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# The positive effect of workplace accommodations on the continued employment of cancer survivors five years after diagnosis

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1 **The positive effect of workplace accommodations on the continued employment of cancer**  
2 **survivors five years after diagnosis**

3

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12

13 **Abstract**

14 *Purpose.* To evaluate the effect of workplace accommodations on the continued employment of cancer  
15 survivors five years after diagnosis.

16 *Population and methods.* This study is based on VICAN5, a French survey conducted in 2015-2016 to  
17 examine the living conditions of cancer survivors five years after diagnosis. Two subsamples, one with  
18 and one without workplace accommodations, were matched using a propensity score to control for  
19 the individual, professional, and medical characteristics potentially associated with receipt of  
20 workplace accommodations.

21 *Results.* The study sample was composed of 1,514 cancer survivors aged 18-54 and employed as  
22 salaried at diagnosis. Among them, 61.2% received workplace accommodations within five years after  
23 diagnosis: 35.5% received a modified workstation, 41.5% received a modified schedule, and 49.2%  
24 received reduced hours. After matching, receipt of workplace accommodations appeared to improve  
25 the continued employment rate five years after cancer diagnosis from 77.8% to 89.0%.

26 *Conclusion.* Receipt of workplace accommodations strongly increases the continued employment of  
27 cancer survivors five years after diagnosis. More research is needed to better understand the  
28 differences in receipt of workplace accommodations along with the related selection effect.

29 **Keywords:** Cancer survivors; Workplace accommodations; Continued employment; VICAN5; France.

31 In developed countries, increased early screening and improved treatments have led to more frequent  
32 diagnosis of cancer and to a rise in the number of cancer survivors. In France, the estimated prevalence  
33 of cancer survivors among individuals aged over 15 is around three million [1]. In this context,  
34 researchers are paying more and more attention to the living conditions of cancer survivors. The  
35 international literature has documented the negative effect of the disease on economic well-being,  
36 and, in particular, on the professional career of working-age individuals. Studies have shown that the  
37 main indicators of professional life deterioration after cancer diagnosis are lower employment rate,  
38 decrease in the likelihood of being employed, and working time reduction [2–6]. Moreover, this effect  
39 was found to be socially differentiated: the most vulnerable individuals on the labour market are also  
40 the most likely to experience a deterioration of their professional life (especially task performers,  
41 temporary contract workers, and the oldest workers). This negative effect stems mostly from damage  
42 to physical and psychological health which can have chronic or permanent effects on survivors.

43 In view of the above, French law now encourages employers to effectively redeploy employees  
44 diagnosed with cancer and to adjust their workload (Labour Code Article L1226-2). However, the  
45 implementation of workplace accommodations is not mandatory, and there are no guidelines on how  
46 they should be put in place. Some studies have identified a positive association between receipt of  
47 workplace accommodations after cancer diagnosis and return to work [2,4,7–9]. However, two  
48 systematic reviews analysed studies about interventions made to enhance return-to-work for cancer  
49 patients and highlighted the lack of study about the evaluation of professional intervention as  
50 workplace accommodation for cancer survivors [10,11]. Yet, while between a quarter and a half of  
51 cancer survivors receive workplace accommodations upon returning to work [7], very few studies have  
52 specifically analysed the effect of these accommodations on return to work after cancer diagnosis. To  
53 our knowledge, the study by Duguet et al. is the only one that examined this effect in the context of  
54 France: It found that men and women who receive workplace accommodations return to work more  
55 quickly after sick leave than those who do not [7].

56 In this study, we continued the research conducted by Duguet et al.[7], but instead of analysing the  
57 effect of workplace accommodations on return to work after sick leave, we examined the effect of  
58 these accommodations on continued employment five years after cancer diagnosis.

