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ORIGINAL REPORT

# Sex Differences in the Return-to-Work Process of Cancer Survivors 2 Years After Diagnosis: Results From a Large French Population-Based Sample

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## ABSTRACT

### Purpose
To investigate the effects of clinical, sociodemographic, and occupational factors on time to return to work (RTW) during the 2 years after cancer diagnosis and to analyze whether sex differences exist.

### Patients and Methods
This study was based on a French national cross-sectional survey involving 4,270 cancer survivors. Time to RTW was estimated through the duration of sick leave of 801 cancer survivors younger than 58 years who were employed during the 2-year survey. Multivariate analysis of the RTW after sick leave was performed using a Weibull accelerated failure time model.

### Results
We found some sex differences in the RTW process. Older men returned to work more slowly than older women ($P = .013$), whereas married men returned to work much faster than married women ($P = .019$). Duration dependence was also sex-specific. In men, the time spent on sick leave was independent of the probability of returning to work, whereas in women, this duration dependence was positive ($P < .001$). For both men and women, clinical factors including chemotherapy, adverse effects, and cancer severity were found to delay RTW ($P = .035$, $P = .001$, and $P < .001$, respectively). Survivors investing most strongly in their personal lives also delayed their RTW ($P = .006$), as did those with a permanent work contract ($P = .042$). The factor found to accelerate RTW was a higher educational level ($P = .014$).

### Conclusion
The RTW process 2 years after cancer diagnosis differed between men and women. A better knowledge of this process should help the national implementation of more cost-effective strategies for managing the RTW of cancer survivors.

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## INTRODUCTION

Recent progress in the early diagnosis of cancer has increased the number of working-age adults with cancer, and improvements in cancer treatment have led to an increased likelihood of long-term disease-free survival. Cancer can therefore now be considered as a transient health shock that is no longer likely to prevent survivors from returning to their workplace.[1]

From a societal perspective, long periods of sick leave have a heavy economic impact on society at large because of the indirect costs owing to the loss of productivity.[2] From the patients' perspective, long periods away from work are also likely to cause a loss of income and financial difficulties.[3,4] In addition, because return to work (RTW) helps patients to regain a normal life, it can be expected to enhance their social well-being, self-esteem, and quality of life.[5,6]

The literature on the RTW of cancer survivors is quite recent. Various authors have reported that most people return to work a few months after cancer diagnosis[6,7] and have documented the effects of disease-related and work-related factors, as well as patients' sociodemographic characteristics on their ability to RTW.[8-15] However, less attention has been paid to the factors contributing to the duration of cancer patients' sick leave. In France, absence from work because of cancer is covered by the National Health System, which provides workers with daily allowances that largely offset their loss of income during the sick-leave period (for up to 3 years). Workers on sick leave are regarded as being employed. Thus the time to RTW within the 2-year survey can be studied through the analysis of the

duration of the sick leave period. Cox proportional hazards model has been commonly used in cancer studies to analyze time to RTW, assuming the independence between the time elapsing during sick leave and the probability of returning to work. Studies in the field of labor economics have suggested, however, that some duration dependence often occurs, and this should be taken into account when analyzing the RTW process.[16,17] Studies on this topic have also stressed the need to distinguish between men and women because they behave differently in terms of the labor supply, which may in turn affect other labor market outcomes differently.[18] The factors underlying the RTW process certainly have a different impact, depending on whether the individual involved is a man or woman.[19]

This study therefore focused on the role of clinical, sociodemographic, and occupational characteristics of cancer survivors in the RTW process. Sex differences were addressed taking into account the duration dependence issue. The study was based on data obtained on a representative French national sample of 4,270 cancer survivors interviewed 2 years after cancer diagnosis.

## PATIENTS AND METHODS

### Study Population

A French national cross-sectional survey was launched in 2004 to investigate the living conditions of adult patients with cancer 2 years after cancer diagnosis.[20,21] It included 13,923 people diagnosed with cancer, who were randomly selected from the Long Duration Disease File of the National Health Insurance Fund between September and October 2002. This is a representative sample of cancer survivors alive in 2004 by one of the three main Health Insurance Schemes covering approximately 96% of the French population. Eligibility was restricted to adult patients diagnosed with first cancer. All eligible patients were invited to send back their signed informed consent. The study was approved by the French National committee on Informatics and Freedom. Among the 6,957 eligible patients with cancer, 4,460 agreed to participate (response rate, 64.1%). The final study sample consisted of 4,270 persons (Fig 1).

