 participants the study was not powered to explore the association between age and activities during and after lockdown.

There were small numbers in some response groups, e.g. single parents, so we have not attempted to draw conclusions from these data. It will be important to broaden the range of participants in future studies, including a significant proportion of male oncologists, single parents and those living alone.

Although place of work was collected as part of the demographic data for respondents, the questionnaire

did not ask whether participants changed their role, e.g. moving to a COVID-19 ward, during the pandemic. This could be taken into consideration in future research.

While our research extended understanding of the impact of the COVID-19 pandemic on the professional and home lives of oncologists, further research could explore additional aspects of the complex and multifaceted issue of gender in relation to roles of leadership and influence at a time of such unprecedented risk and uncertainty.

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### DISCLOSURE

PG: Advisory Board: Abbvie, Amgen, AstraZeneca, Bayer, Boehringer Ingelheim, Bristol-Myers Squibb (BMS), GlaxoSmithKline, Janssen, Lilly, Merck Sharp & Dohme (MSD), Novartis, Pfizer, Roche, Takeda. Invited Speaker: AstraZeneca, Boehringer Ingelheim, BMS, Janssen, MSD, Novartis, Pfizer, Roche, Takeda. Research funding: Novartis, Janssen, AstraZeneca, Pfizer, Blue-print, Apollomics, Amgen, Array Biopharma. SB: Research grants: AstraZeneca, GlaxoSmithKline (GSK). Honoraria Amgen, Astrazeneca/MSD, GSK, Clovis, Genmab, Immunogen, Merck Serono, Mersana, Pfizer, Roche, Tesaro. ASB: Anna Sophie Berghoff has research support from Daiichi Sankyo ( $\leq$ €10 000), Roche ( $>$ €10 000) and honoraria for lectures, consultation or advisory board participation from Roche, BMS, Merck, Daiichi Sankyo (all  $<$ €5000) as well as travel support from Roche, Amgen and AbbVie. EF: Advisory Board: Abbvie, Amgen, AstraZeneca, Bayer, Blue Print Medicines, Boehringer Ingelheim, BMS, Eli Lilly, GlaxoSmithKline, Janssen, Merck, Mabxience, MSD, Novartis, Pfizer, Puma Biotechnology, Roche, Sanofi, Genzyme. Invited Speaker: AstraZeneca, Boehringer Ingelheim, BMS, Eli Lilly, Medscape, MSD, Novartis, Peervoice, Pfizer, Prime Oncology, Roche, Springer, Takeda, Touchime, Cme Outfitters. Research funding: Merck Serono. AJSF: Speaker Fees from BMS, Ipsen, Esai. Consultancy Fees from Sangamo Therapeutics. EG: Speaker: MSD, Roche, Thermo Fisher, Lilly. Advisory Board: Genentech, Roche, Ellipses Pharma, Neomed Therapeutics, Boehringer Ingelheim, Janssen, SeaGen, TFS, Alkermes, Thermo Fisher, BMS, MabDiscovery, Anaveon. Research funding: Novartis, Roche, AstraZeneca, Thermo Fisher, Taiho Oncology. JH: Advisory Board: BMS, Achilles Therapeutics, BioNTech, Immunocore, Gadeta, Ipsen, MSD, Merck Serono, Pfizer, Molecular Partners, Novartis, Neogene Therapeutics, Roche, Sanofi, Third Rock Venture. Stocks/Shares: Neogene

Therapeutics. Research Grant: BMS, BioNTech US, MSD, Amgen, Novartis. SP: Consultation/Advisory role: AbbVie, Amgen, AstraZeneca, Bayer, Beigene, Biocartis, Boehringer Ingelheim, BMS, Clovis, Daiichi Sankyo, Debiopharm, Eli Lilly, F. Hoffmann-La Roche, Foundation Medicine, Illumina, Incyte, Janssen, Medscape, MSD, Merck Serono, Merrimack, Novartis, Pharma Mar, Phosphoplatin Therapeutics, Pfizer, Regeneron, Sanofi, Seattle Genetics, Takeda. Talk in a company's organized public event: AstraZeneca, Boehringer Ingelheim, BMS, Eli Lilly, F. Hoffmann-La Roche, Illumina, Medscape, MSD, Novartis, Pfizer, Prime, Sanofi, Takeda. Receipt of grants/research supports: (Sub)investigator in trials (institutional financial support for clinical trials) sponsored by Amgen, AstraZeneca, Biodesix, Boehringer Ingelheim, BMS, Clovis, F. Hoffmann-La Roche, GSK, Illumina, Lilly, MSD, Merck Serono, Mirati, Novartis, Pfizer, Phosphoplatin Therapeutics. JT: Reports personal financial interest in the form of a scientific consultancy role for Array Biopharma, AstraZeneca, Bayer, Boehringer Ingelheim, Chugai, Daiichi Sankyo, F. Hoffmann-La Roche Ltd, Genentech, Inc, HaliDX SAS, Hutchison MediPharma International, Ikena Oncology, IQVIA, Lilly, Menarini, Merck Serono, Merus, MSD, Mirati, Neophore, Novartis, Orion Biotechnology, Peptomyc, Pfizer, Pierre Fabre, Samsung Bioepis, Sanofi, Seattle Genetics, Servier, Taiho, Tessa Therapeutics and TheraMyc. Educational Collaboration: Imedex, Medscape Education, MJH Life Sciences, PeerView Institute for Medical Education and Physicians Education Resource (PER). JC-HY: Advisory or consultancy services: Amgen, AstraZeneca, Bayer, Boehringer Ingelheim, BMS, Celgene, Chugai Pharmaceutical, Daiichi Sankyo, Eli Lilly, Hansoh Pharmaceuticals, Merck KGaA, MSD, Novartis, Ono Pharmaceuticals, Pfizer, Roche/Genentech, Takeda Oncology, Yuhan Pharmaceuticals. MCG: Reports grants and personal fees from Eli Lilly, personal fees from Boehringer Ingelheim, grants and personal fees from Otsuka Pharma, grants and personal fees from AstraZeneca, grants and personal fees from Novartis, grants and personal fees from BMS, grants and personal fees from Roche, grants and personal fees from Pfizer, grants and personal fees from Celgene, grants and personal fees from Incyte, personal fees from Inivata, personal fees from Takeda, grants from Tiziana Sciences, grants from Clovis, grants from Merck Serono, grants and personal fees from Bayer, grants and personal fees from MSD, grants and personal fees from GlaxoSmithKline S.p.A., grants and personal fees from Sanofi-Aventis, grants and personal fees from Spectrum Pharmaceuticals, grants and personal fees from Blueprint Medicine, personal fees from Seattle Genetics, personal fees from Daiichi Sankyo, grants from United Therapeutics Corporation, grants from Merck KGaA, personal fees from Janssen, non-financial support from MSD, non-financial support from Eli-Lilly, grants from Turning Point, grants from Ipsen, grants from MedImmune, grants from Exelisis, grants from Pfizer, personal fees from Mirati Therapeutics, Regeneron Pharmaceuticals, grants from BMS and Celgene. Non-financial interests: Principal Investigator Keynote 189, MSD - MISP Sunitinib in thymic

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