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# Perceived Discrimination at Work: examining social, health and work-related factors as determinants among breast cancer survivors.

## Evidence from the prospective CANTO cohort

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**Abstract:**

## Background:

We assessed the prevalence of self-reported perceived discrimination in the workplace after the end of treatment among BC survivors and studied its association with social, health and work-related factors.

## Methods:

We used data from a French prospective cohort (CANTO) including women diagnosed with stage I-III BC. Our analysis included 2130 women who were employed, <57 years old at BC diagnosis and were working two years afterwards. We assessed the association between social, health and work-related factors and perceived discrimination in the workplace using logistic regression models.

## Results:

Overall, 26% of women reported perceived discrimination in the workplace after the end of treatment. Women working for a small company, in the public sector or with better overall health status were less likely to report perceived discrimination. Women who benefited from easing dispositions at their workplace, who did not feel supported by their colleagues and those who returned to work because of fear of job loss were more likely to report perceived discrimination.

## Conclusions:

One in four BC survivors perceives discrimination in the workplace. Health and work-related factors are associated with increased likelihood of reporting perceived discrimination.

**Key messages****What is already known on this topic?**

- Return to work (RTW) is a challenge for breast cancer survivors, two years after BC diagnosis 30% of women have not returned to work. Factors associated with RTW have been largely studied in the literature.
- However, women that return to work may also encounter problems when they reincorporate to the workforce. This includes discrimination from employers, which has been overlooked.

**What are the new findings?**

- One in four active breast cancer survivors report perceived discrimination from their employer two years after diagnosis.
- New and pre-existing working conditions, in addition to reported health status one year after diagnosis, are associated with reporting perceived discrimination.

**How might this impact on policy or clinical practice in the foreseeable future?**

- Because perceived discrimination can have long lasting psychological effects on BC survivors, educational programmes on cancer survivorship for patients, employers and practitioners are needed.

## **Introduction:**

Worldwide, breast cancer (BC) is the most common cancer among females and has an overall survival rate of over 85% in many high income countries.<sup>1,2</sup> In Europe and North America, it is estimated that 41% of women are younger than 60 years old at the moment of BC diagnosis and therefore a substantial proportion is working at diagnosis.<sup>1</sup>

BC has a major impact on work trajectories, including prolonged sick leave, job loss and early retirement.<sup>3-6</sup> Return to work (RTW) after BC treatment can help BC survivors on their way towards recovery and to maintain their financial stability.<sup>7,8</sup> However, two years after BC diagnosis 30% of women have not returned to work.<sup>9</sup> BC survivors who return to work may also encounter changes in their work environment that may further impact their work reintegration.<sup>6</sup> However few studies have looked into the conditions BC survivors encounter in the workplace after the end of treatment.<sup>3,6,9-12</sup>

In this regard, an important problem for cancer survivors is the perception of discrimination in the workplace, which can occur at different stages in the professional life of cancer survivors (e.g. when seeking for employment, during sick leave or after RTW).<sup>12,13</sup> Perceived discrimination can have an important impact on several dimensions of the life of cancer survivors, including decreased self-confidence and worth issues,<sup>12</sup> as well as work trajectories with a prompt exit from the workforce.<sup>3,10</sup> In the US cancer survivors are more likely to report discriminatory events at work compared to the general disabled population.<sup>14</sup>

Rates of discrimination among BC survivors can range from 0% to 11%.<sup>13,15,16</sup> Such heterogeneity could be due to differences between countries but also to the differences in the definition of perceived discrimination. In the literature, perceived discrimination has been defined in a variety of forms. First, the origin of discrimination; some authors study discrimination from employers,<sup>13,15</sup> while others include discrimination from colleagues.<sup>16</sup> Then, as aforementioned, the professional stage at which the discrimination occurs also needs to be considered. Furthermore, it is also important to consider how discrimination is measured; some studies use direct questions,<sup>13,15,16</sup> while other use filed allegations.<sup>14,17</sup> These issues add to the challenges to study this topic, making it difficult to compare between studies. However, discrimination among BC survivors who returned to work or never stopped working after the end of treatment remains understudied.