### Data Collection

People were asked by telephone about their occupational situation during the 2-year study period (occupational status at the time of diagnosis, current work situation, duration of the last sick leave because of cancer) and their working conditions (type of job, work contract, work schedules, and income). Medical information about the disease (cancer type, disease stage at diagnosis, type of treatments, and evolution of the disease 2 years after diagnosis) was also collected. A three-category adverse effects variable was computed using the responses to two questions about the adverse effects people experienced: no adverse effects/slightly disturbing adverse effects and very disturbing adverse effects. A continuous variable (from 0 to 1) giving each patient's cancer prognosis was calculated based on the cancer survival rate 5 years after first diagnosis weighted by both the stage of the disease and the age at the time of diagnosis. In addition, they were asked to answer a three-category question about their priorities in life since diagnosis: "I attach more importance to my personal life"; "I attach equal importance to my personal and working life"; and "I attach more importance to my working life."

### Outcome

The main outcome was the time to RTW after sick leave, defined as the number of months elapsing between the first day of sick leave due to cancer and the first day on which the patient actually returned to work.

### Patients

The analysis was based on a sample of 1,150 participants who declared that they were employed during the 2 years covered by the survey (at diagnosis in 2002 and 2 years later) and were younger than 60 years (the French legal retirement age) at the time of the interview. Because no data were available on 144 patients' episodes of sick leave, these patients were dropped from the analysis. Our final study sample therefore included 1,006 patients meeting all the eligibility criteria (Fig 1).

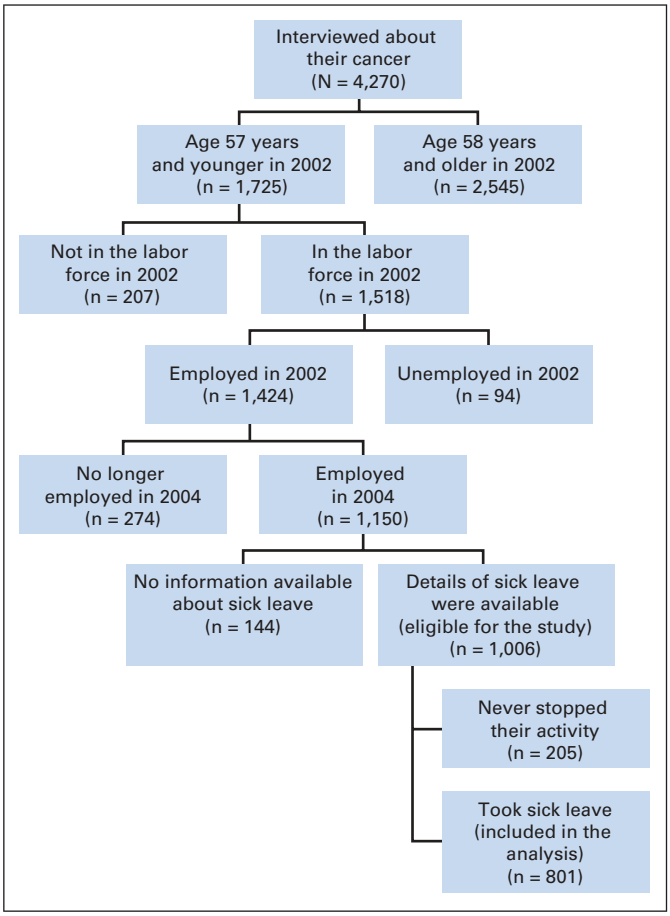


**Fig 1.** CONSORT diagram of the sample included in the survey.

### Statistical Analysis

$\chi^2$ tests and *t* tests were used to compare individual characteristics and duration of sick leave between men and women. Kaplan-Meier curves were drawn up showing the RTW process during the 2-year period, depending on sex.

Multivariate analysis was performed by implementing a Weibull accelerated failure time (AFT) model[22] allowing duration dependence to be considered (ie, to verify whether the probability of end of sick leave at any point in time depends on the amount of time that has already elapsed). AFT models provided accelerating factors (AF), which were interpreted in a similar way to hazard ratios: AF less than 1 (AF $>$ 1) indicated a longer (shorter) time to RTW.

