

## Attachment D-2:

### Prior MSD Intervention Studies

Most MSD intervention effectiveness studies have been quasi-experimental (e.g. pre- and post-intervention studies without control groups or randomization). Those studies that have focused on the effectiveness of MSD engineering controls alone have tended to focus on short term workload assessments as outcomes rather than MSD symptoms/ cases and have been mixed in quality and findings (van der Molen et al 2005). Luijsterburg et al. 2005 conducted a controlled engineering intervention study with a follow-up period of 10 months was performed with 202 bricklayers from 25 construction companies. Analysis indicated no decrease in reported MSD symptoms as a result of the intervention, but sick leave in the intervention group was significantly lower compared to controls. Marras et al 2000 used an interrupted time-series quasi-experimental design involving 36 repetitive materials handling jobs and found a significant difference in pre- and post-intervention low-back incidence rates. Fujishiro et al 2005 conducted a prospective study to evaluate a statewide program (funded by the Ohio Bureau of Workers Compensation, OBWC) that provided consultation and financial support for purchasing devices to aid in patient handling and lifting. The median MSD rate decreased from 12.32 to 6.64 per 200,000 employee-hours between baseline (1 year pre-intervention) and post intervention (up to 2 years), indicating that the program was an effective intervention to reduce MSDs among healthcare workers.

A number of recent studies have examined the combined effect of MSD control programs that include engineering, administrative, and work practice controls and involve both management and employees in the improvement process. Some of the quasi-experimental studies investigating the effects of such participatory MSD control programs have found reductions in MSD outcomes. Collins et al 2004 investigated a “best practices, musculoskeletal injury prevention program consisting of mechanical lifts and repositioning aids, a zero lift policy, and employee training on lift usage” in a quasi-experimental, pre-post design. The authors found “significant reduction in resident handling injury incidence, workers’ compensation costs, and lost workday injuries after the intervention.” Rivilis et al. 2006 used a longitudinal quasi-experimental design, comparing a participatory MSD control program at “one depot of a large courier company, with a nearby depot serving as a control. Evaluations focused on 122 employees across the two depots who participated in both pre- and post-questionnaires. Improvements in communication levels were associated with reduced pain intensity and improved work role function.” Authors concluded that a participatory MSD control program “can improve risk factors related to WMSD.” However, Haukka et al. 2008 conducted one of the few true experimental studies investigating the effect of a participatory MSD control program on MSD outcomes. This study used a cluster randomized control trial of 504 workers and 119 kitchens and determined that “no systematic differences in any outcome variable were found between the intervention and control groups during the intervention or during the 1-year follow-up.” Haukka notes that evidence for the effectiveness of MSD control interventions is “scanty” and is “mostly derived from case studies, while controlled trials are sparse and most have severe methodological flaws.” As described previously, recent literature reviews have found little evidence to support the efficacy of MSD control interventions designed to reduce low back pain (LBP). For example, Bigos et al.

2009 found “exercise interventions effective and other interventions not effective.” Other systematic reviews found a consistent lack of effectiveness of back supports (van Duijvenbode et al 2009) and shoe inserts (Sahar et al 2009). Tveito et al 2004 found that “only exercise and the comprehensive multidisciplinary and treatment interventions have a documented effect on LBP.”

In summary, clearly there is a need to conduct rigorous experimental research to define further the effectiveness and cost-benefit of MSD control interventions. A renewed partnership between the Ohio Bureau of Workers Compensation (OBWC) and NIOSH provides a timely opportunity to conduct such research in a relevant, efficient, and impactful manner.