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# Professional and Psychological Impacts of the COVID-19 Pandemic on Oncology Residents: A National Survey

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**PURPOSE** The COVID-19 pandemic has severely affected clinical practice in oncology, leading to organizational, ethical, and medical issues. In particular, it has raised challenges in the context of competing care priorities between COVID-19 and cancer treatment. Residents on the front line face difficulties related to increasing care needs and urgent reorganization of health care systems while managing psychological stress and uncertainty. We aimed to evaluate the impact of the COVID-19 pandemic on oncology residents.

**METHODS AND MATERIALS** We conducted a national survey (39 questions) in France among oncology and radiation therapy residents to determine the psychological impact and professional difficulties (eg, reassignment, training/research time, supervision, teleworking, management of patients) associated with the first peak of the COVID-19 pandemic.

**RESULTS** Overall, 222 residents (medical oncologists, 61%; radiation therapists, 39%) participated in our survey, representing approximately one third of all residents and fellows in France. One third of respondents had been reassigned to a COVID-19 ward. Training and research activity decreased for 89% and 41% of respondents, respectively. Two thirds (70%) of respondents declared that they had faced ethical issues, 35% felt worried about their own health, and 23% experienced psychological distress. According to the Hospital Anxiety and Depression Scale, 32% were anxious and 17% depressed. Consumption of tobacco, psychostimulants, and alcohol increased in 31%, 24%, and 29% of respondents, respectively.

**CONCLUSION** French oncology residents were highly affected by the first peak of the COVID-19 pandemic in terms of professional activity and psychological impact. This national survey can be used as a basis for improved management, medical reorganization, and training of residents during the ongoing COVID-19 pandemic.

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## INTRODUCTION

First detected in China as a respiratory disease in December 2019, SARS-CoV-2 has spread around the world and become a global public health emergency.<sup>1</sup> Coronavirus disease 2019 (COVID-19) was declared the first pandemic of the 21st century on March 11, 2020. As of June 15, 2020, 8,020,087 cases had been officially diagnosed worldwide, and 436,167 deaths had occurred,<sup>2</sup> including 29,407 in France. With rapid human-to-human transmission, COVID-19 induces a broad range of symptoms of variable severity, from asymptomatic to acute respiratory distress syndrome,<sup>1</sup> myocarditis,<sup>3</sup> and even neurologic and digestive symptoms.<sup>4</sup> Since the first patient was diagnosed in France on January 24, 2020, COVID-19 has spread rapidly, challenging health care systems worldwide.<sup>5</sup>

In this regard, patients with cancer are a specific population<sup>6</sup> with vulnerability to SARS-CoV-2 (both

infection and death), but they are also at risk in the context of rationing normal care.<sup>7</sup> For these patients, continuing the management of their cancer as a chronic disease is as important as facing the COVID-19 pandemic. Moreover, a shortage of beds and resources resulting from a huge influx of patients with COVID-19 requiring hospitalization and intensive care, along with the perception of cancer as a disease with a poor life expectancy, may lead to limited therapeutic procedures in these patients.

In France, during the first peak of the COVID-19 pandemic, hospitals were rapidly reorganized in terms of oncology and surgery provision, and new intensive care units were created, with reassignment of human and material resources.<sup>8,9</sup> Residents and fellows in medical and radiation oncology were then first in line for the management and care of patients with cancer in general hospitals and cancer centers. Although coping with death and end-of-life care is part of the

## ASSOCIATED CONTENT

### Data Supplement

Author affiliations and support information (if applicable) appear at the end of this article.

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## CONTEXT

### Key Objective

What were the professional difficulties and psychological effects for medical and radiation oncology residents during the first peak of the COVID-19 pandemic?

### Knowledge Generated

Seventy-two percent of residents felt uncomfortable with patient management, and 70% had faced ethical issues. Thirty-two percent of residents were classified as anxious and 17% as depressed according to the Hospital Anxiety and Depression Scale.