A pooled model with a dummy variable distinguishing between men and women was estimated (model 1). Although this model allows verifying sex differences, it did not provide additional information about the observed characteristics at the origin of these differences. For this reason, a second pooled model was estimated with the set of observed characteristics interacted with the sex dummy variable (model 2).

It is important to notice that models 1 and 2 impose the strong assumption that duration dependence is the same for men and women. To relax this assumption, a third estimation (model 3) was carried out stratifying by sex. The global likelihood-ratio (LR) test was computed to test the pertinence of the stratified estimation of separate Weibull parameters. All the statistical analyses were computed with the R software.[23] For a detailed description of the econometric method, see Appendix (online only).

  

**Table 1.** Demographics and Clinical Characteristics of the Patients in the Sample

| Characteristic | Women (n = 544) | | Men (n = 257) | | Together (n = 801) | | No Sick Leave (N = 205) | |
|---|---|---|---|---|---|---|---|---|
| | No. | % | No. | % | No. | % | No. | % |
| Sex | | | | | | | | |
| Women | 544 | 100 | | | 544 | 67.9 | 110 | 53.7* |
| Men | | | 257 | 100 | 257 | 32.1 | 95 | 46.3* |
| Average age, years | | | | | | | | |
| Mean | 47.9 | | 49.3 | | 48.4 | | 48.5 | |
| SD | 7.3 | | 8.3 | | 7.6 | | 8 | |
| Living with a partner | | | | | | | | |
| Yes | 418 | 76.8 | 216 | 84.0† | 634 | 79.1 | 167 | 81.5 |
| No | 126 | 23.2 | 41 | 16.0† | 167 | 20.9 | 38 | 18.5 |
| Educational level | | | | | | | | |
| No high school qualifications | 97 | 17.8 | 51 | 19.8 | 148 | 18.5 | 39 | 19.0 |
| Junior high school | 189 | 34.7 | 106 | 41.2† | 295 | 36.8 | 76 | 37.1 |
| High school certificate | 102 | 18.8 | 39 | 15.2 | 141 | 17.6 | 35 | 17.1 |
| > High school level | 156 | 28.7 | 61 | 23.8 | 217 | 27.1 | 55 | 26.8 |
| Occupational group at diagnosis | | | | | | | | |
| Farmers, manual workers | 56 | 10.3 | 97 | 37.7* | 153 | 19.1 | 46 | 22.4 |
| Shopkeepers, crafts workers | 17 | 3.1 | 24 | 9.4* | 41 | 5.2 | 23 | 11.2* |
| Higher level professionals and managers | 64 | 11.8 | 46 | 17.9† | 110 | 13.7 | 32 | 15.6 |
| Lower level professionals | 137 | 25.2 | 53 | 20.6 | 190 | 23.7 | 51 | 24.9 |
| Clerical and similar workers | 270 | 49.6 | 37 | 14.4* | 307 | 38.3 | 53 | 259* |
| Work contract at cancer diagnosis | | | | | | | | |
| Permanent | 460 | 84.6 | 215 | 83.7 | 675 | 84.3 | 149 | 72.7* |
| Fixed-term | 47 | 8.6 | 14 | 5.4 | 61 | 7.6 | 17 | 8.3 |
| Self-employed | 37 | 6.8 | 28 | 10.9 | 65 | 8.1 | 36 | 17.6* |
| Missing values | | | | | | | 3 | 1.4 |
| Average monthly income per person in the household at diagnosis in Euros | | | | | | | | |
| Mean | | 1,672.6 | | 1,598.3 | | 1,648.7 | | 1,739.3 |
| SD | | 1,167.8 | | 1,064.2 | | 1,135.3 | | 2,311.4 |
| Tumor type | | | | | | | | |
| Colon/rectum | 26 | 4.8 | 35 | 13.6* | 61 | 7.6 | 15 | 7.3 |
| Breast | 358 | 65.8 | 0 | | 358 | 44.7 | 61 | 29.8* |
| Prostate | 0 | | 32 | 12.5 | 32 | 4 | 15 | 7.3‡ |
| Upper aerodigestive tract-lung | 16 | 2.9 | 61 | 23.7* | 77 | 9.6 | 15 | 7.3 |
| Other urogenital tumors | 60 | 11 | 28 | 10.9 | 88 | 11 | 32 | 15.6‡ |
| Malignant hemopathy | 27 | 5 | 40 | 15.6* | 67 | 8.4 | 16 | 7.8 |
| Other cancer | 57 | 10.5 | 61 | 23.7* | 118 | 14.7 | 51 | 24.9* |
| Average prognosis index§ | | | | | | | | |
| Mean | 64.2 | | 42.8 | | 57.3 | | 63,4 | |
| SD | 18.8 | | 21.5* | | 22.1 | | 18.2* | |
| Treatment | | | | | | | | |
| Surgery only | 89 | 16.3 | 82 | 31.8* | 169 | 21.1 | 89 | 43.4* |
| Surgery and chemotherapy | 57 | 10.5 | 37 | 14.5 | 95 | 11.8 | 19 | 9.3 |
| Surgery and radiotherapy | 122 | 22.5 | 35 | 13.7* | 157 | 19.6 | 40 | 19.3 |
| Surgery, chemotherapy, and radiotherapy | 242 | 44.5 | 49 | 18.9* | 293 | 36.6 | 39 | 19.2* |
| Other combination (including watchful waiting) | 34 | 6.2 | 54 | 21.2* | 87 | 10.8 | 18 | 8.8 |
| Disease status | | | | | | | | |
| Progressive disease | 45 | 8.3 | 25 | 9.7 | 70 | 8.7 | 6 | 2.9* |
| Nonprogressive disease | 499 | 91.7 | 232 | 90.3 | 731 | 91.3 | 199 | 97.1* |
| Side effects | | | | | | | | |
| None or only slightly disturbing | 214 | 39.4 | 96 | 37.4 | 311 | 38.8 | 129 | 62.9* |
| Yes, rather disturbing | 218 | 40 | 89 | 34.6 | 307 | 38.3 | 45 | 22.0* |
| Yes, very disturbing | 112 | 20.6 | 72 | 28.0† | 183 | 22.9 | 31 | 15.1 |

