

## Are Injuries Reported

# EQUALLY

## Throughout the Work Week?

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**I**n 1999, 3.8 million disabling injuries occurred at work, while 6.8 million occurred at home in the U.S. (NSC 29). This means that a disabling injury occurred every eight seconds in the workplace and every five seconds at home.

The high human and monetary costs associated with these injuries emphasize why safety professionals must strive to track, analyze and promote programs that target specific injuries/illnesses. This article describes a research study conducted to determine whether the number of injuries/illnesses reported on Mondays by employees of a major state university system in the southeastern U.S. for the years 1991 to 1996 was significantly different from those reported for other week days (Tuesday-Friday).

This analysis of 4,215 injury/illness cases was conducted to target future strategies to reduce on- and off-the-job injuries/illnesses—specifically those associated with cumulative trauma and repet-

itive motion. From 1991 to 1996, a greater number of cases were found to be reported on Mondays than on the other individual weekdays. This analysis also found that when type of injury/illness (e.g., strain, sprain, carpal tunnel syndrome) was further isolated, a greater number of cumulative-trauma-related injuries/illnesses were reported on Mondays than other individual days of the week. These findings support the need to focus injury prevention programs on chronic illnesses and injuries that can result from a combination of home and work activities as well as on work situations that can produce acute injuries.

In the past, injuries were tracked by day of occurrence, primarily to detect fraudulent claims. In 1997, for example, the Nevada State Industrial Insurance System listed several characteristics that could indicate a fraudulent claim. Among them: "The alleged injury occurs late on a Friday afternoon but is not reported until Monday" (Hammer and Price 36).

In 1999, the average cost per disabling

injury was \$28,000 (NSC 51). As costs associated with lost workdays continue to mount, employers are seeking strategies to reduce the number of injuries—both on- and off-the-job—incurred by employees. However, different prevention strategies are needed to address acute injuries that occur at work than for chronic injuries caused by activities conducted at work or home. Previous research has indicated that both on- and off-the-job injuries/illnesses can produce or aggravate strains, sprains and other cumulative trauma injuries (McGorry and Courtney 22).

Research supports the need for further analysis of both categories of injury/illness and indicates that employers must recognize the impact of any work or recreational activity that can cause stress to a particular body part or requires repetitive motion (Kroemer 596; McGorry and Courtney 22). Risk factors such as gender, injury and health history, hobbies (sports) and pregnancy can cause or aggravate an injury as well, particularly those associat-

**TABLE 1 Highest Number of Injuries/Illnesses Reported Per Year by State University Employees 1991-1996**

	1991	1992	1993	1994	1995	1996
<b>Monday</b>	185	139	155	138	159	158
<b>Tuesday</b>	169	157	142	149	159	134
<b>Wednesday</b>	160	144	148	142	137	126
<b>Thursday</b>	151	139	149	134	133	104
<b>Friday</b>	145	110	141	118	85	105

Note: Shaded boxes represent the highest number of injuries/illnesses reported per year.

ed with cumulative trauma (Kroemer 598; Hess 115; Hanson 43; Sandler 73).

Sandler also studied injuries prone to aggravation as a result of work-related tasks. "It remains to be seen how regulations could identify when a workplace cause for carpal tunnel syndrome exists and rule out non-work causal factors" (Sandler 74). This statement emphasizes the complex nature of CTDs and highlights the need for further understanding of them; it also suggests the need to expand programs that reduce the number and severity of such injuries/illnesses experienced by employees.

To that end, it is believed that analysis of the characteristics of reported injuries, including day of week incurred, can help a company target injury prevention programs. For example, a new program could focus on ways to reduce injuries that may be caused or aggravated by specific away-from-work activities as well as ways to address acute and cumulative injuries related to work functions.

**RESEARCH DESIGN**

This study examined injuries reported between 1991 and 1996 by employees working for a major public university system in the southeastern U.S. The purpose was to assess whether a significant difference existed between total recordable injuries/illnesses and/or recordable cumulative trauma injuries/illnesses reported on different days of the five-day work week. The population for this retrospective study was state employees from 21 campus, training center, medical and institute locations of the university system. Although employees had the opportunity to report seven days a week, cases reported on Saturday and Sunday were excluded from analysis since a small number of injuries were reported on these two days.