### Relevance

Improved management, medical reorganization, and training of residents are mandatory to minimize the effects of the ongoing COVID-19 pandemic.

daily practice of young oncologists,<sup>10,11</sup> great adaptability and flexibility were asked of them, with potential psychological and physical impacts, as well as an impact on their training. Because residents are at the beginning of their medical careers, they may not have the resources to deal with the potential negative effects of this pandemic. This may negatively affect their careers and their education or even change their career perceptions.<sup>12</sup> Therefore, studying how the pandemic is affecting residents is important for every specialty; it has been done for orthopedic,<sup>13</sup> urology,<sup>14</sup> and dermatology<sup>15</sup> residents in different countries.

We conducted a national survey in France to determine the psychological impact on and professional difficulties encountered by medical and radiation oncology residents (eg, reassignment, training/research time, supervision, teleworking, management of patients) during the first peak of the COVID-19 pandemic.

## MATERIALS AND METHODS

Our questionnaire was developed and validated by a working group comprising resident and senior clinicians (medical and radiation oncologists) and psychologists. The 39-question survey comprised three sections: demographics of the respondents (11 questions), professional impact (15 questions), and psychological impact (13 questions; Data Supplement).

The target population was composed of French medical and radiation oncology residents who are following a 5-year training schedule. After 6 years of studying medicine, French students pass a national resident ranking examination, which allows them to choose their specialty according to their rank and become residents. At this point, they are mostly between 25 and 30 years of age and begin full-time rotations of 6 months, mainly in their field, under the responsibility of attending physicians.

Anxiety and depression symptoms were assessed using the Hospital Anxiety and Depression Scale (HADS), with significance defined by a score of  $\geq 8$ .<sup>16</sup> Subjective

quantitative variables were assessed using a virtual visual analog scale (VAS) rated from 0 to 100.

The questionnaire was available for 10 days, from May 4 to 14, 2020. The residents (medical oncologists and radiation therapists) were invited via e-mail, Web site, and social networks through the National Association of Medical Oncology Residents and the Radiation Therapist Residents to participate in this nationwide prospective survey. Three reminder e-mails to complete the survey were sent after the initial mailing to increase the number of responses. Participants were invited to complete the survey using SondageOnline (Zurich, Switzerland), accessible from a computer, tablet, or smartphone; they could log on to the survey through a specific link provided to each group.

## Statistical Analyses

Continuous and categorical variables are described as means (ranges [minimum to maximum]/interquartile ranges [IQRs]) and frequencies (percentages), respectively. Subgroup analyses were carried out according to sex, year of residency (first 3 years v last 2 years), medical specialty (medical v radiation oncology), type of hospital (cancer center v public university hospital), and COVID-19 incidence area (high-incidence area v other area). The  $\chi^2$  test was used for large samples ( $> 60$ ), and Fisher's exact test was used for small samples ( $< 60$ ). For each test, statistical significance was set at a two-sided  $P$  value of  $< .05$ .

## RESULTS

A total of 222 residents participated in this survey; 206 (92.8%) completed the entire questionnaire. Medical oncologists represented 52% of the respondents ( $n = 111$ ), and 56% of the respondents were women ( $n = 124$ ). Distribution according to year of residency was well balanced (Table 1). All areas of the country were represented, with 36% of residents working in the three most affected regions ( $n = 79$ ). The most represented hospitals were public university hospitals (31%;  $n = 69$ ) and cancer centers (45%;  $n = 99$ ). Overall, 26% of respondents had