(continued on following page)

**Table 1.** Demographics and Clinical Characteristics of the Patients in the Sample (continued)

| Characteristic | Women (n = 544) No. | Women (n = 544) % | Men (n = 257) No. | Men (n = 257) % | Together (n = 801) No. | Together (n = 801) % | No Sick Leave (N = 205) No. | No Sick Leave (N = 205) % |
|---|---|---|---|---|---|---|---|---|
| Life priorities since diagnosis | | | | | | | | |
| Attach more importance to their personal lives | 372 | 68.4 | 165 | 64.3 | 538 | 67.2 | 104 | 50.7* |
| Attach equal importance to their personal lives and their work | 149 | 27.4 | 80 | 31 | 227 | 28.4 | 88 | 42.9* |
| Attach more importance to their work | 23 | 4.2 | 12 | 4.7 | 36 | 4.5 | 13 | 6.4 |
| Average duration of sick leave, months | | | | | | | | |
| Mean | 10.5 | | 8.1 | | 9.8 | | | |
| SD | 6.9 | | 6.9 | | 7.0 | | | |
| Censored‖ | 147 | 27 | 92 | 35.8 | 239 | 29.8 | | |

NOTE. Symbols in the "Men" column denote comparisons between women and men; symbols in the "No Sick Leave" column denote comparisons between the patients included in the sample and those removed.
Abbreviation: SD, standard deviation.
*Significant differences at a 1% CI.
†Significant differences at a 5% CI.
‡Significant differences at a 10% CI.
§The prognosis index ranged between 0 and 100 (the worst and best prognosis, respectively).
‖Censored data correspond to individuals still on sick leave at the time of the interview (ie, it was not possible to know the complete duration of the period of sick leave).

## RESULTS

### Sample Description

Of the 1,006 eligible patients, 205 (20.3%) practically never stopped working during the observation period and were therefore excluded from the analysis (Table 1). They tended to be men, shopkeepers or artisans, self-employed, and have a better prognosis. They tended less frequently to have progressive disease, adverse effects, and a stronger investment in their personal life. The characteristics of the remaining 801 patients included in our analysis are also summarized in Table 1. Men were more likely to be living maritally, to have higher educational levels, and to be farmers or manual workers. They also experienced very disturbing adverse effects more frequently. The cancer type and treatment obviously differed between men and women: more men underwent only surgery, whereas more women underwent sequential treatment involving surgery, chemotherapy, and radiotherapy (the routine treatment for breast cancer).