59

62 The VICAN5 national survey was conducted in France to explore the life conditions of individuals aged  
63 18-82, living in metropolitan France, and diagnosed five years earlier with a first malignant cancer  
64 located in one of 12 common tumour sites [12]. These 12 tumour sites, which account for 88% of global  
65 cancer incidence in France, are as follows: breast, lung, upper aerodigestive tracts, colon-rectum,  
66 prostate, bladder, kidney, thyroid, melanoma, lymphoma, cervix, and uterus. Participants were  
67 interviewed between 2015 and 2016, namely five years after being diagnosed with cancer. The data  
68 collected for VICAN5 came from three sources: 1) a patient questionnaire administered mostly by  
69 phone; 2) a medical questionnaire administered to the physician who initiated the cancer treatment;  
70 and 3) the medico-administrative databases of the French National Health Insurance Fund known as  
71 *Système National d'Information Interrégimes de l'Assurance Maladie* (SNIIRAM).

## 72 **Study population**

73 As the aim of our study was to assess the effect of workplace accommodations on continued  
74 employment five years after cancer diagnosis, only individuals employed at diagnosis (n=1,921) were  
75 included in the analysis. Moreover, our study population was restricted to individuals aged under 55  
76 at diagnosis (n=1,690) to ensure that sample participants would be under statutory retirement age  
77 (i.e., 60 years in France). Lastly, individuals who did not provide their employment status and those  
78 who did not answer the questions about workplace accommodations were excluded from the analysis.  
79 Thus, of the 4,174 individuals who participated in the VICAN5 survey, 1,514 were included in this study.

## 80 **Statistical analyses and main indicators**

81 Student's t-tests and Chi-square tests were performed to compare receipt of workplace  
82 accommodations according to different individual, professional, and medical characteristics.

83 Using propensity score matching, two groups of comparable cancer survivors were constituted to  
84 measure the effect of workplace accommodations on continued employment: the first group received  
85 workplace accommodations (treatment group) and the second did not (control group). The propensity  
86 score was estimated from a probit model performed on the probability to receive workplace  
87 accommodations after cancer diagnosis according to different explanatory variables (matching  
88 variables) [13–15]. These explicative variables were defined based on the assumption that they  
89 simultaneously affected both the treatment variables and the performance variable. Since we  
90 measured the effect of four treatment variables cited below, we performed four different matching.

91 The performance variable was being employed at the time of the survey (yes/no). Its effect was  
92 separately estimated for each following treatment variables: 1) having received a modified work  
93 station (yes/no) (for example, having switched from construction to warehouse work); 2) having

94 received a modified schedule (yes/no) (for example, having switched from night to day schedule); 3)  
95 having received reduced hours (yes/no) (for example, therapeutic part-time work); and 4) having  
96 received at least one of the workplace accommodations above (yes/no). The matching variables were:  
97 sex (male/female), age at diagnosis (continuous variable ranging from 18 to 54), education level (less  
98 than high school/high school degree or more), type of employment contract at diagnosis  
99 (permanent/temporary), sector of employment (public/private), company size  
100 (microenterprise/other), socio-professional category (task performer/manager), receipt of  
101 chemotherapy (yes/no), and comorbidity score at diagnosis (continuous variable).

102 Based on these variables, individuals in the treatment group were matched with their nearest  
103 neighbours in the control group. These neighbours were defined by a Mahalanobis distance that  
104 accounted for variance and correlation between covariates.

105 The neighbours were selected in the nearest neighbourhood according to the Caliper method (with a  
106 0.005 threshold) [17]. The balancing property needed to be satisfied. To obtain a more accurate  
107 estimation of the effect of the treatment variables on the performance variable, we used a 95%  
108 confidence interval calculated with the bootstrap method. This effect, which is presented in the Results  
109 section, corresponds to the mean of the treatment effects calculated for each 1,000 sample replicates  
110 [15].

111 Finally, we performed sensitivity analyses to test the robustness of our results. We began by stratifying  
112 samples by sex and by sick leave duration. We then tested the only type of workplace accommodation  
113 for which detailed data was available: therapeutic part-time work. Specifically, we sought to determine  
114 whether the timing and duration of this specific type of accommodation contributed to continued  
115 employment among cancer survivors.