**TABLE 1.** Demographic Characteristics of the Study Population (N = 222)

Characteristic (survey question)	No. (%) of Participants
Q1. Age, years	
Mean	28
Range (minimum to maximum)	24→33
IQR	3
Q2. Sex	
Female	124 (55.9)
Male	98 (44.1)
Q3. Specialty	
Medical oncology	116 (52.3)
Radiation oncology	69 (31.1)
Oncology, no option yet	35 (15.8)
Other	2 (0.9)
Internal medicine	1 (0.5)
Gastroenterology	1 (0.5)
Q4. Year of residency	
1	35 (15.8)
2	39 (17.6)
3	45 (20.3)
4	53 (23.9)
5	50 (22.5)
Q5. Area of practice	
High COVID incidence	79 (35.6)
Low COVID incidence	143 (64.4)
Q6. Type of organization	
Public university hospital	69 (31.1)
Public hospital	20 (9.0)
Cancer center	99 (44.6)
Private hospital	14 (6.3)
Research laboratory	15 (6.8)
Temporary study break	5 (2.3)
Q7. Living alone	
Yes	69 (31.1)
No	153 (68.9)
Q8. COVID-19 screening <sup>a</sup>	
Yes	60 (26.1)
Polymerase chain reaction	51 (23.0)
Serology	9 (4.1)
Chest scan	0 (0.0)
No	162 (73.0)
Q9. COVID-19 risk factors	
Yes	12 (5.4)
No	210 (94.6)

(Continued in next column)

**TABLE 1.** Demographic Characteristics of the Study Population (N = 222) (Continued)

Characteristic (survey question)	No. (%) of Participants
Q10. COVID-19 self-isolation	
Yes	28 (12.6)
< 2 weeks	22 (9.9)
> 2 weeks	6 (2.7)
No	195 (87.8)
Q11. Care and sequelae	
Hospitalization	1 (0.5)
Antiviral drug	1 (0.5)
Respiratory sequelae	2 (0.9)
Contact with occupational physician	13 (5.9)

Abbreviation: IQR, interquartile range.

<sup>a</sup>Respondents were allowed to select more than one answer (responses do not add up to 100%).

been tested for COVID-19 (n = 60), and 13% were socially isolated (n = 28; [Table 1](#)).

Since the start of the COVID-19 pandemic, 32% of French residents had been reassigned to a new hospital department (n = 67), mostly voluntarily (82%; n = 55), and 65% managed patients with COVID-19 (n = 138), mainly during night shifts (68%; n = 94). At the time of mid May, 85% of residents (n = 179) had returned to management of patients without COVID-19, and 78% had returned to their previous professional activity (n = 167). Most residents had access to personal protective equipment (94%; n = 201), but this was deemed inadequate in 31% of cases (n = 65), and 53% did not receive proper hygiene training regarding the equipment (n = 112; [Table 2](#)).

Training and research activities had decreased for 89% (n = 189) and 41% of residents (n = 88), respectively, whereas working hours and night shifts had increased for 31% (n = 67) and 44% of residents (n = 94), respectively ([Fig 1](#)). Seventy percent of residents had faced ethical issues (n = 150), mainly related to their ability to provide less support to patients' relatives (48%; n = 102) and suboptimal cancer treatment (43%; n = 91). Respondents had the feeling that the COVID-19 pandemic might have a negative impact on their training/career in the short term (mean VAS, 52.5; IQR, 55) rather than in the long term (mean VAS, 27.6; IQR, 50) and may negatively affect oncology patients, research, and training in 78%, 68%, and 93% of cases, respectively. In addition, they believed their hospital or department had adapted to respond to COVID-19 in 79% and 72% of cases, respectively, although they felt uncomfortable with patient care (mean VAS, 58.1; IQR, 32) and received less supervision (mean VAS, 61.0; IQR, 35; [Table 2](#); [Fig 2](#)). Residents' opinions about the impact of the COVID-19 pandemic on the future of oncology are shown in [Figure 3](#).