Several factors may interrelate with perceived discrimination, including social, health- and work-related factors. First, side effects of cancer treatment such as arm dysfunction, fatigue or psychological distress can

hinder the working ability of survivors and have a negative impact on their careers, making them targets of discriminatory behaviours.<sup>3,18-20</sup> Second, working conditions before and after cancer diagnosis could also be of importance. Indeed, the work environment (e.g. support from colleagues and superiors), workplace disposition after BC and job security (e.g. permanent contract) influence RTW and job retention, and could also play a role on perceived discrimination.<sup>3,6,11,12,21</sup> Third, in the general population individuals from lower socioeconomic status (SES) are more commonly in subordinate positions and therefore more prone to being treated unfair.<sup>22</sup> Therefore a precise understanding of the independent effect of health, work-related and social factors on perceived discrimination is lacking.<sup>12,23</sup> Perceived discrimination can impact the professional trajectories of BC survivors and their recovery. Thus, it is essential to understand its determinants to target women that are at a higher risk and to inform policymakers.

Thus, using data from a unique large prospective cohort of BC survivors combining clinical, social and work-related data, this paper aimed to study perceived discrimination from employers at the workplace among women working after the end of BC treatment and to investigate factors associated with perceived discrimination.

**Methods:**

**Study design:** We included data from the CANCER TOxicities (CANTO) cohort, which is a prospective French cohort comprised of 12,000 women with BC stage I-III, recruited between 2012 and 2018. Patient reported outcomes on physical and psychological health were measured using validated questionnaires (Figure 1). Self-reported questionnaires investigated perceived discrimination, socioeconomic and work-related factors, and were based on different French population-based surveys.<sup>24,25</sup> Clinical data were extracted from medical files or collected by dedicated nurses. Detailed information on this cohort has been published elsewhere.<sup>26</sup> Data were collected at the following time points: at diagnosis, and approximately at Year 1 and 2 post-diagnosis (Figure 1). Year 1 visit took place 3 to 6 months after the end of primary treatment.

**Population:** Out of the 12000 women included in CANTO, 9595 women had available follow-up information until Year 2 when this study was performed. In order to allow at least 5 years elapse between diagnosis and the legal age of retirement in France, our population was restricted to women age 57 years old at diagnosis (n=4812). Finally, 2130 women aged below 57 years, employed at diagnosis who were working at Year 2 were included in our analyses (Figure 2).

**Variables:** The outcome was perceived discrimination from employers that had occurred due to cancer or its sequelae in the last 12 months (yes, no) (table S1). This variable resulted from the aggregation of 5 types of perceived discriminations: 1) loss of responsibilities, 2) loss of advantages, 3) being refused a promotion or salary raise, 4) being downgraded and/or 5) being unwillingly moved to another position. This information was only obtained at Year 2. Patients were asked whether they had been penalised at work in the past 12 months in any of the five areas listed above due to cancer or its sequelae.

Adjustment variables were selected based on existing literature.<sup>3,12</sup>

*Demographic variables:* age at diagnosis (<40, 40-50, 50-56 years old).

*Clinical variables:* stage of tumour at diagnosis, surgery (mastectomy/conservative surgery, sentinel node section/axillary dissection), radiotherapy, systemic treatment (chemotherapy, hormone therapy, anti HER2 therapy) and Charlson index at diagnosis (0/>=1), with higher values indicating presence of more severe comorbidities.<sup>27</sup>

SES was defined as monthly household income per consumption unit (hereafter, income) at diagnosis, which was estimated using the square root method described by the OECD.<sup>28</sup>

*Administrative working conditions collected at diagnosis:* size of company, work/life balance (private life as/more/less important than professional life), private or public company, working full/part-time, permanent or fixed term contract. Further information on physical and psychosocial working conditions at diagnosis (strenuous postures, independence on decision making, perceived as boring, having difficulties to meet work objectives/deadlines, having good career prospects, support from colleagues) was also available for participants recruited after 2014 (N=1522).

*Health related variables collected at Year 1:* Physical side effects of treatment were collected by a nurse at Year 1 using the Common Terminology Criteria for Adverse Events (CTCAE-V4.0) and were defined as the presence

of any grade  $\geq 3$  toxicity reported in one of the following areas: cardiovascular, gynaecologic, rheumatological, gastrointestinal, dermatological, pulmonary or neurology. We included the overall health status defined using the QLQ-c30 summary score of the European Organization for Research and Treatment of Cancer Questionnaire as a continuous variable.<sup>29</sup> Reporting depressive symptoms was defined as having a Hospital Anxiety and Depression Scale (HADS) questionnaire score  $\geq 11$ .<sup>30</sup>

*Work-related variables collected at Year 2:* number of months worked between Year 1 and Year 2 (>4, 4-8, <8), presence of accommodations made by employer (on working schedules, and/or working hours and/or workload). Participants were asked if they felt they had returned to work because of fear of job loss. This variable was dichotomised as yes/no.

