

Change in Employment Status in Survivors With Occupational Cancers: A Case Control Study

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Research

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Abstract

Background: The change of employment status in cancer survivors is underinvestigated. The aim of this study is to investigate the change in employment status in survivors with occupational cancers at the time of diagnosis until 2 years.

Methods: In this study, we included 382 occupational cancer workers. In these 382 workers, 218 workers were insured. Ninety-nine occupational cancer workers in 2004-2015 were included for the change of employment status and salary buckets. The confirmation of change of employment status was retrieved in the Labor Insurance Database's employment data.

Results: The mean age of cancer workers were 51.38 ± 9.1119 years old and the average salary of industry of $NTD 30511.6 \pm 3980.6$. In our results, most cancer survivors are in 46-55-year-old group (40.7%). Salary adjustment are the most change in the employment status in cancer survivors.

Conclusion: Change of employment status in cancer survivors are important to decrease the impact of economic burden on society.

Introduction

The risk of unemployment of cancer survivors, were 1.4 times higher than healthy people (1). Almost half of cancers have been diagnosed younger than 65-year-old in the United States. Cancer complications, such as absenteeism due to psychological pain and stress, ineffective working, disability and even premature death were the indirect cost of cancer, which costs much than direct treatment costs of cancer, which have exacerbated the economic burden (2). There were many countries, such as French (2), Japan (3), Dutch (4), Norway (5), Europe (5), Swedish (6), and the United States (2, 7) have pay attention in these groups. Short-term and long-term follow-up's studies and projects of cancer survivors have been established due to the emergence of work disability throughout the globe (8).

Although multidisciplinary providers, such as feasible hospital setting, rehabilitation inpatient and outpatient services, the main focal point of return to work (RTW) were patients themselves as work disability was episodic and specific reasons for job change or loss were variable among cancer survivors (1). No considerable effect on workplace interventions with mental health problems and/or cognitive behavior and clinical intervention in improve functional status and reduce time to RTW (4). Moreover, the psycho-educational either patient education or patient counselling and vocational interventions, such as workplace adjustments, have no evidence of enhancing RTW in cancer survivors (1, 9).

Change of employment status in cancer survivors are frequent (1), but were under investigated, compared to RTW. Therefore, the aim of this study is to investigate the change in employment status in survivors with occupational cancers at the time of diagnosis until 2 years.

Materials And Methods

Study design

The occupational disease identification in Labor Insurance Database is a standardized process, which consists of data collection and field investigations, continual review, revision and setting of instrumental guidelines or standard operation procedures for occupational disease. We identified workers from Taiwanese-based databases, including National Health Insurance Research Database (NHIRD), Labor Insurance Database and Taiwan Cancer Registry. Our retrospective study period was from 2004 to 2015. Employment data, employee industry, average salary of industry and units, and number of insured at the end of month were extracted from Labor Insurance Database. Other unique encryption data of the workers were extracted from Labor Insurance Database to Taiwan Cancer Registry and National Health Insurance Research Database. We excluded aged ≤ 20 years workers, unemployment and have ever been diagnosed with cancer at the baseline.

Study Sample

In this study, we included 382 occupational cancer workers. In these 382 workers, only 218 workers were insured in different periods: 1971–2003, 2004–2015 or 2016–2017. Taiwan started to launch NHIRD from year 2004. Thus, 99 occupational cancer workers in 2004–2015 were included for the change of employment status and salary buckets. Table 1 showed the variables of workers of cancer with the mean age 51.38 ± 9.1119 years old and the average salary of industry of NTD 30511.6 ± 3980.6 . Of the 218 cancer survivors, 20 (23.3%) workers are in aged 28–45 years groups, 35 (40.7%) workers are in aged 46–55 aged groups and 31 (36%) workers are in aged 57–71 years group. Their industries' classification and subtypes which divided according to the Standard Industrial Classification System, and workplace's geographic location, are listed in Table 1.

Outcome Measures

The primary outcome for this cohort were the change in employment status in the different aged groups and different district of survivors with occupational cancers

after the diagnosis of cancer from day 1 to day 730 day. The confirmation of change department or job position, suspension, salary adjustment or extending coverage

and the change in salary buckets was retrieved in the Labor Insurance Database's employment data.

Statistical Analysis

Descriptive information is presented as number, percentage, means, and standard deviation. Statistical estimations used in the study are performed by the Statistical Package for the Social Sciences, version 22.0 for Windows. Student's t test and Pearson's chi-square test are used to examine the differences in terms of demographic information between different groups. Statistical significance was claimed when a two-sided P-value turned out to be less than 0.05.

Results

All information is achieved from NHIRD from year 1971 to year 2017. Table S1 showed total 382 person who enrolled in the Labor Insurance Program. Table S2 showed 218 person who were still be insured when cancer diagnosed. 99 persons are insured in our study year (2004-2015). Fifteen persons have left the workplace before cancer were diagnosed.

Table 1 summarized the variables of the cancer patients and the characteristics of company. Aged were stratified into 28-45-year-old group (23.3%), 46-55-year-old group (40.7%) and 56-71-year-old group (36%). The companies were mainly located in the New Taipei (16.3%), Taipei (16.3%) and Taoyuan (15.1%). We divided the various type of industrial units according to the standard industrial classification system of the Republic of China into 6 groups. Manufacturing, Transportation and Storage, Occupational labor, and Companies' staff hold the most of cancer survivors in our study, which were 31.4%, 31.4%, and 27.9%, respectively. Our results showed 730 days after cancer diagnosis was 30% with the increased of salary adjustment and decreased of extending coverage in Fig. 1 and Table 2. Suspension was less happened in cancer survivors.

Fig. 2 showed the percentage of staying in workplace of aged 28-45, aged 46-55 and aged 56-71 years old groups were 55%, 29% and 13%, respectively. In aged 56-71 groups, salary adjustment was the only one change of employment status in the day 730 of cancer diagnosis. The mean of the salary of all cancer survivors at day 1, day 365 and day 730 after the diagnosis of cancer were NTD 31492±10696, NTD 31588±10272 and NTD 30071±9412, respectively (Table 3). Then mean salary in aged 28-45 groups at 1 day, 365 days and 730 days were NTD 22609±7698, NTD 34686±9770 and NTD 36108±8642, respectively; In aged 46-55 groups were NTD 21745±4245, NTD 32628±10461 and NTD 38275±6509, respectively; In aged 56-71 groups were NTD 35941±9382, NTD 35417±9149 and NTD 36250±7799, respectively (Table 3).

Fig. 3 showed the percentage of staying in workplace of men was 30% and 30% at day 540 and day 730 while women was 40% at day 540 and 20% at day 730, respectively. 52% of the women have extended their coverage in the first months and salary adjustment increased after the first month. While men remained small fluctuation between the change of employment status, especially in salary adjustment and extending coverage.