### RTW Rates by Sex

The Kaplan-Meier survival curves giving the probability of RTW after sick leave over time, depending on sex, are shown in Figure 2. The median duration of sick leave was the same with both sex (12 months, not significant). However, the shape of the curves differed, and they crossed 12 months after diagnosis. Six months after diagnosis, 36% of the men and 25% of the women had returned to work ($P = .006$). At 24 months, 65% and 72% of the men and women, respectively, had returned to work ($P = .042$).

### Multivariate Analysis of Duration of Sick Leave With Sex Interaction Terms

Table 2 presents the factors significantly associated with time to RTW after sick leave, along with the corresponding AFs and CIs. Model 1 (first column of Table 2) showed the existence of a statistically significant difference between men and women ($P = .03$) in the RTW rate. This difference indicates that men were 29.2% (AF = 1.292) more likely to return to work than women at each point in time.

In model 2 (with sex interaction term), some clinical factors were found to be significantly associated with the RTW process, independently from sex. Chemotherapy (alone or combined with other types of treatment) decelerated RTW (AF = 0.746, $P = .035$), as well as disturbing reported adverse effects (AF = 0.703, $P = .001$ for rather

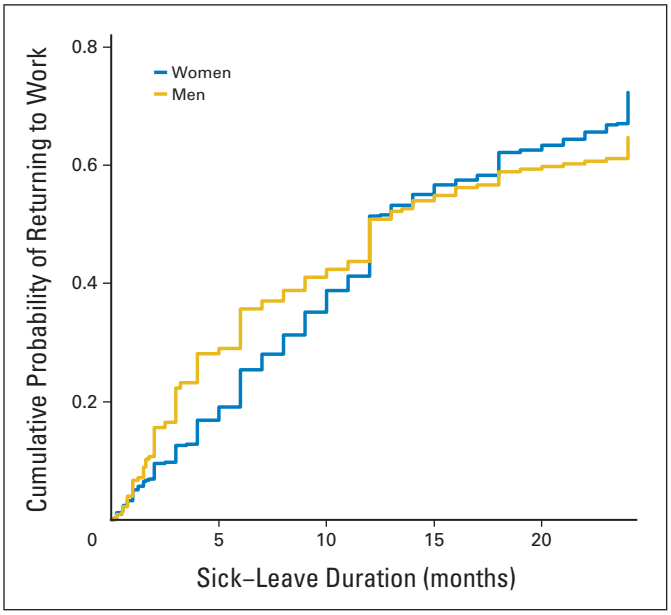


**Fig 2.** Kaplan-Meier estimation of the duration of sick leave, depending on sex.

  

**Table 2.** Pooled Weibull Regression for Men and Women of Main Factors Predicting Return to Work After Sick Leave: Sex-Crossed Effects