**Statistical analyses:** Logistic regression modelled perceived discrimination as the outcome of interest. All models were adjusted for age and clinical variables to study the association of health related and social factors independent of clinical factors. To better understand the determinants of perceived discrimination, we performed several models with successive and additional adjustments for administrative working conditions at diagnosis, health-related variables at Year 1, and work-related variables at Year 2. Possible bias due to over-adjustment was assessed by removing the non-significant variables from the final model. In addition, we conducted a sensitivity analysis restricted to the subsample for which more detailed information on physical and psychosocial working conditions at diagnosis was available.

Multiple imputations by chained equations were performed to deal with missing values with 30 imputed datasets. Odds ratios (OR) and 95% confidence intervals (95%CI) were estimated. All analyses were performed using R statistical package (version 3.6.3).

## **Results:**

At diagnosis, the mean age of our population was 47 (sd=6.28) and 13% were under 40 years old. Most women had been diagnosed with stage I BC (46%), and 10% with stage III BC. Most women worked full-time (78%) and for a medium size company (48%). Additional information regarding the characteristics of our population are displayed in table 1 (after multiple imputation) and table S2 (before multiple imputation).

Overall, 26% of all eligible women reported at least one type of discrimination, as displayed in table 2. Among these women the most common types of discrimination were loss of responsibility, loss of advantages, and promotion being refused, each being reported by about half of these women.

The associations were similar in all four models, except for income (table 1). When adjusting for age and clinical variables, the likelihood of reporting perceived discrimination increased as women's income decreased (model 1). The association strengthened when accounting for work characteristics at year 1 (model 2), attenuated when adjusting for health and work-related characteristics at year 2 (model 4).

The fully adjusted regression model (model 4) shows that women working for a small company or in the public sector were less likely to report perceived discrimination. Women with better reported quality of life as measured with the QLQ-c30 summary score and women without treatment related physical effects were also less likely to report perceived discrimination. When looking at work-related factors at Year 2 we observed that having accommodations put in place at work and returning to work because of fear of job loss increased the likelihood of reporting perceived discrimination. In addition, women that had worked 4-8 months between Year 1 and Year 2, were more likely to report perceived discrimination compared to those that had worked for longer. Estimates hardly changed after removing non-significant variables (results not shown).

Further analysis on work related factors at diagnosis showed that women who did not feel supported by their colleagues were more likely to report perceived discrimination (OR = 2.02, 95%CI = 1.24 to 3.28) (table S3).

Women with difficulties to meet deadlines at work were also more likely to report perceived discrimination (OR = 1.40, 95%CI= 1.07 to 1.84).

### **Discussion:**

Using data from a large prospective cohort of BC survivors we found that perceived discrimination is a greater issue than previously reported.<sup>13,15,16</sup> Indeed, our results suggest that one in four women face a challenging work environment after the end of BC treatment. In addition, we showed that, among women that were working after the end of treatment, health at the end of treatment and work-related factors were important determinants of perceived discrimination from employers due to cancer or its sequelae.

Previous studies have highlighted the importance of studying perceived discrimination in cancer survivors.<sup>6,12,14,17</sup> Among BC survivors, perceived discrimination can range between 0% and 11%,<sup>13,15,16</sup> an

estimation that is lower than our findings. Such differences could be because of several reasons. First, survivors can be targets of discriminatory behaviours at different stages of their professional life.<sup>12</sup> While most studies looked at the impact of discrimination on return to work,<sup>13,15,16</sup> this study focused on discrimination as reported by BC survivors who were working after the end of treatment. Differences between countries may also be important. A previous French study found that 22% of cancer survivors (all cancers included) reported discriminatory events after RTW.<sup>10</sup> In the US, this ranged from 4% to 43%, the highest rates corresponding to childhood cancer survivors.<sup>12</sup> Finally, previous studies included self-employed women in the study samples which may add to the differences.<sup>13,16</sup> In our study we excluded self-employed women because by definition they cannot be discriminated by their employer.

Challenges related to BC continue after the end of treatment, a period when survivors find difficulties to RTW and to maintain their jobs with these differences being more pronounced for those with a low SES.<sup>3,10,31,32</sup> One important question is whether people with a low SES also experience worse working conditions after the end of treatment. In our study income was inversely associated with perceived discrimination once clinical and work conditions at diagnosis were accounted for. Indeed, compared to high income women, women with lower income are more likely to report poorer health status, to have longer sick leaves (19% vs 9% of had been working <4 months between Year 1 and Year 2) and to be more likely to have workplace accommodations (67% vs 53%). Therefore, these factors may have resulted on a confounding effect of low-income women being more likely to report discrimination.