Fig. 4 and Table 4 showed different geographical locations and the employment status of cancer survivors within 2 years. Central district maintained its highest staying percentage within 365 days, but it tremendously decreased to 30% at day 730, which had the same percentage as Northern distinct and Southern distinct. Salary adjustment was the only change in their employment status.

In different grades of labor insurance salary showed in Fig. 5, extending coverage remained high in cancer survivors with NTD 16500-22800 while cancer survivors with NTD 42000-43900 salary, had the suspension on the first day of cancer diagnosis until day 730. In different company size showed in Fig. 6, companies which <10 employees maintained the highest staying percentage at the cut-off point of day 270 and decreased to lowest of 23%, compared to other big companies. Salary adjustment, change of

department (71.4%) or job position (14.3%) and suspension (14.3%) were showed in <10 person's companies at day 730 after diagnosis a cancer.

In different industries' average salary, the cancer survivors who staying in workplace at the first week of cancer diagnosis were 93% (NTD 24433-28577), 96% (NTD 28698-30674) and 93% (NTD30755-43989), respectively but decreased to 27%, 30% and 31% at day 730 (Fig. 7).

Wholesale and Retail Trade had the most of percentage of cancer survivals remained on workplace (53%, Fig. 8), with all types of change of employment status (Fig. 9). Manufacturing, Transportation and Storage, and Service Industry have both salary adjustment and extending coverage in the change of employment status on the day 730 (Fig. S5). Salary adjustment was showed the only change in Agriculture, Forestry, Fishing and Animal Husbandry and Water Supply and Remediation Activities on the day 730 (Fig. 9).

Discussion

Change of employment status, such as job loss, have been reported in cancer survivors even after a long period of diagnosis and treatment, and caused a low rate of RTW (10, 11). Government has paid attention to the RTW in cancer survivors helped them overcome the transition to a normal life after cancer. RTW has been established by cancer survivorship. There are two perspectives that leading to the outcome of cancer survivors. Firstly, from the policies, procedures and economic factors to work environment. Second, from the interventions and rehabilitation programs promoting RTW. However, the employment status are related to individual and interpersonal factors, and tolerable to the short-term, long term and late effects of different cancer treatments (8). There are many reasons that affect change of employment status in cancer survivors. A qualitative meta-synthesis has demonstrated three categories: personal (symptoms, work abilities, coping, and motivation), environmental (workplace, social, family, and professionals) and occupational (type of work, work demands, and job flexibility), which were associated to change of employment status (12).

Almost half of cancers have been diagnosed younger than 65-year-old in the United States. Early diagnosis and multimodal cancer treatments nowadays have benefited many cancer survivors (8). In our result, the most changes of employment status in younger groups throughout 730 days was salary adjustment. Most of them chose to retain at the same jobs as working gave them self-esteem, while not retained the jobs, they will lose their ability to paying bills and getting adequate health insurance (8). However, they had to face some blocks along the way to finding and keeping the job due to the outdated personal policies (8), such as social comparison between other cancer patients, work-capabilities with other colleagues and workplace support and characteristics (13). Therefore, they might let go from the jobs or put themselves into lower position without getting promotions, facing resentment by co-workers (job discrimination) (8). If not, they may extend their coverage (aged 28-45 groups) or change their department or job position (aged 46-55 groups).

Older was a risk factor for job loss, even in healthy person (12). The younger had a better physical performance than the older while compared to the same aged group. Scientists have demonstrated that the younger's physical performance status were stronger at 6 months than 18 months after diagnosis (12). Other reason was the frequency of advanced disease in the elderly and advanced disease lead to advanced treatment (9). Therefore, heavy treated patients with more cycle of chemotherapy due to long standing treatment effects significantly, have faced the problem of work loss (6). Other than toxicity, the somatic complications, such as infertility and osteoporosis, may also affect work ability (9). Previous study has demonstrated that personal reasons such as the characteristic of patients also affected the RTW in the before (facing stress, adjustment of emotional), within (early effect of chemotherapy, radiotherapy and cancer types) and after (late effect of chemotherapy, radiotherapy and progression of disease) the cancer therapy (14). Therefore, the characteristics of cancer types, such as chemo-brain effect seemed fewer in the patients with solid tumors (9), and the tolerable to cancer treatments were affected the change of employment status in cancer survivors (6, 9).

Our results showed the higher grade of labor insurance salary, the lower the staying percentage in their workplace and the acceptance of change their department or job position (NTD 24000-40100 and NTD 42000-43900). Scientist have demonstrated that the synergistic effect of low socioeconomic status and prolonged unemployment (14). Low socioeconomic status of employees obtained low paid job, therefore most of them will choose to retain at workplace as they were more difficult to seek a job (14). Our results showed the employees with salary of NTD 16500-22800 have the highest of percentage of cancer survivors to stay in workplace by extending their coverage. In contrasts, in average salary aspect, the higher salary, the more the cancer survivors staying in workplace. If they leave their workplace, the change of their employment status was suspension, it is due to their high grade of labor insurance salary and labor pension. The results were same as the high salary in Northern distinct which had high staying rate among other geographical locations.

Salary adjustment are the most change in the employment status in cancer survivors but without tremendous difference between day 1 and day 730 (NTD 1,421). The salary fluctuation was small within 2 years in cancer survivors was because of the protection of Ministry of Labor. The employers must maintain their salary as the victims of occupational accidents within 2 years regarding the protection of workers. If the workers have been confirmed by a designated hospital inability to perform the original work without reaching disability requirements after two years, the employees may pay 40 months' average wage if the workers have agreed.¹⁷ Although the protection to workers of Ministry of Labor, cancer survivors may suffer inadequate rest due to many factors. Scientists have demonstrated an adequate paid sick leave may reduce the unpaid time off during cancer treatment but only 60% of workers paid sick leave during cancer treatment (11). An inadequate rest may cause long time absenteeism due to psychological pain and stress, ineffective working, disability and even premature death were the indirect cost of cancer, which costs much than direct treatment costs of cancer, which have exacerbated the economic burden (2). Therefore, the balance between economic hardship, insurance coverage and time of sick leave among cancer survivors were important in economic

perspective (11), and a comprehensive self-assessed work ability scoring system need to be established in order to predict the retained job in cancer survivors after 2 years of labor's law protection in Taiwan (3, 15).