116

## 117 **Other indicators**

118 Aggregated socio-professional category: This categorical variable (task performer/manager) provided  
119 information on the socio-professional category of the job held at diagnosis. Managers, company  
120 directors, and some intermediate professions were grouped together in the “manager” category, while  
121 blue collar workers, employees, shopkeepers, craftsmen, and farmers were all classified as “task  
122 performers”.

123 Adverse cancer event: This categorical variable (yes/no) created from the SNIIRAM databases provided  
124 information on the evolution of the disease in the five years after diagnosis. Individuals presenting  
125 metastases or diagnosed with recurrence or a second cancer were considered as having had an adverse

126 cancer event. Individuals who were treated with chemotherapy, radiotherapy, and/or targeted  
127 therapy and those who received palliative care in the three years before survey were also considered  
128 as having had an adverse cancer event.

129 Comorbidity score at diagnosis: This continuous variable was measured using a score of individual  
130 chronic conditions (excluding cancer) based on the SNIIRAM databases [18].

131 Duration of sick leave: This categorical variable (less than one month/one month or more) was  
132 constructed for each individual from the number of successive days of paid sick leave, as recorded in  
133 the SNIIRAM databases. The one-month threshold was selected because employees in France are  
134 required to undergo a medical examination with an occupational physician one month after the start  
135 of sick leave.

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**137 Sample description**

138 The study population was mostly female, as only 19.4% of participants aged 18-54 and employed at  
139 diagnosis were men. Mean age was around 44 years old; it was slightly higher for men (45 years old)  
140 than for women (44 years old), and this difference was statistically significant. Breast cancer concerned  
141 half (55.2%) of the sample, and each other type of cancer represented from 3.2% (lung cancer) to  
142 10.2% (thyroid cancer) of the sample. This distribution may be explained by the epidemiological  
143 characteristics of the studied diseases: namely, the high frequency and high survival rate of breast  
144 cancer, the low survival rate of lung cancer, and, finally, the low frequency of bladder cancer, kidney  
145 cancer, and prostate cancer in the age group selected for the study [19]. Furthermore, the majority of  
146 survivors employed at diagnosis had a permanent contract (62.4%), held a full-time job (76.3%), and  
147 worked in the private sector (74.1%). Around half of the study population received chemotherapy  
148 (50.9%), and less than one in five (18.4%) had an adverse cancer event within five years after diagnosis.

**149 Receipt of workplace accommodations**

150 In our study, three in five (63.7%) cancer survivors received workplace accommodations (modified  
151 work station, modified schedule, and/or reduced hours) within five years after diagnosis.

152 Receipt of workplace accommodations was strongly associated with the individual, professional, and  
153 medical characteristics listed in Table 1. First, receipt of workplace accommodations varied by sex, as  
154 63.3% of female survivors received at least one type of workplace accommodation against only 52.6%  
155 of male survivors. Second, receipt of workplace accommodations was significantly and positively  
156 associated with two professional characteristics, namely company size larger than a microenterprise  
157 and permanent contract at diagnosis. Lastly, receipt of workplace accommodations was strongly  
158 associated with tumour site (i.e., it was more frequent among individuals diagnosed with breast cancer  
159 or with Non-Hodgkin lymphoma) and with receipt of chemotherapy (i.e., it was significantly more  
160 frequent among individuals treated with chemotherapy), except in the case of modified work stations.

161 More specifically, 35.5%, 41.5%, and 49.2% of the study population received a modified work station,  
162 a modified schedule, and/or reduced hours, respectively. These different types of workplace  
163 accommodation were not exclusive: some survivors received two or three types of accommodation,  
164 whether simultaneously or not. Among individuals who received at least one type of workplace  
165 accommodation, seven in ten (70.3%) received several types of accommodation within five years after  
166 cancer diagnosis. Half of these (50.8%) received all three types of accommodation and the other half  
167 received two out of three. The most common pair was reduced hours and modified schedule.

168 Furthermore, of the three in ten survivors (29.7%) who received only one type of accommodation,  
 169 51.1% received reduced hours, 36.1% received a modified work station, and only 12.8% received a  
 170 modified schedule.