Furthermore, our analysis confirmed that good quality of life, as measured with the QLQ-c30 summary score, decreased the likelihood of reporting perceived discrimination. This could be because they can return to their normal activities more easily and be more productive. On the contrary, depression at the end of treatment was not associated with perceived discrimination. We did not consider depression at the moment of reporting perceived discrimination because when both are measured at the same time, we cannot be sure of the direction of the causality. However, existing literature suggests that cancer survivors who experience discrimination at work develop self-confidence issues.<sup>12</sup> Indeed, in other populations work stress can have deleterious effects on the mental health of employees.<sup>33</sup> Future studies should investigate the psychological impact of discrimination at work on BC survivors.

In addition to and independent of women's health, we found that working conditions, both at diagnosis and after the end of treatment, were important determinants of perceived discrimination from employers. Existing literature have highlighted the importance of working conditions pre-diagnosis, such as the size of the company survivors work for or relationship with colleagues.<sup>3,34</sup> In this regard, it can be assumed that larger companies will have specialized human resources' services that may facilitate the communication. Previous studies have pointed that managerial members of smaller companies had less awareness of existing policies to facilitate RTW of cancer survivors.<sup>34</sup> However, we found that working for small rather than large companies was a protective factor. This may be because, in small companies, employees are more likely to work close to their supervisors or employers, which may facilitate communication. In this regard, our sensitivity analysis showed that women with difficulties to meet deadlines even before diagnosis were more likely to report perceived discrimination. This suggests the importance of pre-existing communication and support issues. Furthermore, previous studies have suggested that support from colleagues was strongly associated with RTW.<sup>3</sup> Our results highlight the importance of a supportive working environment, especially feeling supported by colleagues. Furthermore, more than the type of contract, we found that individuals working in the public sector were particularly protected against perceived discrimination. This may be due to the nature of public sector contracts in France. In France, civil servants benefit from higher job security as they cannot be fired or be downgraded, and during sick leave they are entitled to three years' full salary. However, despite existing laws to protect employees from discrimination, the above stated does not apply to employees from private companies. Therefore, we recommend such policies need to be reinforced to ensure that cancer survivors can have more time for medical appointments and protect them from being fired. The latter could also help decrease the number of survivors that return to work because of fear of job loss even if they do not feel ready to return.

Previous studies have highlighted that workplace accommodations had a positive impact on RTW and job retention.<sup>11</sup> However, such accommodations may also rise feelings of discrimination or penalisation.<sup>21,23</sup> This is in line with our results. This, somehow, contradictory effect may be explained by a lack of communication between human resources, line managers or other managerial personnel and cancer survivors.<sup>34</sup> Indeed, it has been shown that some cancer survivors had the feeling that accommodations were "*forced upon them*".<sup>21</sup> Our study emphasizes the importance of clear communication between the different stakeholders involved.

Finally, we observed that perceived discrimination was inversely associated with the number of months worked after the end of BC treatment, suggesting that the feeling of being discriminated may attenuate with time. It may be that survivors may lose responsibilities or promotions at the beginning that may recover after several months in the post. It is also likely that survivors that returned to work earlier or never stopped working have better health and fewer treatment associated late effects.

### **Strengths and limitations**

First, our analysis was based on a large sample, where women were recruited from university hospitals and oncologic reference hospitals usually placed in large cities. It is thus possible that our population has a higher SES than the general BC population. In addition, we did not have information regarding participation rate or information regarding the characteristics of people that declined to be part of the CANTO cohort. However, comparison with a national French population-based survey showed our population was similar to the general BC population in France in terms of age (median age was 53 and 56 years old for the general population and our study, respectively) and income (income was >5000€ in 11% and 9% of the general population and our study, respectively) (*La Vie Deux Ans Après Un Diagnostic de Cancer - 2012, INSERM, INCa [Producteurs], ADISP [Diffuseur]*).<sup>35</sup> Finally, CANTO does not include information on women's migration status and ethnicity, which may impact on discrimination at work, since the collection of such information is not possible according to the French data protection law.

A major strength of our study is the prospective nature of data. This feature allowed us to account for temporality of data, looking at possible determinants of perceived discrimination that were collected before reporting discrimination, e.g., income, work-related factors at diagnosis or health at Year 1. In addition, all women included in this study were working when reporting discrimination, thus women that had already lost their job or did not RTW were excluded. This is important to avoid possible overestimation of perceived discrimination due to job loss. Indeed, individuals may be more likely to report discrimination following job loss. Because we only included women that were working at the moment of reporting discrimination, we may have removed women that had been discriminated before RTW.