A self-assessed work ability scoring system have been constructed to predict the RTW of cancer and their result showed a direct proportional of cancer types and RTW score (3, 15). Scientist have categorized RTW rate into two groups: lung, hepatic, pancreatic, esophageal, blood cancers were in the lower full RTW rate groups, while gastric, intestinal, breast, GU cancers were in higher full RTW rate groups (3). Breast cancer, which was categorized into higher full RTW groups, was the most common cancer in women worldwide, while hepatic cancer and lung cancer were the common cancers in male worldwide, were categorized into lower RTW groups. It was compatible to our results, which showed high staying rate in women in the first 2-3 months after diagnosis of cancer.

In addition, the social support, including cancer supporting group programs, interaction between occupational health professionals and health providers, was another superordinate theme that facilitated in the RTW process (13), such as breast cancer's survivors have contributed a strong association in Taiwan, which sharing the useful information and social support to paid work to breast cancer's survivors. Therefore, the percentage of women who remained in their workplace was greater than men within 540 days. However, the declined of staying rate in women in day 730 may cause by the demographic structure of the society. Men trended to be the family finance support while women trends to head the household. In addition, women were more easily influenced by the advice of other cancer survivors and thus effecting their personal subjective work capacity although most of them have higher working capacity than other cancer types of patients (16). Therefore, upward information generated positive effect and impacted their self-esteem and self-evaluations while downward information deteriorated their health status (13).

The impact of RTW after 1 year of cancer diagnosis are more vulnerable in small- and medium-sized companies in Japan (3). Self-employed people that authorized small-sized company have less legal support from public health insurance and lower social support at work in Norway (5). It was difference from our results. Our results had showed the bigger the company, the lesser the staying percentage. Compared to >1000 person companies, which salary adjustment was the most change of employment status (>80%), extending coverage was showed greater in 10-1000 person's companies (>30%). It may because the company which less than 5 employees, is not a compulsory insurance unit. However, the company should still enroll the employees to participate in employment insurance or labor insurance voluntarily (17). As a result, units of insurance company managing the compulsory insurance paid much for their employees.

The General Accounting Office announced that the median annual salary of employees in 2018 was NTD 490,000 and the average of annual total salary was NTD 629,000 (18). As a result, nearly 70% of the employees' annual wages were lower than the average, especially in Agriculture, Forestry, Fishing and Animal Husbandry and Water Supply and Remediation Activities are manual labors with more physical

works. While Wholesale and Retail Trade, Transportation and Storage had the highest grade of labor insurance salary and had all types of change of employment status.

Our study has few limitations. First, we were not able to know what types of cancer that they have been diagnosed as the epidemiology of gender difference in cancers and the treatment are varied. Second, we were not able to know their exactly job conditions, such as their working hours, either they were able to get help from other work colleagues or work at a slower pace. Third, the option of cancer survivors either continued to work while being treated or their jobs were flexibly adjusted by the employers, was under investigated. Fourth, psychological and social factors either they were financially responsible or not, were limited in this database. However, these limitations can be addressed through actual employment tracking of cancer survivors.

Conclusion

Change of employment status in cancer survivors are important to decrease the impact of economic burden on society. Most studies on the effect of the interventions on RTW were poor methodological quality, non-randomized control trial and usually carried out by social worker, psychologist or nurse. Future studies are needed with the involvement of occupational physician in well-structured work-directed interventions before change in employment status in cancer survivors.

Abbreviations

RTW: return to work

NHIRD: National Health Insurance Research Database

Declarations

Ethics approval and consent to participate: The authors confirm that the study was approved by the Institutional Review Board of Tri-Service General Hospital (IRB no. 1-107-05-129).

Consent for publication: Not applicable

Availability of data and materials: The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Competing interests: The authors declare that they have no competing interests.

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Authors' contributions: ZWL (1,2,3), CCW (1,3), WTW (1,3), WLC (1,2,3)

1 Authors make substantial contributions to conception and design, and/or acquisition of data, and/or analysis and interpretation of data. 2 Authors participate in drafting the article or revising it critically for important intellectual content. 3 Authors give final approval of the version to be submitted and any revised version.

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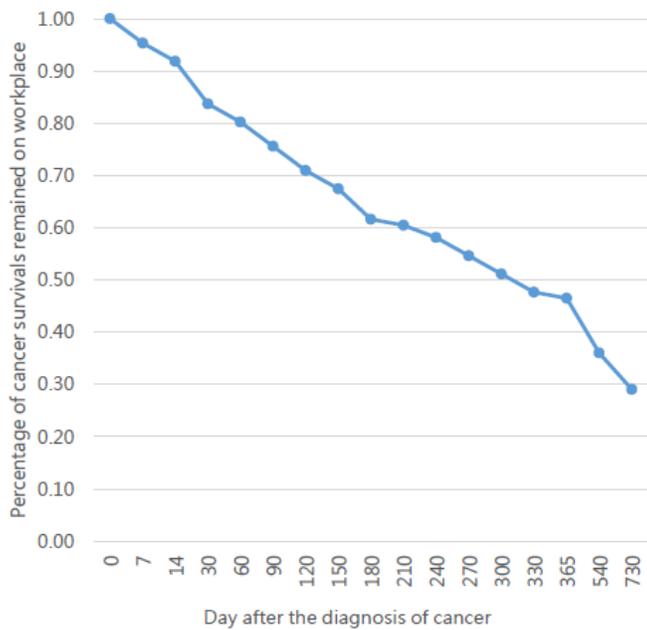
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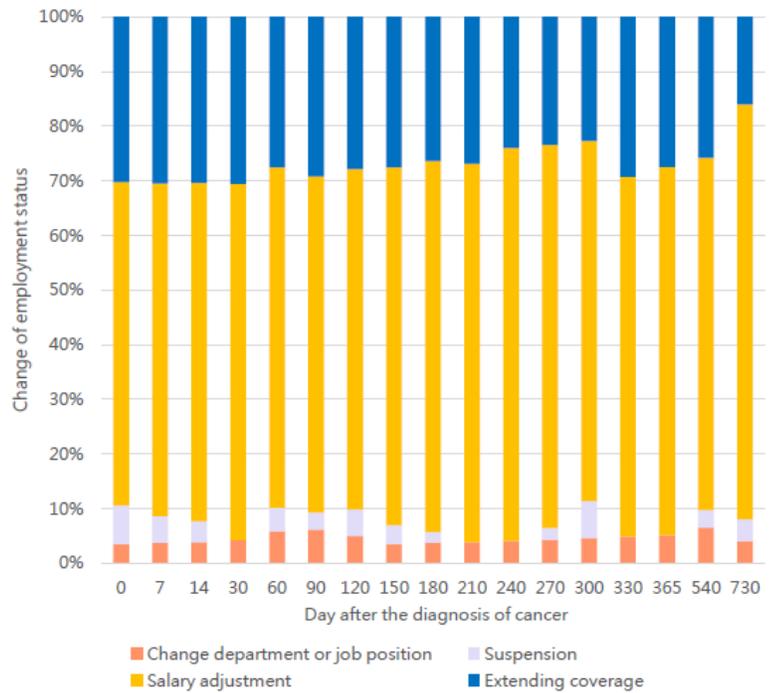
Tables

Due to technical limitations, table 1 to 4 is only available as a download in the Supplemental Files section.

