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**Recto Verso**

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**Evaluating the Impact of Intensive Case Management for Severe Vocational Injuries  
on Work Incapacity and Costs****Rolando Leiva, Lise Rochaix, Noémie Kiefer and Jean-Claude K. Dupont.**

*This study investigates the impact of an intensive case management program on sick leave days, permanent work incapacity levels and treatment costs for severe vocational injuries set up by the French National Insurance Fund in 5 health insurance districts. The method relies on a four-step matching procedure combining Coarsened Exact Matching and Propensity Score Matching, based on an original administrative dataset. Average Treatment effects on the Treated were estimated using a parametric model with a large set of covariates.*

*After one-year follow-up, workers in the treatment group had higher sickness absence rates, with 22 extra days, and the program led to 2.7 (95% CI: 2.3-3.1) times more diagnoses of permanent work incapacity in the treatment group. With an estimated yearly operational cost of 2,722 € per treated worker, the average total extra treatment cost was 4,569 € for treated workers, which corresponds to a cost increase of 29.2% for the insurance fund.*

*The higher costs found for the treatment group are mainly due to longer sick leave durations for the moderate severity group, implying higher cash transfers in the form of one-off indemnities. Even though workers in the treated group have more diagnoses of permanent work incapacity, the difference of severity between groups is small. Our results on longer sick leave duration are partly explained by interactions between the case managers and the occupational physicians that encouraged patients to stay longer off-work for better recovery, despite the higher costs that this represented for the insurance fund and the well-documented adverse side effects of longer periods off-work.*

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**Introduction**

In 2014, the French National Health Insurance Fund for Employees (CNAMTS) developed an experimental program of intensive case management (ICM, hereafter) for workers with severe vocational injuries, which hinder or severely delay Return to Work (RTW) and generate the highest costs. Care coordinators were expected to develop a holistic, personalized treatment plan to support the injured workers through rehabilitation and ensure return to their previous jobs or a suitable alternative.

Overall, the program's aims were threefold: 1) Restore the employees' capacity after a work incident to the best of their ability, reducing physical, psychological, and relational post-trauma effects; 2) Promote the professional and social reintegration of injured workers; 3) Seek to improve the efficiency of the management of work-related injuries.

*Hospinomics* evaluated the effects of coordinated care on several health

and cost outcomes with a 12-month follow-up time.

**Study intervention**

The ICM program was launched in November 2014 in 5 health insurance districts (CPAM), located in 3 different regions in France in order to cover a variety of geographical areas. In each district, there were one or more case managers allocated to the program and one part-time OP.

For those who were eligible and enrolled in the program, the case manager developed a personalized rehabilitation plan. He ensured that administrative files were filled-in, helped arrange health and social care professionals' appointments and facilitate RTW. His main role was to coordinate stakeholders: the injured patient, his employer, the national health insurer as well as health and social care professionals. Each case manager had a list of up to 40 cases.

**Outcome Variables****Primary outcome measure**

The primary outcome measure was the total number of compensated sick leave days (either full-time or part-time) at a given reporting date, i.e., at the end of 12 months after the vocational injury.

**Main secondary outcome measures**

A set of secondary outcomes were chosen: part-time RTW, daily allowances for vocational sick leave, one-off indemnities and total treatment costs. Other secondary outcome measures are presented in more detail in the complete version of this study (1).

**Methodology**

A RCT was initially considered but deemed infeasible for both ethical and practical reasons. Thus, the evaluation resorted to non-experimental matching techniques. The empirical strategy relied on creating balanced groups using a

four-step matching procedure combining Coarsened Exact Matching (CEM) and Propensity Score Matching (PSM), taking advantage of a rich dataset containing key variables influencing the probability of treatment and the outcome results, and enabling a thorough control for the initial severity of the injury faced by the worker.

The initial sample consisted of 269 treated individuals and 304,689 potential controls. After matching, the sample had 240 treated individuals and 13,567 control individuals.

### Main results

- The number of sick leave days due to a vocational injury during the first year after the accident was on average higher in the treated group (259 days) than in the control group (237 days). We obtained an ATT of 22.0 extra sick leave days for a treated worker (95% CI: 13.1-30.9). This effect was highly significant ( $p$ -value $<0.001$ ).

- These additional vocational sick leave days for a treated worker could also be partly due to an increase in the number of days spent in part-time RTW. Yet we only found 4.4 extra days in part-time out of 22, but with a  $p$ -value of 0.065, i.e., slightly above the significance threshold.

- Daily allowances for vocational sick leave (VAR 8) were 1,194 € higher for a treated worker ( $p$ -value  $<0.001$ ).

- One-off disability indemnities for permanent work incapacity of level 1 to 9 (VAR 9) were 310 € higher for a treated worker ( $p$ -value $<0.001$ ).

- Adding cash benefits, treatment costs and operational costs, we obtained an average total additional treatment cost of 4,569 € per treated worker (95% CI: 3,774 € - 5,363 €), corresponding to a cost increase of 29.2% for the insurance fund.

### Discussion

Contrary to expectations, we found that workers in the ICM program

spent 22 more days in sick leave than those in usual care. Only a little increase (not even significant at 5%) of part-time RTW was observed in the French ICM program.

Our results are surprising considering that part-time RTW is actively encouraged in several EU countries (2). If, as has been suggested in the extant literature, part-time RTW increases the probability of full recovery (3), and contributes towards a faster recovery (4,5), this result may partially explain why the program did not reduce the number of sick leave days nor the number of individuals receiving a diagnosis of permanent work incapacity.

As expected from those findings, the ICM program running costs were not compensated by decreases in cash or kind benefits. Only few previous studies found that ICM programs increased costs (6,7).

In the French case, since case managers were mandated to ensure a sustainable RTW, with no instructions regarding costs, it is not surprising to find comparatively higher costs as case managers assumed that more care and more rest would lead to better RTW. Admittedly, this practice of encouraging more off-work days is not congruent with the international rehabilitation practices and may in fact lead to worse health outcomes.

### Conclusions

Our results show that an ICM program is not sufficient to reduce work incapacity of severely injured patients. We also found a higher percentage increase in total treatment costs. This study provided timely feedback to the French National Health Insurance Fund on the impact of the program. Indeed, it enabled an evidence-based decision to better tailor the original case management program to the needs of the target population, in relation to severity levels.

While our study does not imply that ICM programs are not efficient for the rehabilitation of workers after a vocational injury in France, it led to the production of several policy recommendations that will prove useful for future programs' design, implementation, and evaluation.

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