171 Lastly, the association between receipt of workplace accommodations and individual, professional,  
 172 and medical characteristics varied by type of workplace accommodation. Thus, being over 40 at  
 173 diagnosis was significantly and negatively associated with receipt of a modified schedule. Moreover,  
 174 despite the fact that managers received workplace accommodations more frequently than task  
 175 performers, this difference in frequency was significant only when the accommodation was a modified  
 176 work station. Finally, receipt of reduced hours and receipt of a modified schedule were associated with  
 177 receipt of chemotherapy and adverse cancer event, but receipt of a modified work station was not.

178

179 Table 1. Prevalence of receipt of workplace accommodations according to individual, professional, and  
 180 medical characteristics (N=1,514).

Variables	Type of workplace accommodation received			At least one type of workplace accommodation received	
	Modified workstation	Modified Schedule	Reduced hours	Yes	No
	% row				
<b>All</b>	35.5	41.5	49.2	61.2	38.8
<b>Sex</b>	*	***	***	***	***
Male	29.3	31.9	37.6	52.6	47.4
Female	36.9	43.7	51.9	63.3	36.7
<b>Age</b>		*			
18-39	37.9	47.8	50.8	62.2	37.8
40-49	34.4	38.9	49.2	60.8	39.2
50-54	35.9	41.7	47.4	61.3	38.7
<b>Education level</b>					
< high school degree	34.5	40.4	47.8	60.4	39.6
≥ high school degree or more	36.1	42.1	50.0	61.7	38.3



<b>Marital status</b>					
Couple	35.1	42.0	49.1	61.3	38.7
Single	37.5	38.9	49.7	60.6	39.4
<b>Dependent child(ren)</b>					
Yes	36.1	40.9	48.8	61.0	39.0
No	35.2	41.7	49.3	61.3	38.7
<b>Sector of employment</b>					
Public	37.3	40.1	48.9	63.8	36.2
Private	34.8	41.9	49.3	60.3	39.7
<b>Company size</b>	**		*	*	*
Microenterprise	28.3	37.6	43.8	55.9	44.1
Other <sup>1</sup>	37.5	42.6	50.7	62.8	37.2
<b>Working time at diagnosis</b>	§				
Full-time	36.8	41.6	49.6	62.4	37.6
Part-time	31.5	42.0	48.7	57.9	42.1
<b>Type of contract</b>	*			*	*
Temporary	28.0	36.1	44.0	52.9	47.1
Permanent	36.5	42.2	49.9	62.4	37.6
<b>Socio-professional category</b>	*				
Task performer	32.8	40.7	48.8	60.1	39.9
Manager	38.3	42.2	49.6	62.4	37.6
<b>Tumour site</b>	§	**	***	***	***
Breast	38.6	46.0	56.1	66.3	33.7
Lung	40.5	44.4	46.0	63.3	36.7
Colon-rectum	31.8	34.1	47.6	59.6	40.4
UADT	25.9	33.6	42.6	52.7	47.3
Bladder-kidney-prostate	30.8	29.2	35.8	50.9	49.1
Thyroid	32.8	35.3	36.0	49.9	50.1
NH Lymphoma	38.3	49.5	54.5	69.4	30.6
Melanoma	24.0	32.7	31.7	50.3	49.7
Uterus	33.7	33.1	38.8	52.0	48.0

<sup>1</sup> SMEs, intermediate companies, and large companies were grouped together due to their similar distribution in terms of workplace accommodations. Microenterprises (less than ten employees) presented a different distribution and were therefore considered separately.