**TABLE 2.** Professional Impact of the COVID-19 Pandemic (N = 222)

Question	No. (%) of Participants
Q12. Reassignment	
Yes	67 (31.5)
Voluntary	55 (25.8)
Involuntary	12 (5.6)
No	146 (68.5)
Missing data	9 (4.1)
Q13. COVID-19 patient care <sup>a</sup>	
Yes	138 (64.8)
Emergency department	53 (24.9)
COVID-19 ward	57 (26.8)
Intensive care unit	16 (7.5)
Night shifts	94 (44.1)
No	75 (35.2)
Missing data	9 (4.1)
Q14. Return to non-COVID-19 patient care	
Yes	179 (84.8)
No	32 (15.2)
Missing data	11 (5.0)
Q15. Protective equipment	
Yes	201 (94.4)
Hygiene training	89 (41.8)
No hygiene training	112 (52.6)
No	12 (5.6)
Missing data	9 (4.1)
Q16. Adapted protective equipment	
Yes	148 (69.5)
No (type or quantity)	65 (30.5)
Missing data	9 (4.1)
Q17. Difficulty obtaining masks	
Yes	54 (25.4)
No	156 (73.2)
Missing data	9 (4.1)
Q18. Modification of professional activity	
Hours of work	
Increased	67 (31.5)
Unchanged	69 (32.4)
Decreased	77 (36.1)
Shifts	
Increased	94 (44.1)
Unchanged	106 (49.8)
Decreased	13 (6.1)
Teleworking	
Increased	53 (24.9)
Unchanged	153 (71.8)

(Continued in next column)

**TABLE 2.** Professional Impact of the COVID-19 Pandemic (N = 222)  
(Continued)

Question	No. (%) of Participants
Decreased	7 (3.3)
Research activity	
Increased	18 (8.5)
Unchanged	107 (50.2)
Decreased	88 (41.3)
Training	
Increased	7 (3.3)
Unchanged	17 (8.0)
Decreased	189 (88.7)
Missing data	9 (4.1)
Q19. Ethical issues <sup>a</sup>	
Yes	150 (70.4)
Suboptimal end-of-life care	56 (26.3)
Support of close relatives	102 (47.9)
Suboptimal cancer care	91 (42.7)
Administration of invalidated antiviral drug	26 (12.2)
No	63 (29.6)
Missing data	9 (4.1)
Q20. Long-term negative impact on training/ career, VAS	
Mean	27.6
Range (minimum to maximum)	0-100
IQR	50
Missing data	9 (4.1)
Q21. Short-term negative impact on training/ career, VAS	
Mean	52.5
Range (minimum to maximum)	0-100
IQR	55
Missing data	9 (4.1)
Q22. Impact on oncology	
Patient (suboptimal care)	
Yes	165 (77.8)
No	47 (22.2)
Research (decreased investments and laboratory slowdown)	
Yes	144 (67.9)
No	68 (32.8)
Training (slowdown in knowledge sharing)	
Yes	197 (92.9)
No	15 (7.1)
Missing data	10 (4.5)

(Continued on following page)



**TABLE 2.** Professional Impact of the COVID-19 Pandemic (N = 222)  
(Continued)

Question	No. (%) of Participants
Q23. Return to previous professional activity	
Yes	86 (40.4)
Partially	81 (38.0)
No	46 (21.6)
Missing data	9 (4.1)
Q24. Adapted reaction <sup>a</sup>	
Hospital	169 (79.3)
Department	154 (72.3)
Government	72 (33.8)
None	18 (8.5)
Missing data	9 (4.1)
Q25. Comfortable with patient care, VAS	
Mean	58.1
Range (minimum to maximum)	0-100
IQR	32
Missing data	9 (4.1)
Q26. Supervision, VAS	
Mean	61.0
Range (minimum to maximum)	0-100
IQR	35
Missing data	9 (4.1)

Abbreviations: IQR: interquartile range; VAS, visual analog scale.

<sup>a</sup>Respondents were allowed to select more than one answer (responses do not add up to 100%).

