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## **Theoretical impact of workplace-based primary prevention of carpal tunnel syndrome in a French region: a pilot study**

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## Background

- Carpal tunnel syndrome (CTS) is the most common nerve entrapment neuropathy in the working-age population and one of the most common causes of workers' compensation claims worldwide.
- Multi-component global interventions (GI) including both personal behavioral interventions (PI components) and collective technical, ergonomic and organizational interventions (WI components) are considered the most promising preventive approach for upper extremity musculoskeletal disorders among workers. From a theoretical point of view, WIs focusing on work-related risk factors are expected to reduce mainly work-related cases of CTS (WR-CTS); their impact will depend on the proportion of cases attributable to work. Primary multi-component global interventions are expected to be the most efficient in targeting all cases of CTS (work-related or not).
- The aims were to identify high risk jobs and simulate the impact of workplace-based mono-component WI and multi-component GI preventive primary interventions aiming to reduce the incidence of CTS.

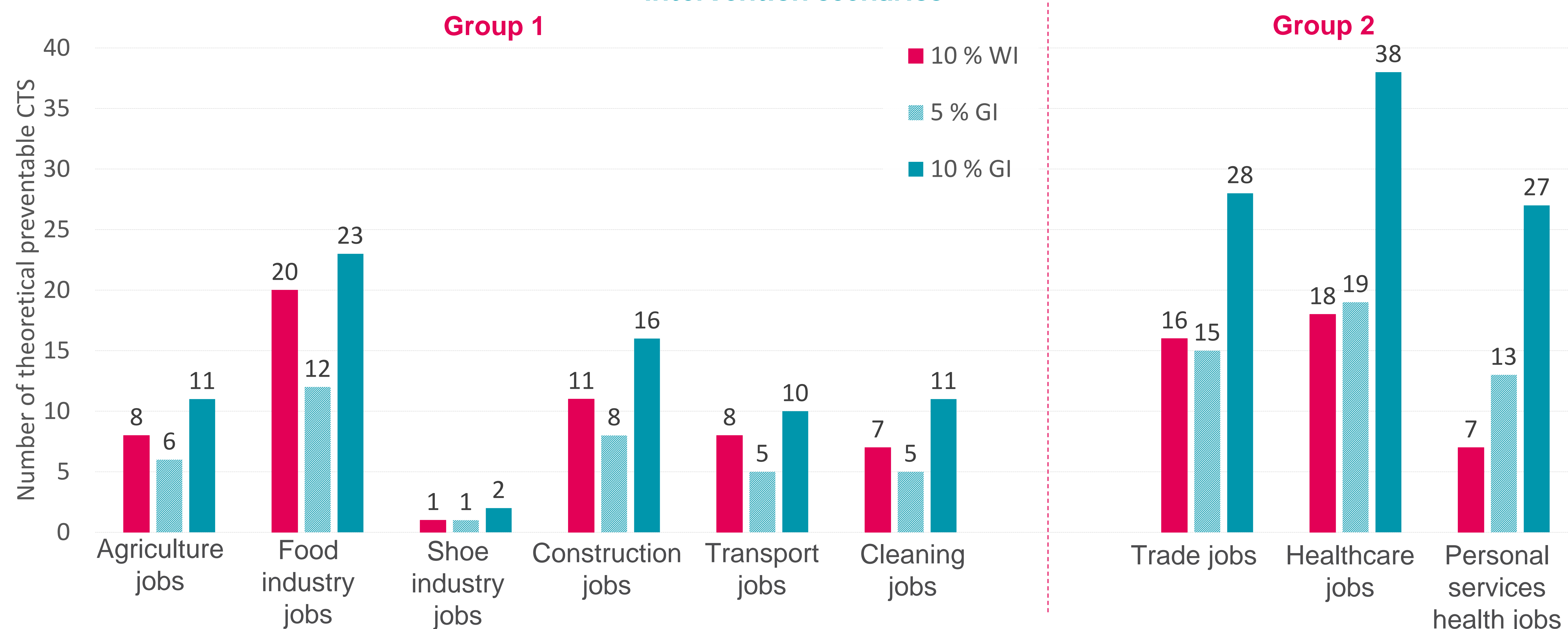
## Methods

- Cases of surgically treated CTS were assessed using regional hospital discharge records for persons aged 20-59 in 2009 and lived in the Pays de la Loire region.
- Due to a lack of information on employment status in regional hospital discharge records, we used data collected by a pilot study conducted among 1,500 persons (1,053 women and 447 men) having undergone CTS surgery in the three largest hand surgery settings of the region in 2002-2003. Using work-related attributable fractions (AFEs) from this pilot study, we estimated the number of WR-CTS in high-risk jobs.
- Three theoretical scenarios of workplace-based primary prevention for jobs at risk were simulated:
  - A mono-component work-centered intervention reducing the incidence of WR-CTS by 10% (10%-WI),
  - Two multicomponent global interventions reducing the incidence of all surgical cases of CTS by 5% and 10% by targeting personal and work risk factors.

## Results

- Nine jobs at high risk of CTS were identified in the region, amounting to 1,618 [1,143-2,233] CTS cases, of which 952 [488-1,575] were WR-CTS.
- The 10%-WI, 5%-GI and 10%-GI hypothetically prevented 95 [49-158], 81 [57-112] and 162 [114-223] CTS cases, respectively.
- As shown in Figure, the number of avoidable CTS varied between the different preventive scenarios and jobs. The 10%-GI had the greatest impact regardless of the job, hypothetically preventing 159 [114-223] CTS out of 1,603 [1,137-2,212]. The 10%-WI prevented a lower number of cases than the 10%-GI, preventing at most 90 [46-153] cases, only slightly more than the 5%-GI, which avoided 81 [58-111] cases.
- The 10%-GI (PE = 10%) had maximum impact in the three jobs with the most cases of CTS: 'Healthcare jobs', 'Trade jobs' and 'Personal service health jobs', with 38, 28 and 27 cases prevented, respectively. The 10%-WI had maximum impact in the 'Food industry jobs' (20 cases avoided), with a comparable impact of the 10%-GI (23 cases avoided). More generally, the 10%-WI was more efficient for jobs with high proportion of WR-CTS (group 1) than for jobs with moderate to low proportion of WR-CTS (group 2) due to higher proportions of WR-CTS (76% vs 43%). Compared to the 5%-GI, the impact of the 10%-WI was higher or at least equal for all jobs of group 1, but similar for 'Healthcare jobs' and 'Trade jobs' and even lower for 'Personal services jobs'.

Figure: Number of theoretical preventable CTS according to the 10-WI, 5%-GI and 10%-GI preventive intervention scenarios



## Discussion

- This study found that work-related CTS cases were concentrated in a limited number of high-risk jobs.
- Simulated workplace-based WI and GI showed that preventive efficiency varied depending on the intervention design, the number of workers in different jobs and the proportion of work-related CTS.
- This suggests that prevention efforts to reduce exposure to work-related risk factors should focus on high-risk jobs. Reducing CTS rates will also require strategies to reduce personal risk factors, particularly in jobs with low levels of work-related risk of CTS.