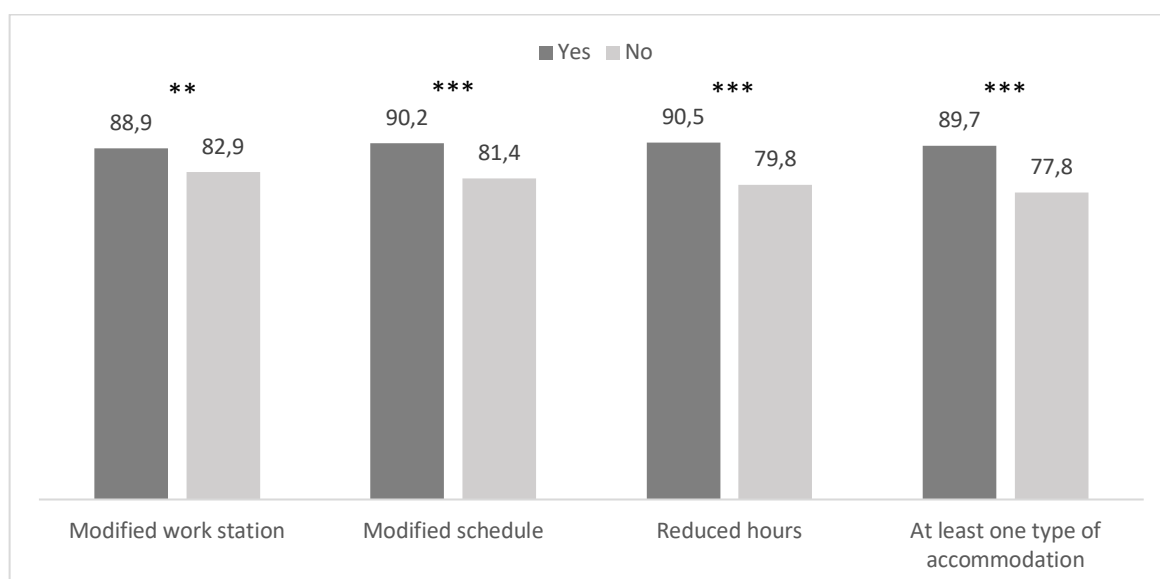
<b>Chemotherapy</b>		***	***	***	***
Yes	36.9	45.9	58.3	67.0	33.0
No	34.0	36.9	39.7	55.3	44.7
<b>Adverse cancer event</b>		§	**		
Yes	33.4	46.6	56.7	65.6	34.4
No	35.9	40.3	47.5	60.2	39.8
<b>Comorbidity score</b>		*	***	*	*
Mean (SD)	0.686 (0.344)	0.694 (0.347)	0.708 (0.345)	0.698 (0.342)	0.631 (0.335)
<p>***p-value &lt; 0.001; **p-value &lt; 0.01; *p-value &lt; 0.05; §p-value &lt; 0.1 (Student's t-test and Chi-square test).</p> <p>Note that 29.3% of men and 36.9% of women received a modified work station within five years after cancer diagnosis.</p>					

181

182

183 **Continued employment among cancer survivors five years after diagnosis**

184 85.1% of the study population was still employed five years after cancer diagnosis (i.e., at the time of  
185 the survey). Receipt of workplace accommodations was strongly associated with continued  
186 employment, as 89.7% of individuals who received workplace accommodations were employed at the  
187 time of the survey against 77.8% who were not (odds ratio was estimated at 2.48 with a 95%  
188 confidence interval [1.860; 3.305]). This association was observed for each type of workplace  
189 accommodation studied.



190

191 \*\*\*p-value < 0.001; \*\*p-value < 0.01 (Chi-square test).

192 Figure 1. Continued employment rate five years after cancer diagnosis according to type of  
193 workplace accommodation received (N=1,514)

194

195 **Positive effect of workplace accommodations on the continued employment of cancer survivors five**  
196 **years after diagnosis**

197 As shown in Table presented in supplementary files, the balancing property was satisfied, and data  
198 were properly matched.

199 Among comparable cancer survivors, receipt of workplace accommodations significantly increased the  
200 continued employment rate five years after diagnosis irrespective of the type of accommodation  
201 received, as shown in Table 2. Receipt of at least one type of workplace accommodation increased the  
202 continued employment rate from 77.8% to 95.0%<sup>2</sup>.