Although residents felt they had adapted (mean VAS, 74.6; IQR, 20) and were supported by colleagues and close relatives (89% and 94%, respectively), the COVID-19 pandemic affected their psychological health. One third (36%) of residents felt exhausted and emotionally overwhelmed, with limited time for their private life (mean VAS, 55.7; IQR, 50), and 25% said their work had been affected by their physical health. As a result, 32% of residents were classified as anxious ( $n = 66$ ) and 17% as depressed ( $n = 35$ ) according to HADS (Fig 4). Furthermore, among tobacco, alcohol, and psychostimulant users, 31%, 24%, and 29% increased their consumption during the COVID-19 pandemic. However, only nine residents (4%) received psychological support from a professional (Table 3).

### Subgroup Analyses

Subgroup analysis by specialty revealed that medical oncologists were more frequently reassigned (42% v 20% for radiation oncologists;  $P = .003$ ) and consequently had longer working hours (63% v 23%;  $P = .04$ ) and night shifts (53% v 36%;  $P < .001$ ). In addition to this inflated workload, their research activity was affected (6% v 21%;  $P = .02$ ), they felt more comfortable managing patients with

COVID-19 (mean VAS, 63 v 52 of 100;  $P = .003$ ), and they had less free time for their private life (mean VAS, 52 v 64 of 100;  $P = .01$ ) compared with radiation oncologists. Men felt more closely supervised than women (mean VAS, 66 v 57 of 100;  $P = .002$ ). Older residents were more frequently reassigned (52% v 14% for younger residents;  $P < .0001$ ), more frequently had adapted personal protective equipment (80% v 61%;  $P = .0001$ ), practiced more teleworking (33% v 18%;  $P = .01$ ), felt more comfortable managing patients with COVID-19 (mean VAS, 54 v 63 of 100;  $P = .01$ ), felt they had better adapted (mean VAS, 73 v 78 of 100;  $P = .03$ ), and had more free time for their private life (mean VAS, 54 v 62 of 100;  $P = .03$ ) than younger residents.

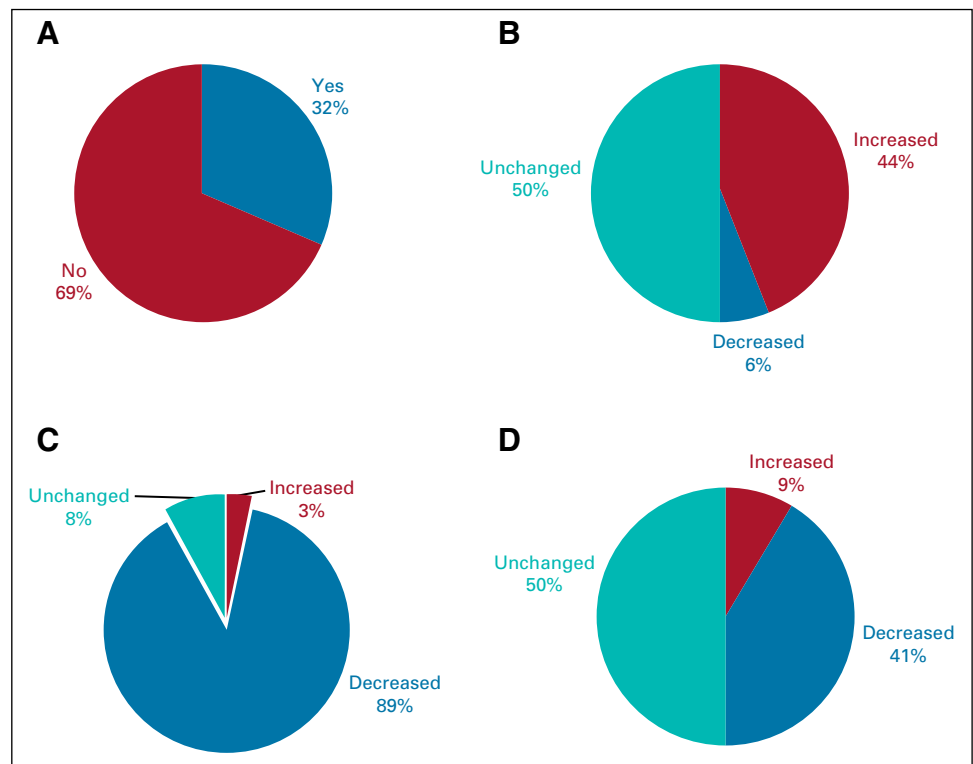
Residents working in cancer centers were more often reassigned (33% v 16% in public university hospitals;  $P = .02$ ), had fewer night shifts (34% v 55%;  $P = .006$ ), more frequently increased their alcohol consumption (41% v 10%;  $P = .01$ ), felt they had better adapted (mean VAS, 75 v 70 of 100;  $P = .05$ ), and had more free time for their private life (mean VAS, 60 v 51 of 100;  $P = .067$ ) compared with residents in public university hospitals. French residents working in the top three high-incidence COVID-19 areas were more frequently reassigned (44% v 25% in other areas;  $P = .004$ ), had more extended working hours (48% v 23%;  $P = .0001$ ) and a higher number of night shifts (55% v 38%;  $P = .02$ ); were more likely to have increased their consumption of psychostimulants (32% v 20%;  $P = .04$ ), were more closely supervised (mean VAS, 65 v 59 of 100;  $P = .07$ ), and had less free time for their private life (mean VAS, 49 v 60 of 100;  $P = .014$ ) compared with those working in other areas.

