

Adolescent Occupational Injuries in Fast Food Restaurants: An Examination of the Problem From a National Perspective

Kitty J. Hendricks, MA

Larry A. Layne, MA

Work injuries to adolescents are most prevalent in the retail trades industry, with a large portion occurring in eating and drinking establishments (E&DEs). Data from the National Electronic Injury Surveillance System were examined for nonfatal injuries to adolescents, ages 14 through 17, injured while working in fast food restaurants (a subcategory of E&DEs) from July 1, 1992, to June 30, 1994. There were an estimated 44,765 adolescent injuries in E&DEs, with an estimated 27,997 in fast food restaurants, during this period. The injury rate for E&DEs in the 15 through 17 age group was higher than for all other industries combined (rate ratio [RR] = 1.7), with little disparity in rates between the sexes. This study identifies the fast food industry as the source of a large proportion of occupational injuries to adolescents, and indicates that task-specific risk factors seem to be strongly related to sex.

The retail trades industry, and particularly the restaurant, is one of most common places of employment and the source of the largest number of occupational injuries to youth in the United States.¹⁻⁷ According to a Bureau of Labor Statistics nationwide survey of private sector establishments, teenagers aged 16 through 19 accounted for about 25% of the workforce in eating and drinking establishments (E&DEs).⁸ The Committee on the Health and Safety Implications of Child Labor reported that retail trades comprised 52% of the employment for youth aged 15 through 17, whereas E&DEs alone comprised 28% of the total.¹ A report from the University of Minnesota listed McDonald's as the employer of 12% of all working adolescents.⁹

In 1992, the retail trades industry accounted for 54% of all nonfatal occupational injuries to adolescents (aged 14 through 17) that were treated in hospital emergency departments, whereas E&DEs accounted for 38% of the total (or 71% of the injuries in retail trades).³ An analysis of New York State Workers' Compensation files for adolescents reported that food service occupations ranked third in injury rates among all major occupational groupings, with a rate of 0.36 for every 100 employees, following only unskilled laborers (0.52 per 100) and building service workers (0.40 per 100).⁴ According to the Bureau of Labor Statistics, teenagers in restaurants were more likely than adults to sustain serious

From the Division of Safety Research, National Institute for Occupational Safety and Health, Morgantown, W.V.

Address correspondence to: Kitty J. Hendricks, MA, NIOSH/DSR/SFIB, 1095 Willowdale Road, Morgantown, WV 26505.

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heat burns but less likely to incur disabling sprains.⁸

Consistent with the Bureau of Labor Statistics finding that adolescents are at increased risk of burns in restaurants, data gathered from telephone interviews with adolescents showed that half of all burn injuries in the sample occurred in fast food restaurants.⁷ Another study reported that 55% of all scald burns were caused by hot grease in fast food restaurants.¹⁰ Worker's Compensation data reported that during August 1990 to August 1991, occupational burns to youth aged 13 to 17 in the State of Minnesota accounted for 13% of all injuries.¹¹ Of all occupational burns to these Minnesota youth, 39% were incurred in fast food restaurants and another 37% in full-service restaurants.¹¹

As the US economy has restructured during the past decades, jobs in traditionally high-wage industries have vanished while new jobs have been concentrated in the lower-wage service sector, including the retail trade food industry.¹²⁻¹⁴ In fact, the fast food industry is one of the fastest growing industries in the United States.² Americans are also shifting away from the purchase of meals in full-service to fast food restaurants.⁸ These economic indicators would suggest that the employment of youth in fast foods will continue to rise.

The growing body of occupational injury research in restaurant and food service work points to the substantial contribution these workplaces have on the adolescent occupational injury problem. This article will build on previous research by examining data from a specific type of establishment, the fast food restaurant, which is a common employer of youth. One of the goals of this research is to illustrate the magnitude of the adolescent occupational injury problem that is associated with fast food establishments. A second goal is to suggest prevention measures specific to this type of workplace and youth.

Methods

The injury data used for this research were extracted from the National Electronic Injury Surveillance System (NEISS). These data were collected by the Consumer Product Safety Commission (CPSC) and shared with the National Institute for Occupational Safety and Health through an interagency agreement. Unlike data commonly collected by CPSC through the NEISS system, the data included all work-related cases presenting to hospital emergency departments. In other words, all case restrictions typically associated with CPSC data have been removed, so cases that do not involve a consumer product or injuries incurred while driving or riding in a motor vehicle are included in the work-related data subset.