**DATA COLLECTION & ANALYSIS**

Analyzed data were extracted from the OSHA 200 logs and related reports maintained to meet OSHA regulatory requirements. These records document the occurrence, date, type and extent of injury/illness. Data were selected for retrospective analysis to provide a profile of recorded cases. It was anticipated that knowledge gained would facilitate development of strategies to prevent future injuries/illnesses within the studied population (Plavner 36).

One potential limitation of data gathered is that information recorded on the OSHA 200 log is supplied by employees and supervisors. Thus it is possible that injury/illness severity or occurrence may have been under- or over-reported. Although few previous studies found in the literature focused on the reliability of such data, those reviewed indicate some concerns regarding its accuracy or inadequacy. In 1996, Weedle stated that "the reliability of such reporting is unknown" (217). Previous studies have also identified the need for additional research to examine the issue of an off-the-job injury being reported as work-related (Finnegan 53).

Researchers in this study assumed that the OSHA 200 logs and related reports were accurate. The investigators included each piece of information retrieved from the 200 logs and coded all entries by job type, injury/illness type, event type and campus location; this data was compiled in an Excel database. If any questions arose based on the log information, actual accident investigation forms were used for clarification. The resulting database contained all cases reported during the five-day work week from the 21 locations. The database was then converted to a Statistical Program for Social Sciences (SPSS) database to facilitate statistical analysis.

**STATISTICAL METHODS**

Using SPSS, case information was analyzed employing the non-parametric Chi

**TABLE 2 Occurrence of Reported Injuries/Illnesses by Day of the Week 1991-1996**

	Observed N	Expected N	Residual
<b>Monday</b>	934	843.0	91.0
<b>Tuesday</b>	910	843.0	67.0
<b>Wednesday</b>	857	843.0	14.0
<b>Thursday</b>	810	843.0	-33.0
<b>Friday</b>	704	843.0	-139.0
<b>TOTAL</b>	4,215		

Chi-Square\*39.592 df = 4 Asymp. Sig <0 .001

\*0 cells (0.0%) have expected frequencies less than 5. The minimum expected cell frequency is 843.0.

**TABLE 3 Occurrence of Sprains, Strains & Carpal Tunnel Syndrome Injuries/Illnesses Reported by Day of the Week 1991-1996**

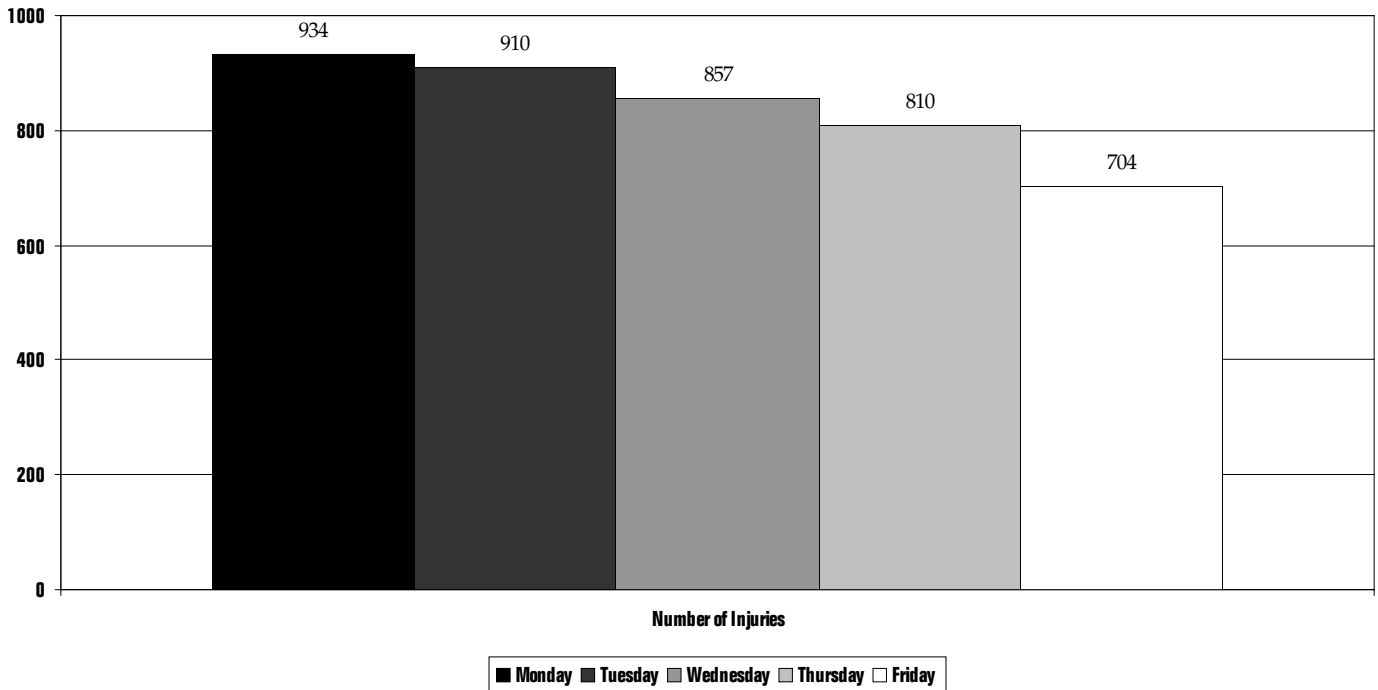
	Observed N	Expected N	Residual
<b>Monday</b>	396	355.8	40.2
<b>Tuesday</b>	379	355.8	23.2
<b>Wednesday</b>	367	355.8	11.2
<b>Thursday</b>	333	355.8	-22.8
<b>Friday</b>	304	355.8	-51.8
<b>Total</b>	1,779		