| Variable | Model 1: Pooled Model, All (n = 801) | | Model 2: Pooled Model With Sex Interactions, All (n = 801) | | | |
|---|---|---|---|---|---|---|
| | | | | | Interactions (men = 1) | |
| | AF* | 95% CI | AF* | 95% CI | AF* | 95% CI |
| Sex | | | | | | |
| Male | 1.292† | 1.014 to 1.645 | 0.962 | 0.037 to 2.714 | | |
| Female | 1 | | 1 | | | |
| Age | 0.984‡ | 0.973 to 0.995 | 0.992 | 0.979 to 1.005 | 0.970† | 0.947 to 0.993 |
| Living with a partner | | | | | | |
| Yes | 1.222† | 1.006 to 1.486 | 1.123 | 0.906 to 1.393 | 1.866† | 1.107 to 3.146 |
| No | 1 | | 1 | | | |
| Educational level | | | | | | |
| No formal education | 1 | | 1 | | | |
| Junior high school | 1.190 | 0.933 to 1.518 | 1.184 | 0.884 to 1.585 | 1.119 | 0.645 to 1.943 |
| High school certificate | 1.342† | 1.005 to 1.792 | 1.406† | 1.005 to 1.966 | 0.929 | 0.486 to 1.776 |
| > High school level | 1.402† | 1.062 to 1.850 | 1.524† | 1.087 to 2.137 | 0.930 | 0.495 to 1.749 |
| Occupational group at diagnosis | | | | | | |
| Farmers, manual workers | 0.797 | 0.607 to 1.046 | 0.901 | 0.627 to 1.295 | 0.717 | 0.411 to 1.249 |
| Others | 1 | | | | | |
| Work contract at cancer diagnosis | | | | | | |
| Permanent | 0.889 | 0.711 to 1.112 | 0.756† | 0.579 to 0.988 | 1.617§ | 0.965 to 2.708 |
| Others | 1 | | 1 | | | |
| Income per person in the household at diagnosis (Euros) | 1.106 | 0.933 to 1.310 | 1.043 | 0.846 to 1.285 | 1.286 | 0.875 to 1.888 |
| Tumor type | | | | | | |
| Colon/rectum | 1 | | 1 | | | |
| Breast | 0.900 | 0.625 to 1.297 | 1.034 | 0.626 to 1.707 | | |
| Prostate | 1.437 | 0.857 to 2.412 | 1.040 | 0.558 to 1.941 | | |
| Upper aerodigestive tract/lung | 0.705 | 0.453 to 1.097 | 0.742 | 0.342 to 1.607 | 0.748 | 0.288 to 1.942 |
| Malignant hemopathy | 0.630§ | 0.375 to 1.057 | 0.660 | 0.284 to 1.531 | 0.599 | 0.203 to 1.769 |
| Other cancer | 0.913 | 0.652 to 1.280 | 1.178 | 0.723 to 1.922 | 0.405† | 0.198 to 0.827 |
| Disease status | | | | | | |
| Progressive disease | 0.318‡ | 0.201 to 0.504 | 0.360‡ | 0.213 to 0.608 | 0.650 | 0.230 to 1.838 |
| Nonprogressive disease | 1 | | 1 | | | |
| Prognosis index | 2.847‡ | 1.591 to 5.097 | 3.346‡ | 1.639 to 6.833 | 0.620 | 0.181 to 2.130 |
| Treatment | | | | | | |
| Surgery | 1 | | 1 | | | |
| Treatment including chemotherapy | 0.683‡ | 0.549 to 0.851 | 0.746† | 0.567 to 0.982 | 0.706 | 0.439 to 1.133 |
| Other treatment | 0.761 | 0.504 to 1.149 | 1.120 | 0.581 to 2.160 | 0.503 | 0.211 to 1.199 |
| Side effects | | | | | | |
| None or only slightly disturbing | 1 | | 1 | | | |
| Yes, rather disturbing | 0.721‡ | 0.384 to 0.613 | 0.534‡ | 0.406 to 0.702 | 0.789 | 0.473 to 1.318 |
| Yes, very disturbing | 0.485‡ | 0.605 to 0.858 | 0.703‡ | 0.576 to 0.859 | 1.227 | 0.817 to 1.843 |
| Life priorities since the diagnosis | | | | | | |
| Attach more importance to their personal lives life | 0.799† | 0.672 to 0.951 | 0.750‡ | 0.613 to 0.918 | 1.196 | 0.807 to 1.772 |
| Attach equal importance to their personal lives and their work | 1 | | 1 | | | |
| Attach more importance to their work | 1.228 | 0.843 to 1.789 | 1.151 | 0.732 to 1.812 | 1.320 | 0.585 to 2.980 |
| Intercept | 2.900‡ | 1.520 to 4.280 | 2.997‡ | 1.360 to 4.635 | | |
| Weibull parameter‖ | 1.147‡ | 1.063 to 1.232 | 1.169‡ | 1.083 to 1.255 | | |
| Log-likelihood | 1,879 | | 1,864 | | | |

Abbreviations: AF, accelerating factor; LR, likelihood ratio.

*Calculated as exp(-$\beta$) and interpreted as a hazard ratio. For instance, in model 1, men (AF = 1.292) are 29.2% more likely to return to work than women (the reference category) at each point in time. Likewise, in model 1, if a patient has a progressive disease, then the model predicts that the risk of return to work after sick leave will decrease (AF = 0.318) in comparison with patients whose disease is not progressive (the reference category). This is interpreted as a 68.2% decrease in the probability of return to work after sick leave.