203

204 Table 2. Estimated effect of workplace accommodation on continued employment five years after a  
205 cancer diagnosis

Performance variable	Type of workplace accommodation			
	Modified work station	Modified schedule	Reduced hours	At least one of type of accommodation
Average treatment effect on the treated (standard deviation of the estimated effect), confidence interval	0.062** (0.028), IC95%=[0,007 ; 0,117]	0.081** (0.027), IC95%=[0,027 ; 0,135]	0.114*** (0.028), IC95%=[0,059 ; 0,170]	0.172*** (0.029), IC95%=[0,114 ; 0,229]

\*\*\*p-value < 0.001; \*\*p-value < 0.01 (Student's t-test).

206

207 **The positive effect of workplace accommodations was higher for men than for women**

208 Given the high proportion of women in our study population, sensitivity analyses were conducted to  
209 test the validity of our results. These analyses were stratified by sex: the effect of receiving at least one  
210 type of workplace accommodation on continued employment five years after cancer diagnosis was

---

<sup>2</sup> This number was calculated by adding together the continued employment rate for cancer survivors who did not receive workplace accommodations (as presented in Table 1) and the estimated effect of workplace accommodations (as presented in Table 2).

211 estimated separately for women and for men. This effect remained unchanged for women: receipt of  
212 workplace accommodations increased the continued employment rate from 73.0% to 86.6%,  
213 compared to 77.8% to 93.1% for the entire study population. The effect was much stronger for men:  
214 receipt of workplace accommodations increased the continued employment rate from 64.6% to 80.9%.  
215 However, given the small number of men in the sample, no clear conclusions could be drawn from the  
216 differences observed between men and women.

217 **Receipt of workplace accommodations had an especially positive effect on cancer survivors who**  
218 **took a short sick leave (less than one month)**

219 We stratified also the sample according to duration of sick leave taken within five years after cancer  
220 diagnosis: the first subsample was made of individuals who took a long sick leave (one month or more)  
221 (n=1,263<sup>3</sup>), and the second subsample included individuals who took a short sick leave (less than one  
222 month) (n=235). After matching, the effect of workplace accommodations on the continued  
223 employment of cancer survivors five years after diagnosis was significantly positive in both sub-  
224 samples. However, this effect was significantly higher in the second subsample: receipt of workplace  
225 accommodations increased the continued employment rate from 68.8% to 86.3% (difference of 17.5  
226 points) for cancer survivors who took a short sick leave compared to an increase from 78.9% to 88.2%  
227 (increase of 9.3 points) for individuals who took a long sick leave.

228 **The case of therapeutic part-time work**

229 In our study, 27.8% of cancer survivors had their hours temporarily reduced for therapeutic reasons.  
230 On average, this hour reduction was granted 17.5 months after diagnosis and lasted 3.9 months. The  
231 estimated effect of therapeutic part-time work on continued employment five years after diagnosis  
232 was 0.095 (SD=0.028, p-value < 0.001). Specifically, this type of accommodation increased the  
233 continued employment rate from 82.3% to 91.8%.

---

<sup>3</sup> Individuals for whom this information was not available were excluded from our analyses (n=16).

235 Our study shows that receipt of workplace accommodations (modified work station, modified  
236 schedule, and/or reduced hours) among individuals diagnosed with cancer is not systematic. Indeed,  
237 we found that only six in ten cancer survivors 61.2% aged 18-54 and employed at diagnosis received  
238 workplace accommodations within five years after diagnosis. As receipt of workplace accommodations  
239 varied by individual, professional, and medical characteristics, two subsamples (one with and one  
240 without workplace accommodations) were matched using a propensity score to estimate the effect of  
241 workplace accommodations on the continued employment of cancer survivors five years after  
242 diagnosis. Among comparable cancer survivors, this effect was positive and estimated at around 17.2  
243 percentage points.

#### 244 **Strengths and limitations of the study**

245 To our knowledge, this is the first study to explore the effect of workplace accommodations on  
246 continued employment in a representative sample of cancer survivors in France. Moreover, VICAN5 is  
247 the first survey to provide such a wide range of individual, professional, and medical data on cancer  
248 survivors.