During the time period of this study, NEISS data were compiled from 91 hospitals that were selected from a probability sample of all hospital emergency departments in the United States.¹⁵ The sampling frame was constructed by first stratifying a list of all hospitals in the United States by size (as determined by the annual number of emergency department visits), then geographic region. Each case in NEISS is assigned a statistical weight on the basis of the hospital's probability of selection in the sample. National estimates are obtained by extrapolating these statistical weights. All results presented in this report are weighted values and are presented as national estimates.

For the purpose of this study, fast food restaurants are defined as those establishments where a limited menu is offered, food is prepared on the premises, and food is prepared in advance or almost immediately after the order. Twenty-four months of data, from July 1992 to June 1994, were used to examine nonfatal adolescent injuries in fast food restaurants. Cases that occurred in E&DEs (Standard Industrial Classification [SIC] Major Group 58)¹⁶ were subset from all work-related injuries by

manually reviewing the narrative information of the industry and occupation fields. The *Dun and Bradstreet Business Index*¹⁷ and the *American Business Information Index*¹⁸ were used to help with the identification of fast food restaurants. Narrative fields were used to group additional information, such as type of fast food restaurant, area of the restaurant the injury occurred, occupation of the injured, work task being performed at the time of injury, and other surrounding circumstances such as floor conditions. There were 2050 occupational injuries to persons 14 to 17 years of age during the study period, 543 of which occurred in fast food restaurants.

The standard errors and confidence intervals, chi-squared tests and *P* values were calculated using the software package Survey Data Analysis (SUDAAN) Version 7.11.¹⁹ SUDAAN allows for the complex sampling design parameters of NEISS to be incorporated in the computation of the standard errors using the Taylor Series approximation of the deviations of estimates from the expected values.

Injury incidence rates for E&DEs and all other industries were calculated using employment estimates from the Current Population Survey (CPS) monthly public use microdata files for workers aged 15 to 17 (the CPS does not include the collection of employment data for persons 14 years of age and under). The CPS is a national household sample of approximately 60,000 households per month.^{20,21} The household respondent reports the number of hours actually worked in the week preceding the interview for all employed persons older than 14 years in the household. From these data, rates were calculated on the basis of actual hours worked per week, which are presented per 100 full-time equivalents. Previous research has shown that for youth, injury rates based on actual hours worked provide a more accurate estimate of risk than rates

TABLE 1

Occupational Injury Rates for Adolescents (15 to 17 Years of Age) in E&DEs Compared With All Other US Industries (July 1992 through June 1994)*

Industry and Gender	Aged 14-17 Years		Aged 15-17 Years Only	
	No. of Injuries	No. of Injuries	FTE	Injury Rate per 100 FTE
All industries, total	108,060	104,490	2,327	4.5
Male	72,069	69,226	1,268	5.5
Female	35,992	35,624	1,058	3.4
E&DEs only (SIC 58)	44,765	44,417	692	6.4
Male	25,774	25,572	354	7.2
Female	18,991	18,845	339	5.6
All other, excluding SIC 58	63,295	60,073	1,634	3.7
Male	46,295	43,654	915	4.8
Female	17,001	16,779	720	2.3

* E&DEs, eating and drinking establishments; FTE, full-time equivalent workers in 1000s.

TABLE 2

Occupational Burn Injuries to Adolescents in E&DEs Compared With All Other US Industries (July 1992 through June 1994)

Industry and Gender	Aged 14-17 Years, No. of Injuries		Aged 15-17 Years Only, Burns Only	
	Burns	All Other	n	Rate*
All industries, total	11,812	96,249	11,409	0.5
Male	7,112	64,956	6,822	0.5
Female	4,700	31,292	4,587	0.4
E&DEs Only (SIC 58)	8,375	36,390	8,130	1.2
Male	5,143	20,631	5,010	1.4
Female	3,232	15,759	3,120	0.9
All other, excluding SIC 58	3,437	59,859	3,279	0.2
Male	1,969	44,325	1,812	0.2
Female	1,468	15,533	1,467	0.2

* Per 100 full-time equivalent workers; employment data available for ages 15 to 17 years only.