Chi-Square\* 15.410 df = 4 Asymp. Sig = 0.004

\*0 cells (0.0%) have expected frequencies less than 5. The minimum expected cell frequency is 355.8.

Square test. This test was conducted with the assumption that there was an equal likelihood/possibility for an employee to experience and report an injury/illness on any day of the five-day work week. It was also used to determine whether a significant difference existed between the number of injuries/illnesses reported each day of the five-day work week. Data were analyzed to compare the set of observed reported injury frequencies from the years 1991 through 1996 for each week day. A set of expected reported injury frequen-

**FIGURE 1 Total Number of Injuries/Illnesses Reported by State University Employees 1991-1996**



cies was generated to determine whether expected frequencies were higher or lower than those observed (Ferguson and Takane 212; Gay and Airasian 502).

#### RESULTS

According to data analysis, job categories reporting the highest number of injuries/illnesses were: maintenance/construction 952 (20.4 percent), nursing 749 (16.0 percent), housekeeping/custodian 487 (10.4 percent), clerical 470 (10.1 percent), food service 388 (8.3 percent) and administration 262 (5.6 percent); some 1,358 (29.2 percent) occurred in 18 other job categories. The total number of cases reported on Monday through Friday was found to be 4,215.

When each year of the six-year period was studied individually, Monday was found to have the highest number of reported illnesses/injuries in four of the six years (Figure 1); Tuesday was found to have the highest number for the other two years (Table 1). The highest number of cases (934 or 22.16 percent) occurred on Mondays, the lowest number on Fridays. Using the Chi Square test, a significant difference ( $p$  less than 0.001) was found between recorded injuries/illnesses reported on different weekdays (Table 2).

Figure 2 provides the total number of sprains, strains and CTDs. A significant difference was found among recordable cumulative trauma injuries/illnesses (e.g., strains, sprains and carpal tunnel syndrome) reported on different days of the work week. The total number of such injuries was 1,779; of these, 396 (22.26

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percent) were reported on Monday; an expected frequency of 355.8 had been estimated for Mondays. This was the highest number of cumulative-trauma-related injuries/illnesses reported for any day of the week.

A statistically significant difference was found in the number of injuries/illnesses reported each day of the work week when Chi Square analysis was performed at the 0.05 level of significance. The resulting  $p$  value of 0.004 demonstrates a significant difference in the number of cumulative-trauma-related injuries/illnesses reported among the five days studied (Table 3).

#### DISCUSSION

As noted, a higher number of injuries (both total and cumulative-trauma-related) were found to be reported on Mondays than on any of the other week days studied. Although the study did not attempt to explain this pattern, safety professionals can use this knowledge when working with employees to address injury trends. For example, these findings suggest the following explanations:

1) Employees may spend two weekend days with no exercise prior to resuming heavy physical activity, resulting in an injury on Monday.

2) Employees may experience an injury resulting from a non-work related injury suffered over the weekend while participating in some recreational activity or performing home repairs.