Figures



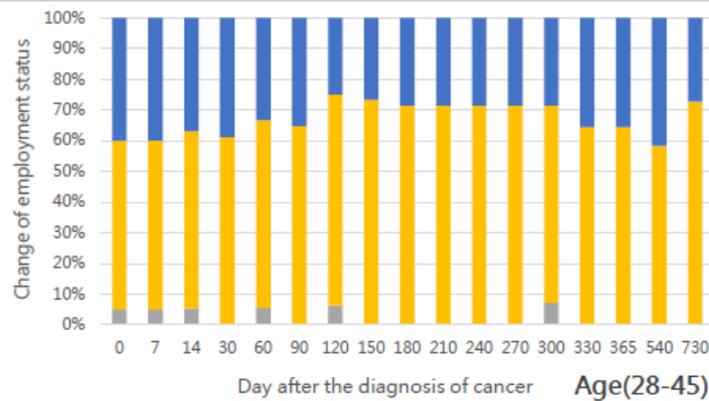
(a)



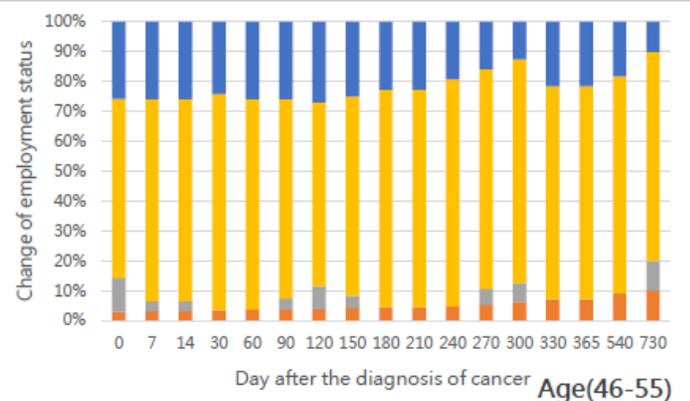
(b)

Figure 1

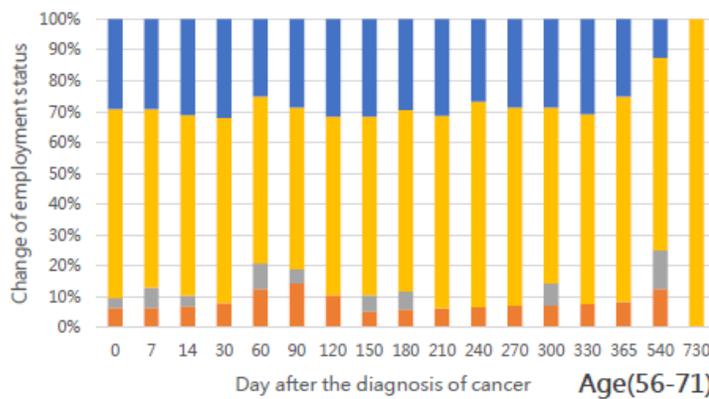
Changes in the proportion of cancer survivors and the employment status within 2 years



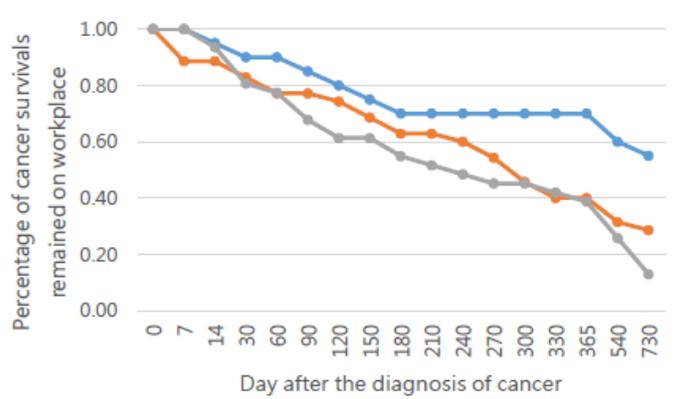
(a)



(b)



(c)



(d)

Figure 2

Changes in the proportion of cancer survivors of stratified aged groups and the employment status within 2 years