based on the number of employed workers because of the part-time and sporadic nature of their work.^{22,23}

Results

Eating and Drinking Establishments Compared With All Other Industries

During the 24-month period of July 1, 1992, to June 30, 1994, there were an estimated 108,060 (95% confidence interval [CI]: 81,563 to 134,557) adolescents aged 14 to 17 who presented to hospital emergency departments for medical treatment of an occupational injury. About 41% (44,765; 95% CI: 32,617 to 56,913) of these cases were classified in the

industry division of E&DEs. Table 1 shows that the injury rate for E&DEs was 1.7 times higher than the rate for all other industries for adolescents aged 15 to 17 years. (CPS does not include the collection of employment data for persons 14 years of age and under.) In E&DEs, the injury rate ratio for males to females was lower than that measured in all other industries combined (RR = 1.3 compared with RR = 2.1, respectively).

Of the total number of injuries (108,060), the attending emergency department physician diagnosed 11% as burn injuries (11,812; 95% CI: 8,329 to 15,295). E&DEs accounted for 71% (8,375; 95% CI: 5,467 to 11,283) of the burns, with a

burn-specific injury rate ratio of 6.0 for E&DEs compared with all other industries (Table 2).

Fast Food Restaurants

In fast food restaurants alone (a subcategory of E&DEs), there were 543 cases identified that produced an extrapolated estimate of 27,997 (95% CI: 20,850 to 35,145) occupational injuries to adolescents aged 14 to 17 nationwide. In other words, fast food restaurants accounted for 63% of the adolescent injuries occurring in E&DEs, or 26% of the total number of occupational injuries among adolescents during the 2-year time period.

Adolescents 17 years of age accounted for an estimated 55% (15,479; 95% CI: 11,390 to 19,568) of the injuries, followed by those 16 years of age, who comprised 38% (10,734; 95% CI: 7,635 to 13,833). Adolescents 15 and 14 years of age comprised 6% and 1% of the injuries, respectively. The mean age of injured adolescents was 16.5 years. Of the total, males comprised 51% (14,246; 95% CI: 9,693 to 18,799) and females 49% (13,751; 95% CI: 10,544 to 16,958). About two-thirds of the injury cases involved whites, 6.7% blacks, and 3.5% other minorities. In more than 20% of the cases, race was not indicated. The majority of these young workers injured in fast food establishments were treated and released from the hospital emergency department without hospitalization (98.9%).

Figures 1 and 2 show the distributions for body part injured and injury diagnosis of the attending physician. Lacerations comprised 78% of all injuries to the finger, and 24% to the hand and head regions, respectively. Burns comprised 55% of all injuries to the eye (cleaning products were the source of injury in 66% of these cases and the remaining 34% resulted from being splashed by hot grease or oil). Burns also accounted for 46% of injuries to the forearm and 45% to the hand. Contusions, abrasions, and hematomas accounted

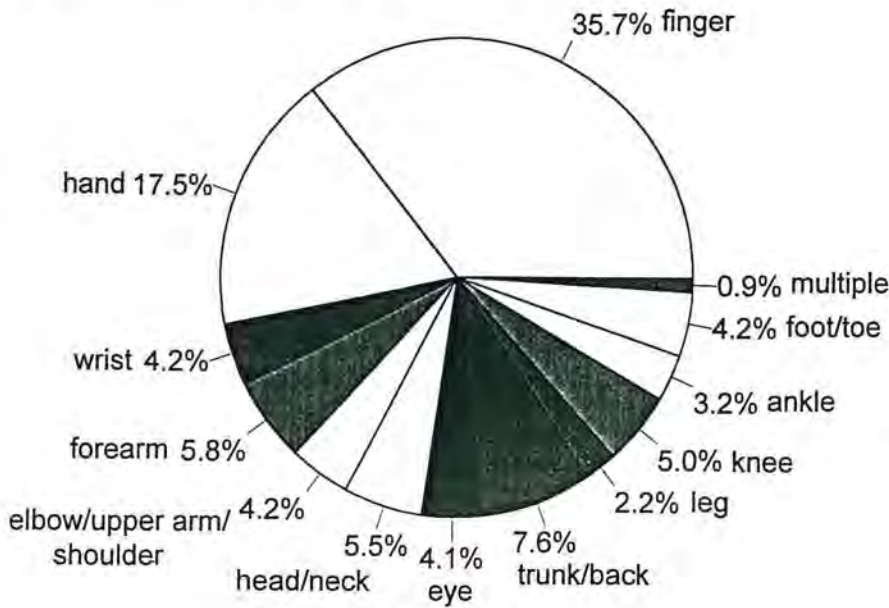


Fig. 1. Body part injured.