Furthermore, women in our cohort were directly asked using a structured form if the discrimination they perceived was due to cancer or its sequelae. This minimizes the possible overestimation of perceived discrimination due to factors other than cancer, although some discrimination due to factors other than cancer

may still be present. In addition, our questions were based on an existing survey,<sup>36</sup> making it possible to compare our results with other existing studies on cancer survivors.<sup>10,12</sup> It would be interesting to use the same questions in other disabled populations to compare our results to other populations. This would provide an insight on the different effect of each disability/chronic disease on perceived discrimination

## **Conclusions**

Overall, our study showed that perceived discrimination among BC survivors who are working may be a greater public health issue than previously reported. Perceived discrimination at work can lead to a double mental health burden suffered by BC survivors, by adding additional stressors (e.g., job instability or low self-confidence) that would further deplete survivors' mental health and general quality of life. Finally, our study provides detailed information on the factors associated with perceived discrimination from employers. This information is of high relevance to identify those at risk by practitioners and provide them with information on their rights as employees and who they should be contacting in case of being victims of discrimination. For policymakers, this information can be used to create targeted policies to reduce perceived discrimination at work, which are urgently needed.

## **Research Ethics Approval**

The study was approved by the national regulatory authorities and ethics committee (ID-RCB: 2011-A01095-36, 11-039).

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## References:

- (1) IARC. Online Globocan Database. 2018.