249 Our study, however, has some limitations. The first limitation is due to the cross-sectional nature of  
250 the data involving that the estimations are all conditional to cancer survival. In the survey, we know  
251 nothing about the occupational status and potential arrangements of workstation of people diagnosed  
252 with a cancer five years before and who died before the survey or were out of sight. In addition, our  
253 analysis was limited by the lack of data on the mode of implementation of workplace accommodations.  
254 In particular, with the exception of therapeutic part-time work, we lacked information on the timing  
255 and duration of the accommodations provided after cancer diagnosis. Yet given the sequelae and  
256 treatments reported, we can assume that the workplace accommodations examined here were  
257 cancer-related, and that they were consequently implemented within three years after cancer  
258 diagnosis to facilitate the return to work of survivors (three years being the maximum duration of paid  
259 sick leave in France). Second, all job-related data were collected with a patient questionnaire and were  
260 therefore declarative data. Some individuals may have forgotten that they received workplace  
261 accommodations or may have failed to perceive them as such. However, this possibility is unlikely  
262 considering the high prevalence of receipt of workplace accommodations in our sample.

#### 263 **Prevalence of receipt of workplace accommodations**

264 In our study, more than six in ten cancer survivors (61.2%) received at least one of type of workplace  
265 accommodation within five years after cancer diagnosis: 49.2% received reduced hours, 41.5%

266 received a modified schedule, and 35.5% received a modified work station. These percentages are  
267 higher than those reported in similar studies conducted two years after diagnosis (i.e., 29.3%, 22.5%,  
268 and 17.4% for reduced hours, modified schedule, and modified work station, respectively) [20]. By  
269 extending the period of observation to five years, we were able to study the provision of workplace  
270 accommodations to individuals who returned to work after at least two years of sick leave [21].  
271 However, we had no information on the timing and duration of workplace accommodations, which  
272 means that these could have been implemented any time between diagnosis and survey. We can  
273 nevertheless assume that their implementation occurred within three years after diagnosis. This  
274 assumption is supported by the first findings of the VICAN5 survey published by the French National  
275 Institute of Cancer: therapeutic part-time work (a form of reduced hours) was implemented on average  
276 two and a half years after cancer diagnosis, which corresponds to the end of the first sick leave [21].

### 277 **Differences in receipt of workplace accommodations according to medical, individual, and** 278 **professional characteristics**

279 First, as expected, receipt of workplace accommodations varied by medical characteristics: individuals  
280 who were diagnosed with breast cancer, lung cancer, or lymphoma, those who received  
281 chemotherapy, those who had an adverse cancer event, and those who had comorbidities before  
282 diagnosis were more likely to receive workplace accommodations. This finding supports the hypothesis  
283 that workplace accommodations are implemented in order to ensure the continued employment of  
284 cancer survivors [9].

285 Second, receipt of workplace accommodations varied by individual characteristics, as it was  
286 systematically more frequent in women than in men. This finding is consistent with the literature [7,21]  
287 and raises questions regarding the pervasiveness of gender representations in the labor market. For  
288 instance, is working time reduction more acceptable for female workers than for male workers due to  
289 the already high prevalence of part-time work among women? Conversely, are men less likely to  
290 reduce their working hours because they are still viewed as the main breadwinner in the household  
291 [22]? Or is it due to the intrinsic characteristics of the male occupations that may be less suitable for  
292 accommodations?

293 Third, receipt of workplace accommodations varied by professional characteristics. Cancer survivors  
294 who were more likely to receive workplace accommodations had the most favourable professional  
295 characteristics (for example, being under 40, having a permanent contract at diagnosis, or holding a  
296 management position in the case of receipt of a modified work station). There are several possible  
297 explanations for this selection effect. It may be that employees who are more likely to remain in the  
298 company after cancer diagnosis request workplace accommodations with greater frequency, and that,

299 conversely, such employees are more often offered workplace accommodations by their employers.  
300 Furthermore, given that workplace accommodations are usually recommended by occupational  
301 physicians in France, we can assume that companies that have an occupational health department are  
302 more likely to provide workplace accommodations to their employees than those who have not such  
303 department. Finally, company policy may have an effect on the continued employment of employee  
304 after cancer diagnosis. Indeed, companies with a high turnover rate may be less likely to provide  
305 workplace accommodations to their employees than companies that favour staff stability.