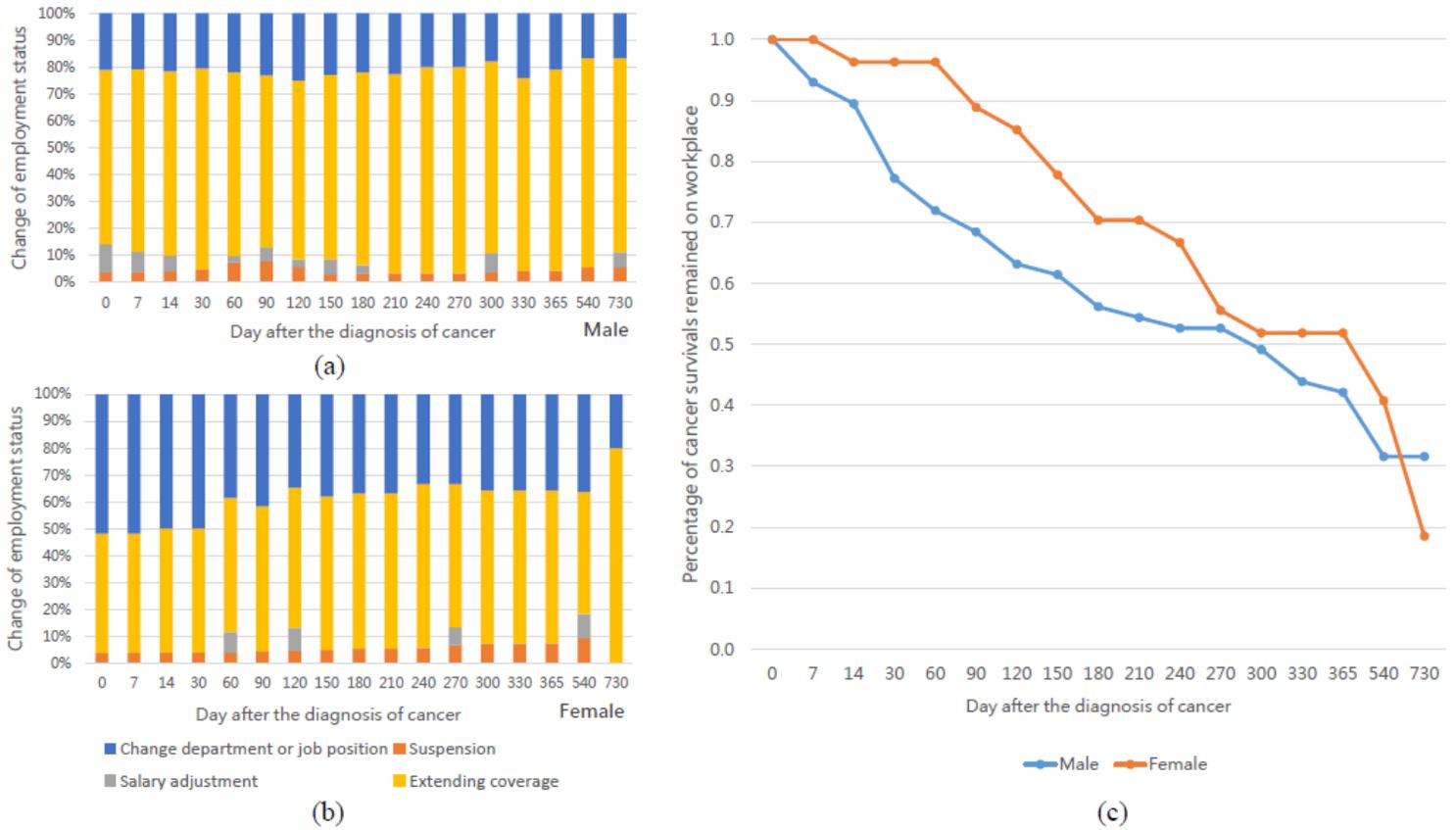


Figure 3

Changes in the proportion of cancer survivors of gender difference and the employment status within 2 years

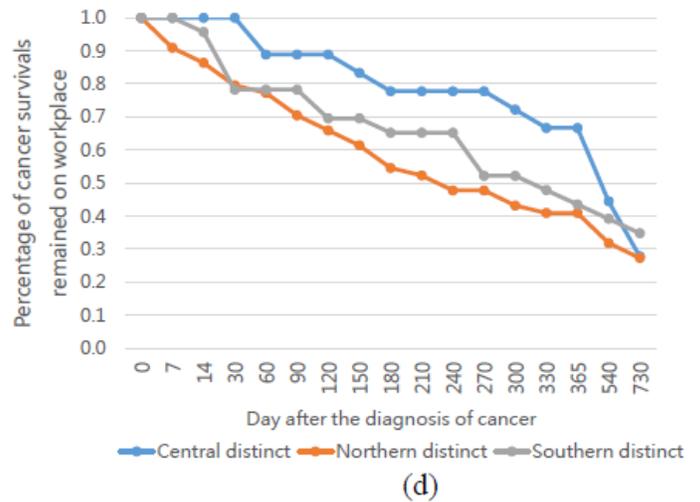
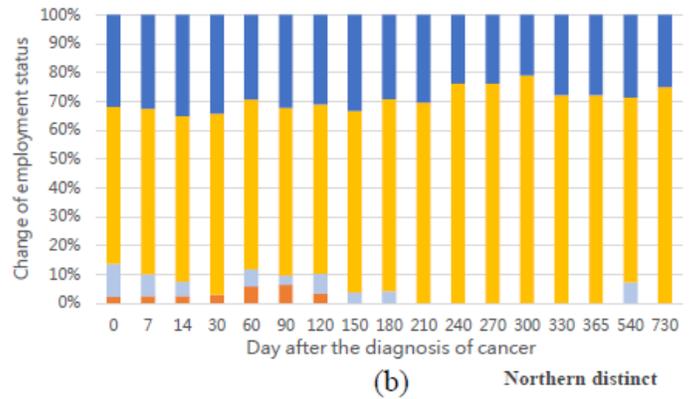
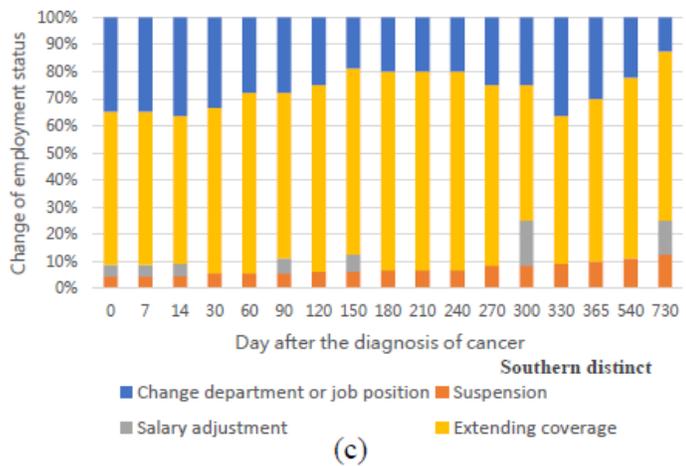
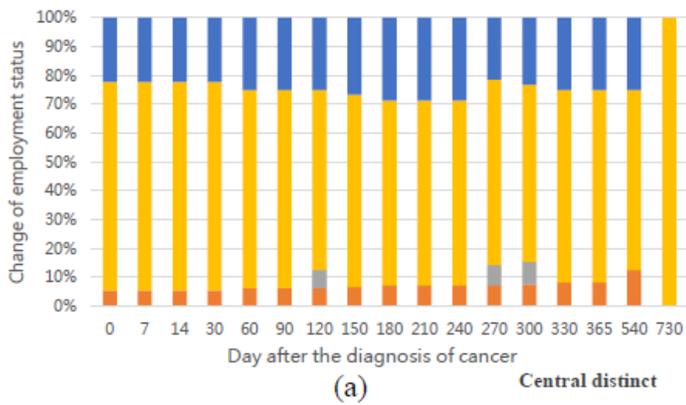


Figure 4

Changes in the proportion of cancer survivors of different geographical locations and the employment status within 2 years