### DISCUSSION

Our survey highlights how deeply the first peak of the COVID-19 pandemic affected French medical oncology and radiation oncology residents. National and international practice guidelines were rapidly published and helped clinicians to adapt their management of patients with cancer.<sup>8,17</sup> However, many aspects of the aftermath were underestimated, especially concerning the adaptation of residents to the COVID-19 pandemic.

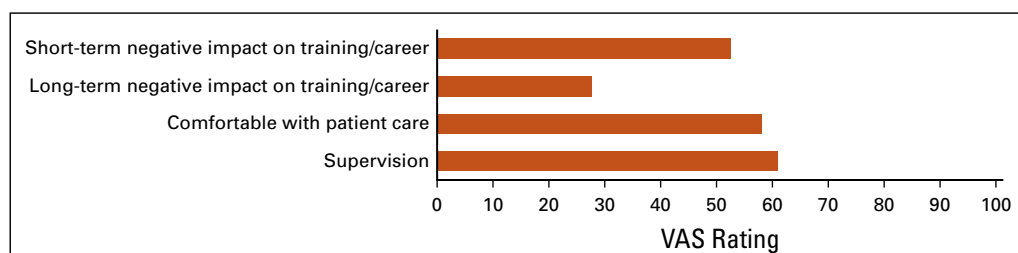
During the first peak, oncology residents had to adapt and change their practice with an increased workload, either being on the front line to manage patients with COVID-19 or managing patients with cancer, whose treatments and complications had not gone away. Importantly, more than one third of oncology residents had been asked to help outside their field of competence, in an intensive care unit or dedicated COVID-19 unit. Reorganization of work in an emergency put residents under pressure, especially those less experienced, with 72% feeling uncomfortable with patient management and lacking educational support. Nevertheless, 85% of residents had returned to their original ward by May 2020.

**FIG 1.** Professional impact of the COVID-19 pandemic on French oncology residents during the first peak regarding (A) reassignment, (B) shifts, (C) training, and (D) research activities.

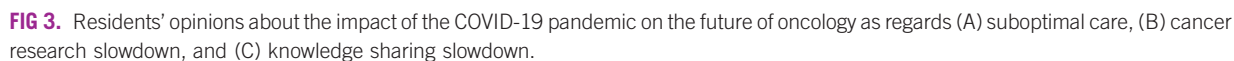


Mental health issues were among the most striking results. Despite the high rate of psychological problems, only 4% sought psychological support from a professional during the pandemic. It is particularly noteworthy that no psychological support units are dedicated to young oncologists, despite the uniqueness of the profession regarding mental health. Results presented at the European Society for Medical Oncology (ESMO) 2014 Congress showed that 45% of European oncologists age < 40 years had emotional exhaustion, and 74% reported no access to adequate support.<sup>18</sup> According to the WHO, in addition to SARS-CoV-2, viral diseases in general threaten public health, with a consistent risk of new viruses emerging. In their meta-analysis, Kisely et al<sup>19</sup> found that emergent viruses caused psychological distress among medical staff. Risk factors for this distress included young age, being more junior, extended quarantine, and lack of practical support. The National French Residents Union presented