### 306 **Effect of workplace accommodations on the continued employment of cancer survivors five years** 307 **after diagnosis**

308 In our study, 85.1% of cancer survivors were still employed five years after diagnosis, a rate that is  
309 fairly higher than that reported in the first published findings of the VICAN5 survey [21]. This difference  
310 can be explained by the fact that 115 individuals who did not answer the questions about workplace  
311 accommodations were excluded from our study sample, on the assumption that they were no longer  
312 on the labour market at the time of the survey.

313 Given the differences in receipt of workplace accommodations that have been previously presented,  
314 the effect of this reception was estimated after adjusting for medical characteristics (receipt of  
315 chemotherapy and comorbidity score at diagnosis), individual characteristics (sex, age at diagnosis,  
316 and education level), and professional characteristics (type of employment contract at diagnosis,  
317 sector of employment, company size and socio-professional category).

318 According to our estimates, receipt of workplace accommodations significantly favoured the continued  
319 employment of cancer survivors five years after diagnosis. Indeed, receipt of at least one type of  
320 accommodation increased the continued employment rate from 77.8% to 95.0%. Moreover, additional  
321 analyses have shown that the estimated effect increased with the number of accommodations  
322 received but this increase was no significant. The threshold effect was thus found from receiving one  
323 accommodation. There are several possible explanations for this positive effect. First, it may be that  
324 adapting working conditions to the new physical and psychological capacities of employees helps them  
325 cope with the sequelae of cancer in the short term, and thereby reduces both the termination rate and  
326 the rate of dismissal due to medical inability. On the one hand, the provision of workplace  
327 accommodations entails a change in perspective: it is no longer employees who must adapt to the  
328 workplace, but the workplace that must be adapted to meet the employee needs. On the other hand,  
329 survivors who receive workplace accommodations enjoy better working conditions, which in turn  
330 encourages them to remain at work. Second, it may be that receipt of workplace accommodations  
331 allows for a progressive return to work that is beneficial to long-term health. In fact, even temporary

332 workplace accommodations (such as therapeutic part-time work, which lasts four months on average  
333 [21]) can be kept in place when they meet the expectations of both employee and employer, and can  
334 thereby preserve the long-term health of cancer survivors. Conversely, it may be that cancer survivors  
335 who do not receive workplace accommodations must work harder to maintain the expected  
336 productivity level, which in turn contributes to the deterioration of their physical and psychological  
337 health and may drive them to exit the labour market.

338 Lastly, the effect of workplace accommodations on continued employment five years after cancer  
339 diagnosis was especially strong in survivors who took a short sick leave or no sick leave at all. For these  
340 specific survivors, the continued employment rate increased by 17.5 percentage points.

341 The above results suggest that the provision of workplace accommodations ensures the continued  
342 employment of cancer survivors, and not just their return to work.

343

#### 344 Conclusion

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345 To our knowledge, this is the first study to assess the effect of workplace accommodations on the  
346 continued employment of cancer survivors five years after diagnosis. Our study suggests that  
347 workplace accommodations are an important tool for ensuring the continued employment of cancer  
348 survivors, and not just their return to work. In view of these findings, we recommend the systematic  
349 provision of workplace accommodations to all workers concerned. Further studies are needed to  
350 describe in greater detail the mode of implementation of workplace accommodations as well as the  
351 most favourable conditions for this implementation.

352

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354

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365 study registered under no 11-143), the ISP (Institute of Public Health, study registered under no C11-  
366 63) and the CNIL (French Commission on Individual Data Protection and Public Liberties, study  
367 registered under no 911290). Confidentiality is assured for all participants with regard to any personal  
368 responses and information provided, as all data collected are anonymized.

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