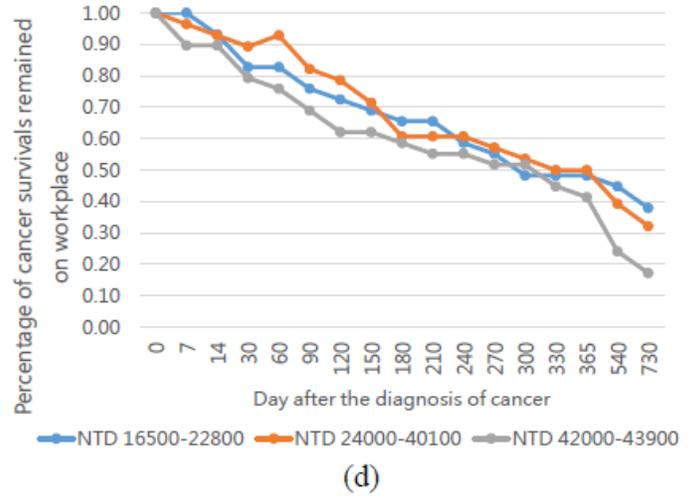
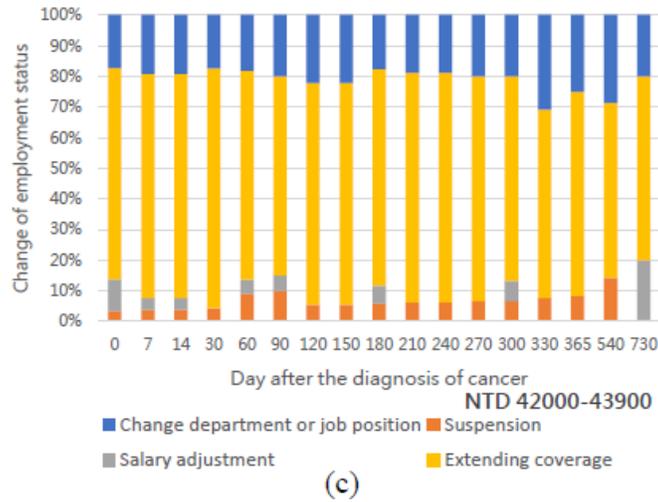
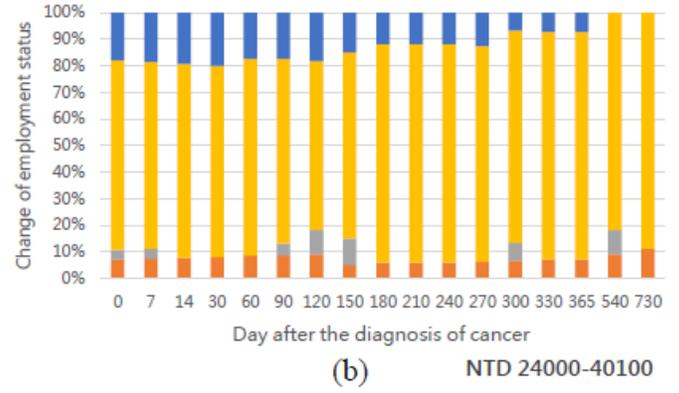
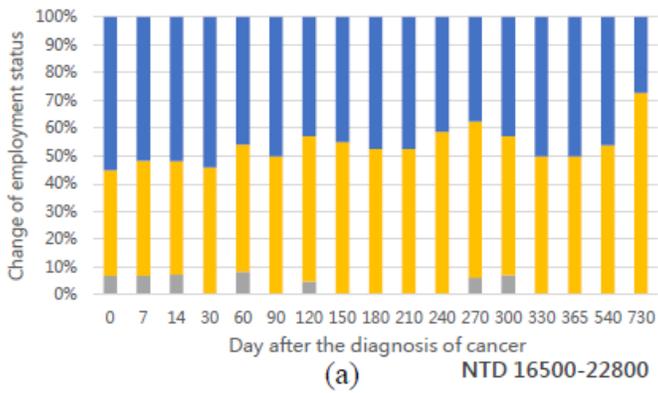


Figure 5

Changes in the proportion of cancer survivors of different grades of labor insurance salary and the employment status within 2 years

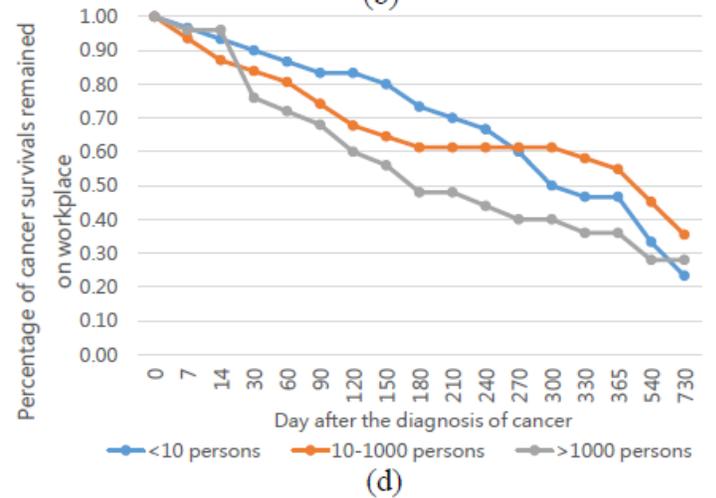
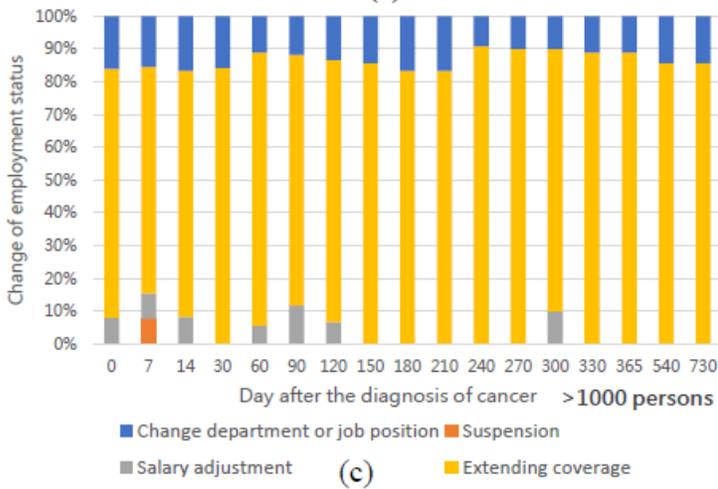
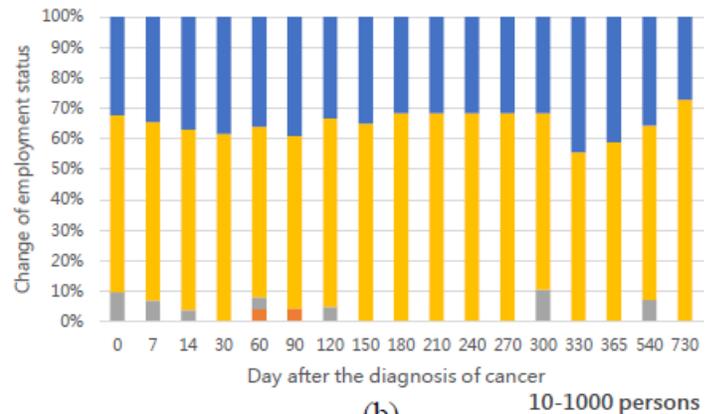
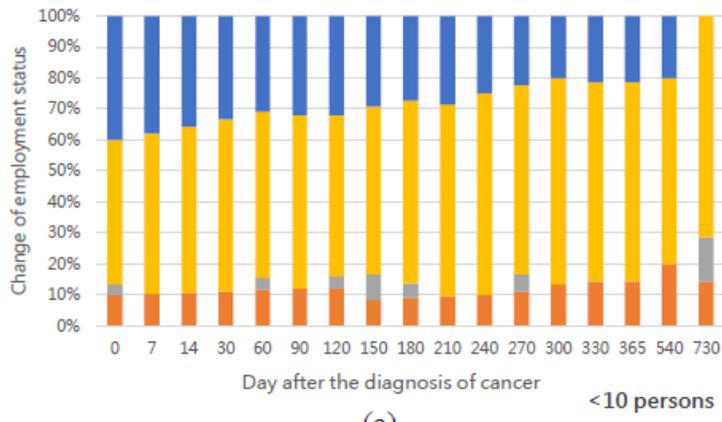