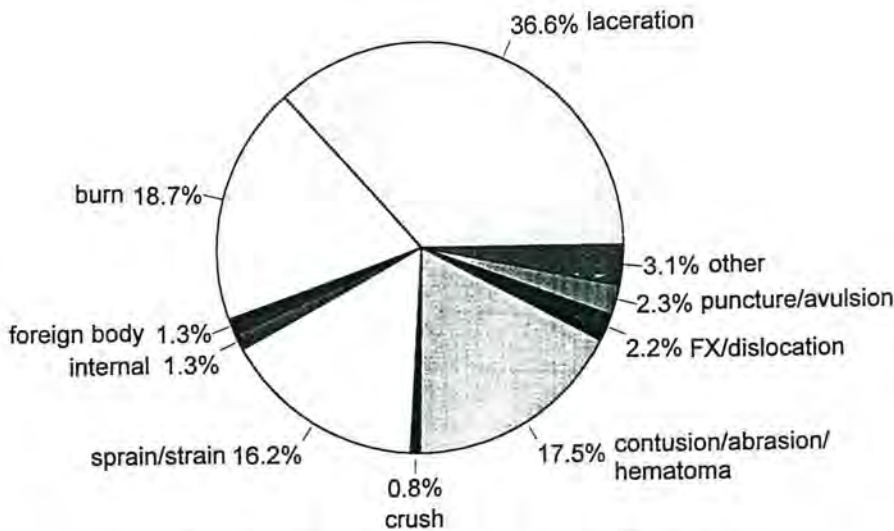


Fig. 2. Attending physician's injury diagnosis. FX, fracture.

for 60% of injuries to the elbow, upper arm, and shoulder. Sprains and strains comprised 69% of the injuries to the trunk and back region, followed by the ankle (68%), knee (39%), and the leg (32%). About 10% of injuries to the foot and toe were diagnosed as fractures or dislocations. A comparison of the attending physician's diagnosis by sex showed there was a statistically significant difference ($\chi^2 = 22.59, P = 0.0005$, see Table 3). Laceration and burn injuries were more common among males, whereas females in-

curred more sprains and strains, contusions, abrasions, and hematomas.

By primary type of fast food served, the majority of injuries occurred in hamburger restaurants (52.6%), followed by pizza and chicken/fish, with 12.6% and 11.7%, respectively (Table 4). Table 5 shows that a larger proportion of injuries to females occurred in hamburger and chicken/fish restaurants, although the difference was not statistically significant ($\chi^2 = 8.16, P = 0.1629$). Youth 14 and 15 years of age showed a different injury distri-

bution pattern than seen overall, with 38% of the injuries occurring in hamburger restaurants and 26% in ice cream/yogurt. The actual number of cases for 14- and 15-year-olds was very small, leading to unstable extrapolated estimates; therefore, caution must be used in interpretation of this distribution.

Among the three types of fast food restaurants that accounted for the largest number of injuries, burns accounted for the second largest proportion of injuries in both hamburger (24%) and chicken/fish (24%) restaurants (Figure 3). Lacerations comprised 59% of injuries in pizza restaurants, compared with 30% and 31% in hamburger and chicken/fish restaurants, respectively. Of all burn injuries in this study, 49% were associated with grease.

Figures 4 and 5 show a comparison of the area within the fast food restaurant and work tasks being performed at the time of injury by sex. About 65% of all injuries to males occurred in the kitchen compared with 52% for females. Males were more likely to be injured performing tasks associated with cooking, whereas a larger proportion of females were injured completing tasks associated with cashiering and servicing tables. Because of the large proportion of cases that could not be assigned codes for area and work task, significance tests were not calculated.

Over 20% of all injuries resulted from a fall. Of these falls, 52% were directly related to floor surface contamination (eg, water, ice, or grease). Falls were the cause of 49% of the reported contusions, 39% of sprains/strains, 8% of cuts, and 4% of burns.