- (2) WHO. *5-year age standardised relative survival*. NORDCAN. [https://nordcan.iarc.fr/en/dataviz/survival?cancers=24&set\\_scale=0&sexes=2](https://nordcan.iarc.fr/en/dataviz/survival?cancers=24&set_scale=0&sexes=2) (accessed 2021-01-13).
- (3) Mehnert, A. Employment and Work-Related Issues in Cancer Survivors. *Critical Reviews in Oncology/Hematology*. **2011**, *77*, 109- 30. <https://doi.org/10.1016/j.critrevonc.2010.01.004>.
- (4) Plym, A.; Johansson, A. L.; Bower, H.; Voss, M.; Holmberg, L.; Fredriksson, I.; Lambe, M. Causes of Sick Leave, Disability Pension, and Death Following a Breast Cancer Diagnosis in Women of Working Age. *The Breast* **2019**, *45*, 48–55.
- (5) Damkjaer, L.; Deltour, I.; Suppli, N.; Christensen, J.; Kroman, N.; Johansen, C.; Oksbjerg Dalton, S. Breast Cancer and Early Retirement: Associations with Disease Characteristics, Treatment, Comorbidity, Social Position and Participation in a Six-Day Rehabilitation Course in a Register-Based Study in Denmark. *Acta oncologica* **2011**, *50*, 254- 81. <https://doi.org/10.3109/0284186X.2010.531048>.
- (6) Cocchiara, R.; Sciarra, I.; D'Egidio, V.; Sestili, C.; Mancino, M.; Backhaus, I.; Mannocci, A.; De Luca, A.; Frusone, F.; Di Bella, O.; Di Murro, F.; Palmeri, V.; Lia, L.; Paradiso, G.; Aceti, V.; Libia, A.; Monti, M.; La Torre, G. Returning to Work after Breast Cancer: A Systematic Review of Reviews. *Work* **2018**. <https://doi.org/10.3233/WOR-182810>.
- (7) OSHA. Rehabilitation and Return to Work after Cancer: Literature Review. 2017.
- (8) Amir, Z.; Neary, D.; Luker, K. Cancer Survivors' Views of Work 3 Years Post Diagnosis: A UK Perspective. *European journal of oncology nursing* **2008**, 190–197.
- (9) de Boer, A.; Torp, S.; Popa, A.; Horsboel, T.; Zadnik, V.; Rottenberg, Y.; Bardi, E.; Bultmann, U.; Sharp, L. Long-Term Work Retention after Treatment for Cancer: A Systematic Review and Meta-Analysis. *Journal of cancer survivorship* **2020**, *14*, 135–150.
- (10) Paraponaris, A.; Sagaon Tayssier, L.; Ventelou, B. Job Tenure and Self-Reported Workplace Discrimination for Cancer Survivors 2 Years after Diagnosis: Does Employment Legislation Matter? *Health Policy*. 2010, pp 144–155.
- (11) Alleaume, C.; Paraponaris, A.; Bendiane, M.; Peretti-Watel, P.; Bouhnik, D. The Positive Effect of Workplace Accommodations on the Continued Employment of Cancer Survivors Five Years after Diagnosis. *Support Care Cancer*. **2020**. <https://doi.org/10.1007/s00520-019-05189-y>.
- (12) Stergiou-Kita, M.; Qie, X.; Yau, H. K.; Lindsay, S. Stigma and Work Discrimination among Cancer Survivors: A Scoping Review and Recommendations. *Canadian journal of occupational therapy* **2017**, *84* (3), 178–188. <https://doi.org/10.1177/0008417417701229>.
- (13) Bouknight, R.; Bradley, C.; Luo, Z. Correlates of Return to Work for Breast Cancer Survivors. *Journal of Clinical Oncology* **2008**, *24* (3), 345- 53. <https://doi.org/10.1200/JCO.2004.00.4929>.
- (14) McKenna, M.; Fabian, E.; Hurley, J.; McMahon, M.; West, S. Workplace Discrimination and Cancer. *Work* **2007**, *29*, 313–322.
- (15) Landeiro, L. C.; Gagliato, D. M.; Fède, A. B.; Fraile, N. M.; Lopez, R. M.; da Fonseca, L. G.; Petry, V.; Testa, L.; Hoff, P. M.; Mano, M. S. Return to Work After Breast Cancer Diagnosis: An Observational Prospective Study in Brazil. *Cancer* **2018**, *000*, 000–000. <https://doi.org/10.1002/cncr.31735>.
- (16) Villaverde, R.; Batlle, J.; Yllan, A.; Gordo, A.; Sanchez, A.; Valiente, B.; Baron, M. Employment in a Cohort of Breast Cancer Patients. *Occupational Medicine*. **2008**, *58*, 509–511. <https://doi.org/10.1093/occmed/kqn092>.
- (17) Feuerstein, M.; Luff, G.; Harrington, C.; Olsen, C. Pattern of Workplace Disputes in Cancer Survivors: A Population Study of ADA Claims. *J Cancer Surviv* **2007**, *1*, 185–192. <https://doi.org/10.1007/s11764-007-0027-9>.
- (18) Carlsen, K.; Jensen, A.; Rugulies, R.; Christensen, J.; Bidstrup, P.; Johansen, C.; Huitfeldt Madsen, I.; Dalton, S. Self-Reported Work Ability in Long-Term Breast Cancer Survivors. A Population-Based Questionnaire Study in Denmark. *Acta oncologica* **2013**, *52*, 423–429. <https://doi.org/10.3109/0284186X.2012.744877>.
- (19) Duijts, S. F. A.; van Egmond, M. P.; Spelten, E.; van Muijen, P.; Anema, J. R.; van der Beek, A. J. Physical and Psychosocial Problems in Cancer Survivors beyond Return to Work: A Systematic Review. *Psychooncology* **2014**, *23* (5), 481–492. <https://doi.org/10.1002/pon.3467>.
- (20) Bijker, R.; Duijts, S.; Smith, S.; de Wildt-Liesveld, R.; Anema, J.; Regeer, B. Functional Impairments and Work-Related Outcomes in Breast Cancer Survivors: A Systematic Review. *journal of occupational rehabilitation* **2018**, *28*, 429–451. <https://doi.org/10.1007/s10926-017-9736-8>.
- (21) Wells MB et al. Supporting “Work-Related Goals” Rather than “Return to Work” after Cancer? A Systematic Review and Meta-Synthesis of 25 Qualitative Studies. *Psychooncology*. 22nd ed. 2013, pp 1208–1219.
- (22) Kramer, R. Divergent Realities and Convergent Disappointments in the Hierarchic Relation: Trust and the Intuitive Auditor at Work. In Kramer R, Tyler T, editors. *Trust in organizations: frontiers of theory and research*; Sage Publications: London, 1996.