Figure 6

Changes in the proportion of number of insurers at the end of the month of different company size and the employment status within 2 years

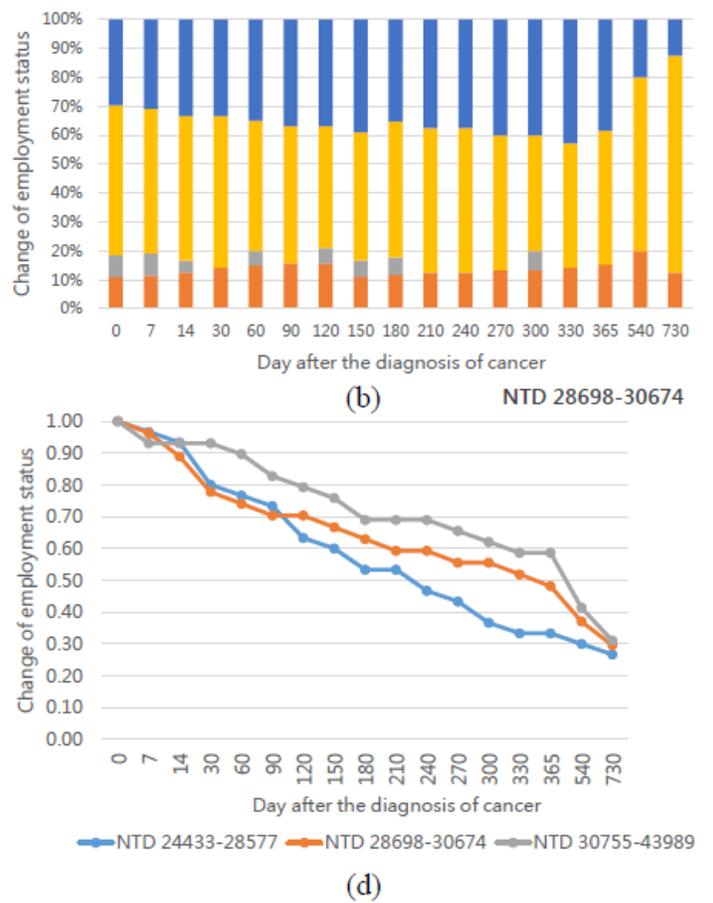
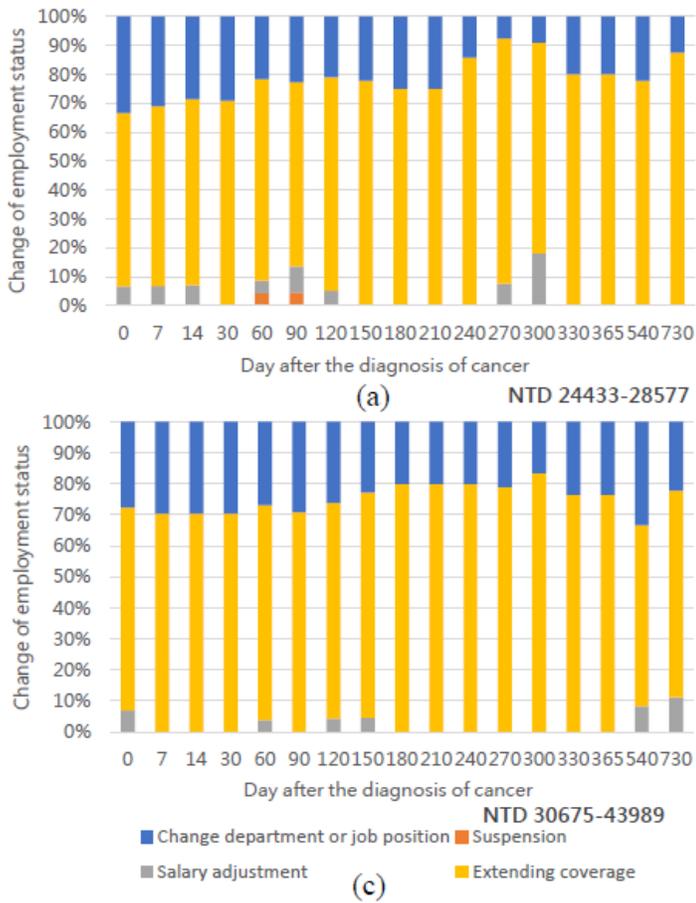


Figure 7

Changes in the proportion of cancer survivors of different industries' average salary and the employment status within 2 years