data during the pandemic, with surprising results: 72% of French residents across all disciplines felt anxious and 37% depressed compared with the 32% and 17% of oncology residents, respectively, in our survey.<sup>20</sup> This difference may be a result of the specific training of oncology residents, with an already developed level of compassion, that may be protective from psychological distress. In a study by Lai et al<sup>21</sup> conducted in China, 45% of health workers showed anxiety and 50% were depressed. These results were worse in the most affected regions and among workers directly exposed to the virus, which is consistent with our data, although the incidence of anxiety and depression was lower in our population. However, these investigators surveyed health care workers in February, whereas we launched our questionnaire in May, after the peak of the epidemic had been reached. French public health services conducted a survey among the general population, with HADS scores decreasing dramatically at

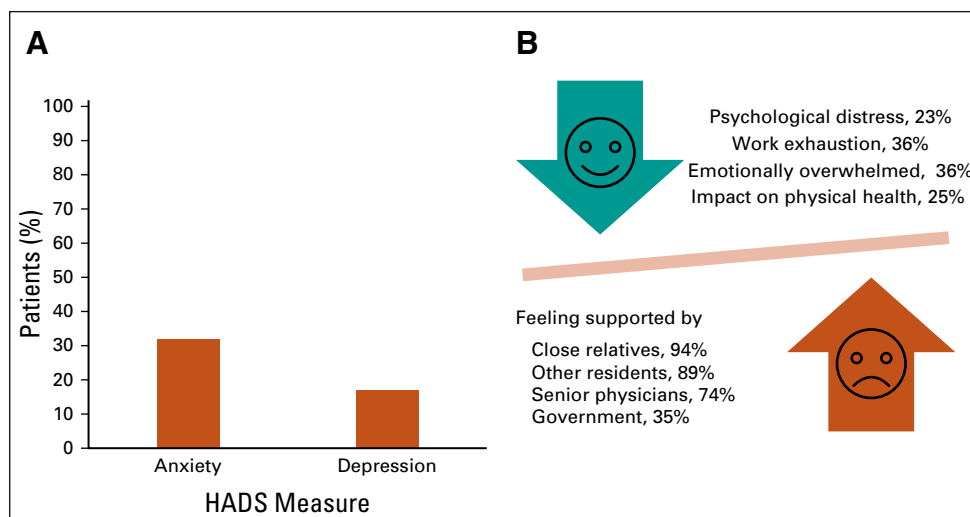


**FIG 2.** Residents' opinions about quality of care, supervision, and impact on their career during the first peak of the COVID-19 pandemic. A virtual visual analog scale (VAS) was rated from 0 to 100.



Besides the health issues, young oncologists are currently worried about the future of their specialty and their training. Nearly a whole semester of theoretic and practical training was missed, and research laboratories were closed for those preparing for MSc or PhD degrees. Uncertainty over future clinical and working conditions and careers, changes to legislation with regard to social distancing, and disruption of education and postgraduate training has led to

Our study has several limitations. First, the timeframe for completing the questionnaire may have had an influence, and the results would probably have been different if the questionnaire had been completed between March 15 and 30, 2020, before the epidemic peak in France. Timing of a questionnaire is crucial against a fast-moving landscape such as a pandemic that requires great adaptability, and