- (23) Duguet, E.; Le Clainche, C. Evaluation of the impact of workplace accommodations on the return to work after cancer [Une évaluation de l'impact de l'aménagement des conditions de travail sur la reprise du travail après un cancer]. *Revue économique* **2016**, 49- 80.
- (24) Richard, J.; Andler, R.; Guignard, R. Health barometer 2017. Survey method. Objectives, context of implementation and protocol. [Baromètre santé 2017. Méthode d'enquête. Objectifs, contexte de mise en place et protocole]., 2018.
- (25) INCA. *Life two years after cancer diagnosis. From diagnosis to after cancer, collection studies and surveys. [La vie deux ans après un diagnostic de cancer -De l'annonce à l'après cancer , collection Études et enquêtes]*; 2014.
- (26) Vaz-Luis, I.; Cottu, P.; Mesleard, C.; Martin, A. L.; Dumas, A.; Dauchy, S.; Tredan, O.; Levy, C.; Adnet, J.; Rousseau Tsagaris, M.; Andre, F.; Arveux, P. UNICANCER: French Prospective Cohort Study of Treatment-Related Chronic Toxicity in Women with Localised Breast Cancer (CANTO). *ESMO open* **2019**.
- (27) Charlson, M.; Pompei, P.; Ales, K.; MacKenzie, C. A New Method of Classifying Prognostic Comorbidity in Longitudinal Studies: Development and Validation. *J Chron Dis* **1987**, *40* (5), 373–383. [https://doi.org/10.1016/0021-9681\(87\)90171-8](https://doi.org/10.1016/0021-9681(87)90171-8).
- (28) OECD. WHAT ARE EQUIVALENCE SCALES?
- (29) Husson, O.; Rooij, B.; Kieffer, J.; Oerlemans, S.; Mols, F.; Aaronson, N.; Van der Graaf, W.; Van der Poll-franse, L. The EORTC QLQ- C30 Summary Score as Prognostic Factor for Survival of Patients with Cancer in the “Real- World.” *The oncologist* **2020**, *25*. <https://doi.org/10.1634/theoncologist.2019-0348>.
- (30) Zigmond, A.; Snaith, R. The Hospital Anxiety and Depression Scale. *Acta Psychiatr Scand* **1983**, *67*, 61–370. <https://doi.org/10.1111/j.1600-0447.1983.tb09716.x>.
- (31) Short, P. F.; Vasey, J. J.; Tunceli, K. Employment Pathways in a Large Cohort of Adult Cancer Survivors. *Cancer*. 103rd ed. 2005, pp 1292–1301.
- (32) Dumas, A.; Vaz-Luis, I.; Bovagnet, T.; El Mouhebb, M.; Di Meglio, A.; Charles, C.; Pinto, S.; Dauchy, S.; Delalogue, S.; Arveux, P.; Coutant, C.; Cottu, P.; Lesur, A.; Lerebours, F.; Tredan, O.; Vanlemmens, L.; Levy, C.; Lemonnier, J.; Mesleard, C.; Andre, F.; Menvielle, G. Impact of Breast Cancer Treatment on Employment: Results of a Multicenter Prospective Cohort Study (CANTO). *J Clin Oncol*. 2020, pp 734–743.
- (33) Karl, M.; Schaber, R.; Kress, V.; Kopp, M.; Martini, J.; Weidner, K.; Garthus-Niegel, S. Precarious Working Conditions and Psychosocial Work Stress Act as a Risk Factor for Symptoms of Postpartum Depression during Maternity Leave: Results from a Longitudinal Cohort Study. *BMC Public Health* **2020**, *20*, 1505. <https://doi.org/10.1186/s12889-020-09573-w>.
- (34) Fitch, M.; Nicoll, I. Returning to Work after Cancer: Survivors', Caregivers', and Employers' Perspectives. *Psycho-Oncology* **2019**, *28*, 792–798. <https://doi.org/10.1002/pon.5021>.
- (35) *La Vie Deux Ans Après Un Diagnostic de Cancer - 2012, INSERM, INCa [Producteurs], ADISP [Diffuseur]*.
- (36) Bouhnik, D.; Bendiane, M.; Cortaredona, S.; Teyssier, L.; Rey, D.; Berenger, C.; Seror, V.; Peretti-Watel, P.; members of the VICAN Group. The Labour Market, Psychosocial Outcomes and Health Conditions in Cancer Survivors: Protocol for a Nationwide Longitudinal Survey 2 and 5 Years after Cancer Diagnosis (the VICAN Survey). *BMJ open* **2015**, *5*, e005971. <https://doi.org/10.1136/bmjopen-2014-005971>.

**Figure 1.** Timeline of the data collected and used in the analyses. Year 1 and 2 correspond approximately to years 1 and 2 after diagnosis.

**Figure 2.** Eligibility flow-chart of study sample.

Abbreviations: BC= breast cancer; dx= diagnosis; RTW= return to work.

Table 1. Characteristics of all women and percentage by category after multiple imputation and social, health- and work-related factors associated with perceived discrimination two years after diagnosis. CANTO cohort (N=2130).