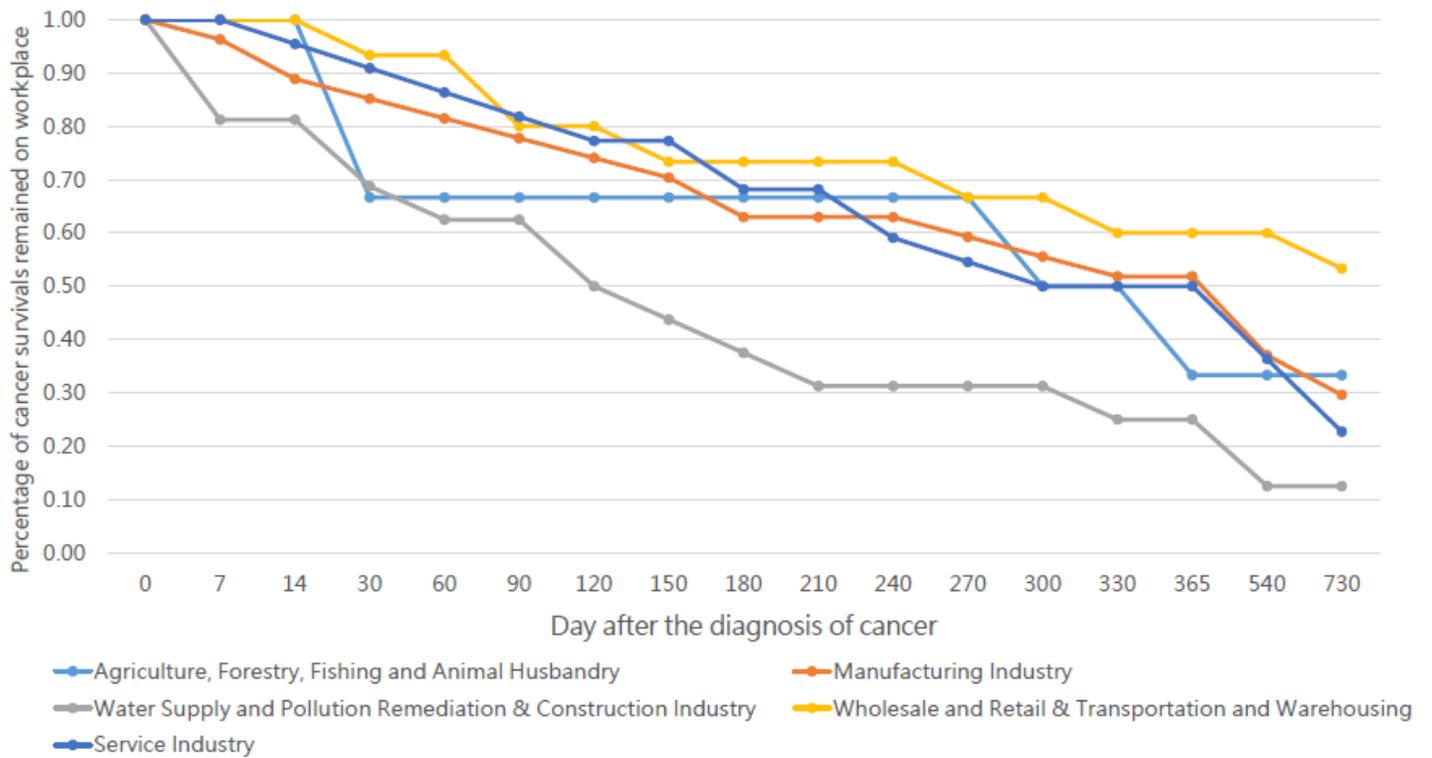


Figure 8

Changes in the proportion of cancer survivors of different industry units within 2 years

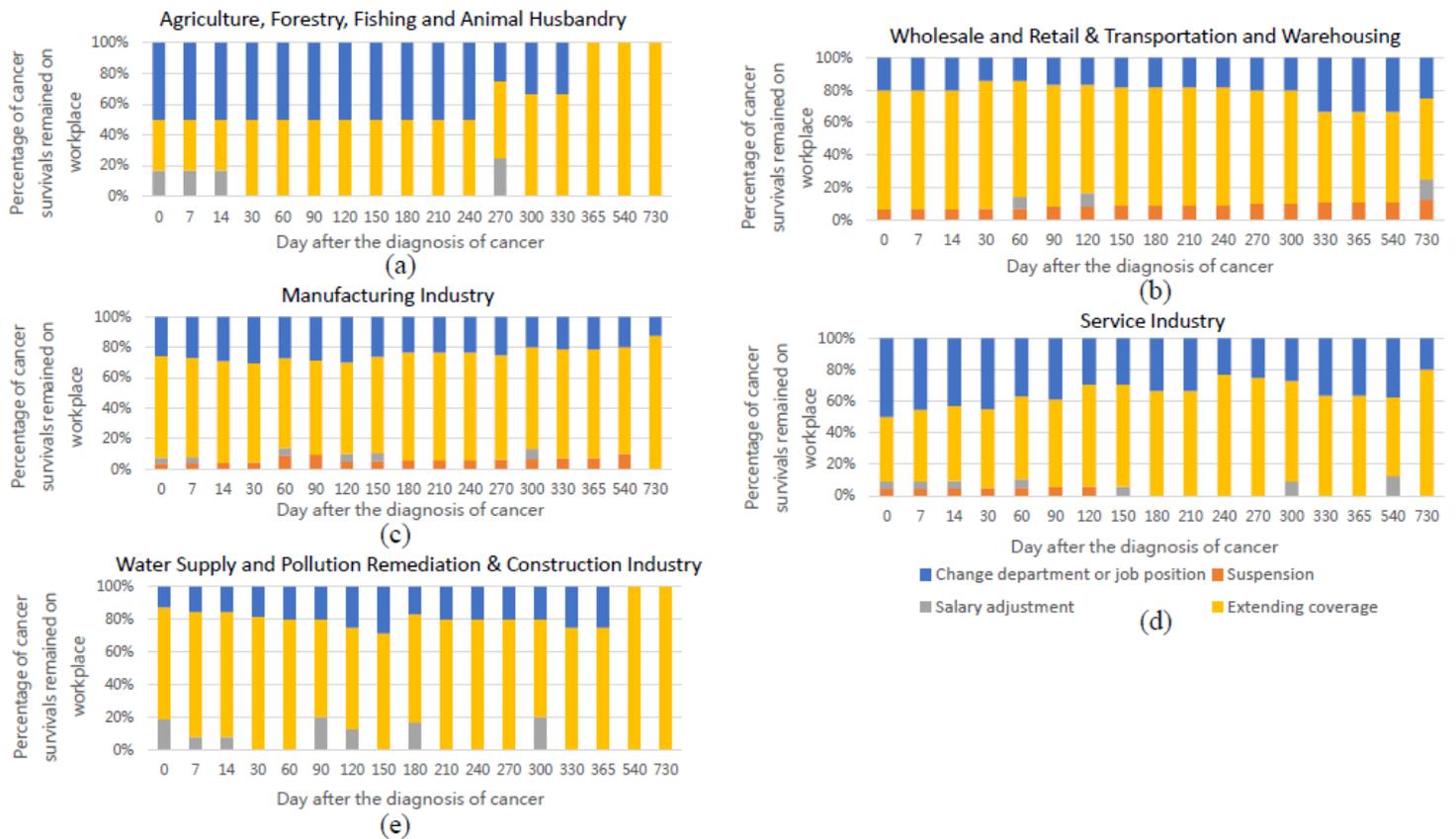


Figure 9

Changes of the employment status in different industry units within 2 years

Supplementary Files

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