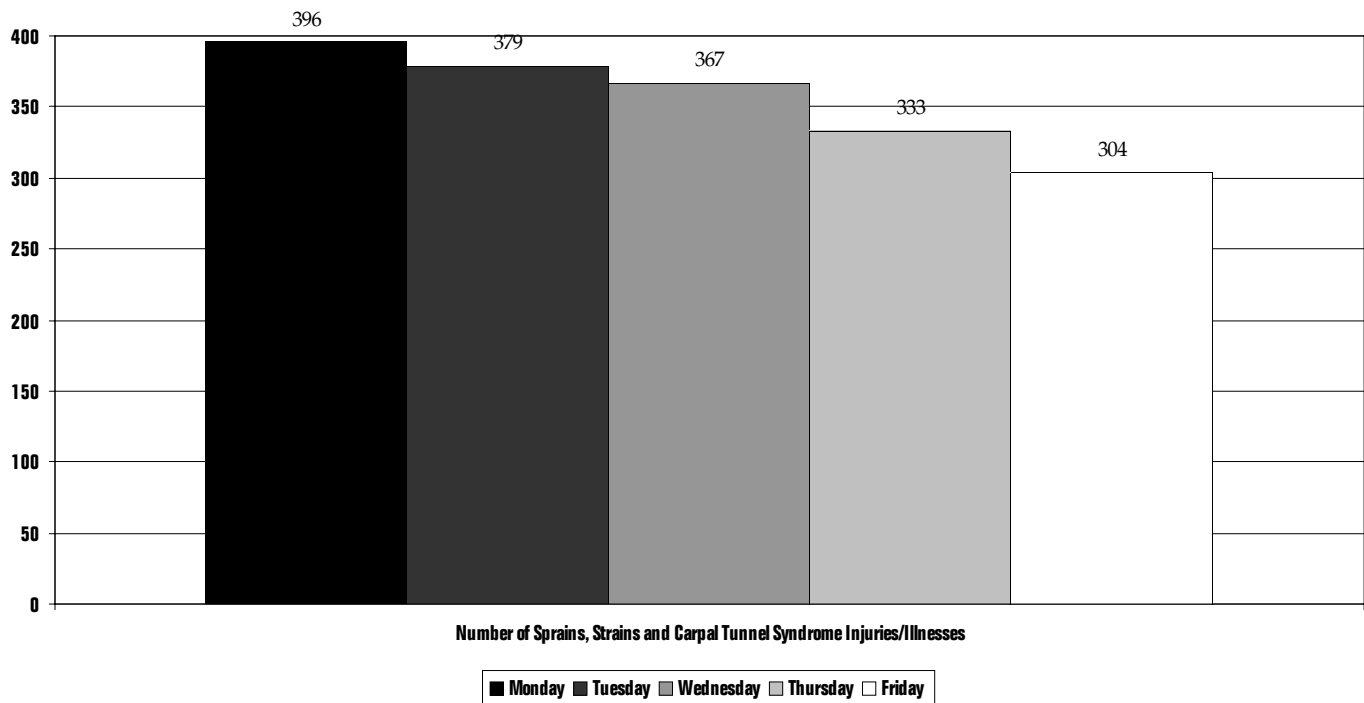
3) Employees may report an injury/illness event which results from a previous work or non-work-related injury that is aggravated on the Monday it is reported.

4) Employees are tired due to insufficient sleep over the weekend. This can result in reduced attention to safety practices on Monday and a subsequent injury at work.

5) Employees may be involved in a work-related activity that is most frequently performed on the first day of the work week.

To develop effective injury prevention programs, safety professionals must seek further information on injury trends and causes; such information can help identify root causes and key characteristics of

**FIGURE 2 Total Number of Sprains, Strains & Carpal Tunnel Syndrome Injuries/Illnesses Reported by State University Employees 1991-1996**



reported injuries. Although this study determined that among this population a higher number of injuries was reported on Monday than on other days studied, sufficient data were not available to analyze why this was the case. A more-detailed analysis of descriptive information from original accident investigation forms and interviews with those submitting reports could provide valuable information in this regard.

The results support the need to collect more-specific descriptive data regarding injuries/illnesses reported on Mondays. This will entail collecting additional data regarding the prior presence of injuries and the type of repetitive motion associated with an employee's work and recreational activities. Gathering data on the worker's physical condition and normal level of exercise can also help determine the actual percent of injuries related to aggravation, weekend activities, lack of weekend exercise, fatigue or specific work-related tasks performed more frequently on Mondays.

To design effective prevention programs and reduce risk factors, it is important to understand each injury category and employee group targeted. As this investigation illustrates, any organization must use the data collected to better understand the injury/illness experience of its employees. ■

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