**TABLE 3.** Psychological Impact of the COVID-19 Pandemic (N = 222)

Question	No. (%) of Participants
Q27. Psychiatric history	
Yes	21 (10.2)
No	185 (89.8)
Missing data	16 (7.2)
Q28. Health concern	
Yes	74 (35.9)
No	132 (64.1)
Missing data	16 (7.2)
Q29. Psychological distress	
Yes	48 (23.3)
No	158 (76.7)
Missing data	16 (7.2)
Q30. Psychological support	
Yes	9 (4.4)
No	197 (95.6)
Missing data	16 (7.2)
Q31. Substance addiction	
Tobacco	
Yes	29 (14.1)
No	65 (31.6)
Not applicable	112 (54.4)
Alcohol	
Yes	41 (19.9)
No	129 (62.6)
Not applicable	36 (17.5)
Anxiolytics	
Yes	11 (5.4)
No	89 (43.2)
Not applicable	106 (51.5)
Coffee and other psychostimulants	
Yes	49 (23.8)
No	123 (59.7)
Not applicable	34 (16.5)
Missing data	16 (7.2)
Q32. Felt supported	
Other residents	
Yes	184 (89.3)
No	22 (10.7)
Senior physicians	
Yes	153 (74.3)
No	53 (25.7)
Close relatives	
Yes	194 (94.2)
No	12 (5.8)

(Continued in next column)

**TABLE 3.** Psychological Impact of the COVID-19 Pandemic (N = 222)

Question	No. (%) of Participants
Government	
Yes	73 (35.4)
No	133 (64.6)
Public opinion	
Yes	144 (69.9)
No	62 (30.1)
Missing data	16 (7.2)
Q33. Adaptation, VAS	
Mean	74.6
Range (minimum to maximum)	5-100
IQR	20
Missing data	16 (7.2)
Q34. Meaning and value of work, VAS	
Mean	69.3
Range (minimum to maximum)	0-100
IQR	30
Missing data	16 (7.2)
Q35. Free time for private life, VAS	
Mean	55.7
Range (minimum to maximum)	0-100
IQR	50
Missing data	16 (7.2)
Q36. Work exhaustion	
Yes	75 (36.1)
No	131 (63.6)
Missing data	16 (7.2)
Q37. Emotional overwhelming	
Yes	73 (36.4)
No	131 (63.6)
Missing data	16 (7.2)
Q38. Impact on physical health	
Yes	51 (24.8)
No	155 (75.2)
Missing data	16 (7.2)
Q39. HADS	
Anxiety	
Yes	66 (32.0)
No	140 (68.0)
Depression	
Yes	35 (17.0)
No	171 (83.0)
Missing data	16 (7.2)

Abbreviations: HADS, Hospital Anxiety and Depression Scale; IQR, interquartile range; VAS, visual analog scale.

our results might have been more significant because the survey was conducted during the epidemic peak. Nevertheless, it allows us to appreciate the feeling of residents during the period with the highest COVID-19 activity. Second, because it was an online questionnaire, a non-response bias is inevitable. There were few missing data, and the questionnaire was designed to be filled in quickly. Third, we lack longitudinal follow-up, even though it was not a goal of our study, but depending on the evolution of the COVID-19 pandemic in France, other surveys will be performed. Finally, not all French oncology residents responded to the survey, but the 222 respondents, from all over France, represented more than one third of all French

oncology and radiation therapy residents, making our survey highly representative of this population.

In conclusion, this national survey raises concerning questions with regard to the professional difficulties and mental and physical issues faced by oncology and radiation therapy residents. Young oncologists show strong resilience, and they must be mentored by senior clinicians to overcome the missed training and research, thereby minimizing the impact of the pandemic on their future practice. This survey can be used as the basis for improved management, medical reorganization, and training of residents during the ongoing COVID-19 pandemic.

## AFFILIATIONS

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**Final approval of manuscript:** All authors

**Accountable for all aspects of the work:** All authors

## AUTHORS' DISCLOSURES OF POTENTIAL CONFLICTS OF INTEREST

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