†Significant at 5%.

‡Significant at 1%.

§Significant at 10%.

‖Indicates whether the risk increases (> 1) or decreases (< 1) with the duration of the sick leave.

disturbing adverse effects; AF = 0.534, $P < .001$ for very disturbing adverse effects). Progression of the disease at the time of the interview was also found to delay RTW (AF = 0.360, $P < .001$). Overall, time to RTW depended on the prognosis of the disease (AF = 3.346, $P < .001$).

Some sociodemographic and psychosocial factors were also found to be related to the RTW process. Higher educational levels accelerated RTW (AF = 1.406, $P = .045$ for those with secondary school education and AF = 1.524, $P = .014$ for those with higher educational levels). People with a permanent work contract showed longer duration of sick leave than employees with fixed-term contracts and self-employed workers (AF = 0.756, $P = .042$). In addition, those who focused more strongly on their personal lives delayed their RTW (AF = 0.750, $P = .006$).

Two variables were found to explain sex differences in the RTW process. Older men returned significantly more slowly to work than women (AF = 0.970, $P = .013$). Otherwise, married men returned to work significantly much faster than married women (AF = 1.866, $P = .019$).

### *Duration Dependence of RTW After Sick Leave*

The Weibull parameter allowed us to test whether the probability of RTW after sick leave during the 2-year period depended on time elapsing on sick leave. The value of this parameter differs significantly between men and women, as confirmed by the nonoverlapping CIs (Table 3). In men, the value of this parameter did not differ significantly from 1, indicating that the conditional probability of return to work is constant over time. This was not so in the case of women, in whom a significant positive duration dependence was observed (Weibull parameter >1, $P < .001$), which means that the conditional probability of RTW increased with the time spent on sick leave. Finally, an LR test comparing model 3 with model 2 (see bottom of Table 3) supported the relevance of estimating sex-specific duration dependence.

## DISCUSSION

Considerable importance is being attached these days to the workplace consequences of cancer, as increasing numbers of people of working age are being diagnosed with cancer. The predictors of RTW after sick leave were studied here among cancer survivors 2 years after diagnosis, focusing on the sex-related differences between these predictors. The question of duration dependence was also addressed, assuming that the time spent away from work (the sick leave period) determines patients' chances of returning to work after sick leave. This is one of the main advantages of the AFT model over Cox's model (Appendix). Few studies have dealt so far with RTW among patients with cancer using survival models, and only one study has been published to date in which an AFT model was used to explain RTW patterns of patients with cancer.[17] The latter study did not include clinical data on points such as cancer stage, types of treatment, or adverse effects. One of the strengths of the present study is the fact that several clinical variables were available, which were included in our survival analysis.

In our study, an AFT Weibull model was used to deal with duration dependence. This approach made it possible to analyze whether time itself can be said to be an explanatory variable in the duration of RTW after sick leave. We expected to find a negative duration dependence, where the probability of returning to work after sick leave decreases as the duration of sick leave increases, as suggested by previous studies.[16,17,24] We found that the RTW rates of men and women depended differently on the time elapsed in sick leave. In the case of women, the conditional probability of RTW increased with the time spent on sick leave. A possible explanation is that, compared with men, there may be smaller differences between women's wages and the compensation provided by the National Health System, as in France, the sex wage gap disfavors women, ceteris paribus. This could reduce women's incentive of returning to work faster than men.[25] In this case, as suggested in a study carried out in the field of labor economics,[26] women's utility of returning to work may be lower than the utility of staying in sick leave. Unfortunately, in our survey, participants were asked about the household income rather than the individual wage, and this hypothesis cannot be statistically confirmed. Notice that it could also explain the fact that women were more likely than men to go on sick leave (Table 1).

The analysis of duration dependence showed that the duration of sick leave is a sex-specific process. This was confirmed by the results of the multivariate analysis including a sex interaction. Thus men living with a spouse had a faster RTW after sick leave. Most of these men were probably aware of their economic responsibilities to their family, which gave them an incentive to return to work as soon as possible. If an older age is a well-known predictor of RTW, it is not clear why this factor was sex-specific in our case.