	Distribution (%)	Distribution of PD by subcategory (%)	Model 1 <sup>†</sup>		Model 2 <sup>†</sup>		Model3 <sup>†</sup>		Model 4 <sup>†</sup>	
			OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
<b>Socioeconomic status at dx</b>										
<b>Income<sup>a</sup></b>										
>3500€	12	21	Ref.	-	Ref.		Ref.	-	Ref.	
3000-3500€	11	25	1.17	[0.76;1.82]	1.26	[0.81;1.97]	1.33	[0.84;2.10]	1.30	[0.81;2.09]
2000-3000€	28	26	1.25	[0.87;1.80]	1.43	[0.99;2.08]	1.34	[0.91;1.96]	1.22	[0.82;1.81]
1500-2000€	25	29	1.39	[0.97;2.01]	1.63	[1.11;2.39]	1.55	[1.05;2.29]	1.35	[0.90;2.04]
<1500€	25	29	1.37	[0.95;1.98]	1.79	[1.21;2.65]	1.50	[1.00;2.25]	1.32	[0.86;2.00]
<b>Work related factors at dx</b>										
<b>Company size</b>										
Large (>250 employees)	16	30	Ref.	-	Ref.		Ref.	-	Ref.	
Medium (50-250 employees)	48	31			0.96	[0.70;1.30]	1.00	[0.73;1.38]	0.96	[0.69;1.34]
Small (<50 employees)	36	19			0.47	[0.33;0.65]	0.47	[0.33;0.67]	0.50	[0.35;0.72]
<b>Work/life balance</b>										
Private life as important as professional life	51	25	Ref.	-	Ref.		Ref.	-	Ref.	
Private life more important than professional life	39	27			1.06	[0.86;1.32]	1.06	[0.85;1.33]	1.03	[0.82;1.30]
Private life less important than professional life	9	30			1.34	[0.94;1.90]	1.13	[0.78;1.63]	1.13	[0.77;1.67]
<b>Type of company</b>										
Private	45	28	Ref.	-	Ref.		Ref.	-	Ref.	
Public	55	25			0.76	[0.62;0.94]	0.75	[0.60;0.94]	0.75	[0.59;0.94]

<b>Contract hours</b>										
Full time	78	27	Ref.	-	Ref.		Ref.	-	Ref.	
Part Time	22	23			0.86	[0.66;1.12]	0.87	[0.66;1.14]	0.87	[0.66;1.15]
<b>Type of contract</b>										
Permanent	86	27	Ref.	-	Ref.		Ref.	-	Ref.	
Fixed term	15	23			0.89	[0.66;1.22]	0.87	[0.63;1.20]	0.87	[0.62;1.21]
<b>Health related factors 1 year after dx</b>										
<b>QLQ-C30 summary score, median (IQR)</b>	82.31 (72.82, 90.51)	77.54 (66.50, 84.96)					0.96	[0.96;0.97]	0.97	[0.97;0.98]
<b>Depressive symptoms<sup>‡</sup></b>										
No	95	26	Ref.	-	Ref.		Ref.	-	Ref.	
Yes	5	44					1.14	[0.70;1.87]	1.13	[0.68;1.87]
<b>Number of physical side effects of treatment</b>										
None	92	26	Ref.	-	Ref.		Ref.	-	Ref.	
At least one	8	37					1.37	[0.96;1.95]	1.44	[1.00;2.08]
<b>Work related factors 2 years after dx</b>										
<b>Number of months worked between year 1 and year 2</b>										
>8	72	23	Ref.	-	Ref.		Ref.	-	Ref.	
4-8	14	39							1.56	[1.15;2.11]
<4	14	31							1.28	[0.93;1.76]
<b>Accommodations at workplace after the end of treatment</b>										
No	38	12	Ref.	-	Ref.		Ref.	-	Ref.	
Yes	62	35							3.18	[2.43;4.17]
<b>RTW because of fear of losing job</b>										
No	20	41	Ref.	-	Ref.		Ref.	-	Ref.	
Yes	80	23							2.30	[1.78;2.97]

<sup>†</sup>All models are additionally adjusted for age, stage at diagnosis, local and systemic treatment, Charlson index at diagnosis. <sup>‡</sup> defined as HADS (Hospital Anxiety and Depression Scale) score  $\geq 11$ . Abbreviations: OR: Odds Ratios, CI: Confidence Interval, PD: Perceived Discrimination, IQR: Interquartile Range, dx:

Diagnosis, RTW: Return to Work. <sup>a</sup>Income was defined as household income per consumption unit, which was created following the square root method defined by the OECD <sup>28</sup>.

1 Table 2. Distribution of women according to the type of perceived discrimination 24 months after  
2 diagnosis (Year 2) among women who reported perceived discrimination (N=562).

<b>Variable</b>	<b>n (%)</b>
Loss of responsibilities	277 (49)
Loss of advantages	281 (50)
Promotion/salary increase refused	254 (45)
Downgrading	71 (13)
Moving to a new post (non-desired)	39 (7)

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