**Table 3.** Weibull Parameter Predicting Return to Work After Sick Leave

| | Model 3: Model Stratified by Sex | | | |
|---|---|---|---|---|
| | Men (n = 257) | | Women (n = 544) | |
| Variable | Coefficient | 95% CI | Coefficient | 95% CI |
| Weibull parameter* | 1.036 | 0.899 to 1.017 | 1.243† | 1.133 to 1.354 |
| Log-likelihood | 519 | | 1,342 | |
| LR test | | | | |
| Model 3 *v* model 1 (df = 20) | 36 to be compared with $\chi^2(20) = 31.41$ at 5% | | | |
| Model 3 *v* model 2 (df = 1) | 6 to be compared with $\chi^2(1) = 3.84$ at 5% | | | |

Abbreviations: AF, accelerating factor; df, degrees of freedom; LR, likelihood ratio.
*Indicates whether the risk increases (> 1) or decreases (< 1) with the duration of the sick leave.
†Significant at 1%.

  

Finally, this study confirmed strong evidence that various factors, other than sex, play a role in cancer survivors' RTW process. Hence progressive disease, receiving chemotherapy, and perception of adverse effects decelerated RTW, in accordance with previous studies.[6,15,27-29] Survivors in the higher educational group were more likely to accelerate their RTW. We can hypothesize that for these patients, as job satisfaction or the possibility of achieving career goals probably play a role.[30-32] Another important finding was that cancer seemed to produce a reassessment of life goals, with people probably placing greater emphasis on their familial life and attaching less value to work than they did 2 years before. This point has been mentioned in the literature in regard to changes in life values linked with the experience of a mortal disease.[33-35]

Along with the methodologic improvement obtained using a Weibull survival model, one of the strengths of our study was the fact that it involved quite a large population-based national sample, representing the whole population of patients with cancer 2 years after diagnosis. In addition, although many studies on cancer survival have included patients at different times after diagnosis, the present study dealt with cancer survivors during the same 24-month period, thus preventing the existence of any confounding effects between cancer and technological and medical innovations, or changes in the labor market, work legislation, or social protection. One should be careful about extending our findings to other countries, as the RTW process is closely linked to the sick-leave system. In the case of France, where the legislation gives workers considerable protection, and in most Western European countries, there are no job-lock problems, whereas the job-lock situation is certainly a major predictor of RTW in less generous sick-leave systems such as that of the United States.

Despite the advantage of dealing with a population-based national sample, this study has several limitations. First, although quite a high response rate was obtained (64.1%), it is likely that those who did not respond may have had different characteristics from those who did. We know in particular that the nonrespondents were older and that a larger percentage of them were diagnosed with breast cancer. Second, the retrospective nature of the study may have induced a memory distortion and reinterpretation bias. However, some studies have shown that when people are interviewed retrospectively after a traumatic event such as cancer,[36] there is little memory bias; this is all the more true in the case of the present study, in which the time elapsing between diagnosis and the interview (2 years) was relatively short. Third, 274 people were no longer employed in 2004 and were not included in the study because of unknown information about their sick leave. Fourth, no data were collected on the cancer survivors' comorbidities, although this factor may have affected their RTW patterns. However, only patients younger than 60 years were included, and it has been established that people in this age group have significantly fewer comorbidities than those older than 60 years.[37]

Finally, we could not analyze the workplace adjustments, such as changes in the work schedule or working hours, occurring after sick leave for cancer. However, only 0.8% of the men and 1.2% of the women in our sample shifted to part-time jobs. Because of these low proportions, this variable was not included in our model.

Despite these limitations, this is the first time to our knowledge that the combined effects of medical, sociodemographic, economic, and psychosocial variables on RTW after sick leave have been analyzed in such a large sample using an AFT model. The results obtained show that the duration of sick leave is sex-specific. This difference in the RTW process between men and women is probably mostly due to the different duration dependences. However, other factors such as age and marital status affect the RTW process differently for men and women. A better knowledge of the RTW process would enable physicians to identify patients with intervention needs more accurately, thus helping national implementation of more cost-effective strategies for managing cancer survivors' RTW.

## AUTHORS' DISCLOSURES OF POTENTIAL CONFLICTS OF INTEREST

The author(s) indicated no potential conflicts of interest.

## AUTHOR CONTRIBUTIONS

**Conception and design:** Laetitia Malavolti, Anne-Gaelle Le Corroller-Soriano
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**Final approval of manuscript:** All authors

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