Discussion

Limitations of Hospital Emergency Department Data

One factor that should be considered when using hospital emergency department data such as that from NEISS is that they include only injuries presented to hospital emer-

TABLE 3

A Comparison of the Nature of Injury (Attending Physician's Diagnosis) by Gender for Adolescents (Aged 14 to 17 Years) Employed in Fast Food Restaurants (National Estimates, July 1992 through June 1994)*

Type of Injury	Male		Female	
	n (95% CI)	%	n (95% CI)	%
Laceration	6,233 (±2,397)	43.8	4,027 (±1,276)	29.3
Burn	2,942 (±1,261)	20.7	2,282 (±897)	16.6
Sprain and strain	1,866 (±934)	13.1	2,671 (±1,177)	19.4
Contusion, abrasion, and hematoma	1,445 (±646)	10.1	3,463 (±1,100)	25.2
All other	1,761 (±764)	12.4	1,307 (±663)	9.5

* $\chi^2 = 22.59$, $P = 0.0005$, $df = 4$; CI, confidence interval.

TABLE 4

No. of Injuries to Adolescents (Aged 14 to 17 Years) by Type of Fast Food Restaurant (National Estimates, July 1992 through June 1994)

Type of Fast Food Establishment	No. of Injuries	95% CI	% of Total
Hamburger	14,718	±4,338	52.6
Pizza	3,527	±1,213	12.6
Chicken and fish	3,264	±1,475	11.7
Deli, hotdog, and sandwich	1,841	±637	6.6
Ice cream and yogurt	1,479	±749	5.3
Mexican and Chinese	869	±471	3.1
Donut and bagel	474	±328	1.7
Other, NEC	1,824	±1,284	6.5
Total	27,997	±7,148	100

TABLE 5

No. of Occupational Injuries by Gender and Type of Fast Food Restaurants for Adolescents (Aged 14 to 17 Years, National Estimates, July 1992 through June 1994)*

Type of Fast Food Establishment	Male		Female	
	n (95% CI)	Column %	n (95% CI)	Column %
Hamburger	7,038 (±2,803)	49.4	7,680 (±2,102)	55.9
Pizza	2,222 (±955)	15.6	1,305 (±589)	9.5
Chicken and fish	1,426 (±692)	10.0	1,837 (±1,005)	13.4
Deli, hotdog, and sandwich	1,045 (±510)	7.3	796 (±460)	5.8
Ice cream and yogurt	505 (±386)	3.5	975 (±608)	7.1
All other	2,010 (±1,141)	14.1	1,157 (±644)	8.4

* $\chi^2 = 8.16$, $P = 0.1629$, $df = 5$.

Interview Survey Occupational Supplement showed that about 34% of all occupational injuries were first treated in a hospital emergency department.²⁴ Although data for adolescents younger than 18 years of age were not available in the National Health Interview Survey, if adolescents 14 to 17 have a distribution for "first source of medical treatment" that is similar to the overall pattern, then an estimate of the total number of adolescents 14 to 17 who are injured at work in the United States may increase threefold.

The total number of injuries presented for adolescents during the 2 years of this study (108,060) may be low owing to sensitivity issues of the NEISS surveillance system. A comparison of the estimated number of occupational injuries for workers of all ages treated in hospital emergency departments showed that the estimate derived from NEISS was lower than an estimate from the National Hospital Ambulatory Medical Care Survey (3.3 vs 4.2 million).^{24,25}

The narrative text in NEISS provided valuable information for the coding of additional information, such as the area of the fast food restaurant, work tasks being performed at the time of injury, and conditions related to injuries from falls and burns. This information was often incomplete, however, with about one-third of cases lacking the detail needed to code the area of the restaurant or the task being performed at time of injury. A formally developed set of criteria and instructions for completing the narrative text, as well as training, may improve the quality of this information.

Additionally, because of the lack of denominator data it was impossible to calculate injury rates for fast food. The gathering of employment data for fast food restaurants would enable injury rates in this area to be calculated. This would allow for the comparison of fast food with other industries rather than the grouping of fast food restaurants in the broader category of E&DEs.

gency departments for medical treatment and exclude all other injury cases that used alternative sources of

medical care, such as private physicians or on-site medical clinics. Analysis of the 1988 National Health

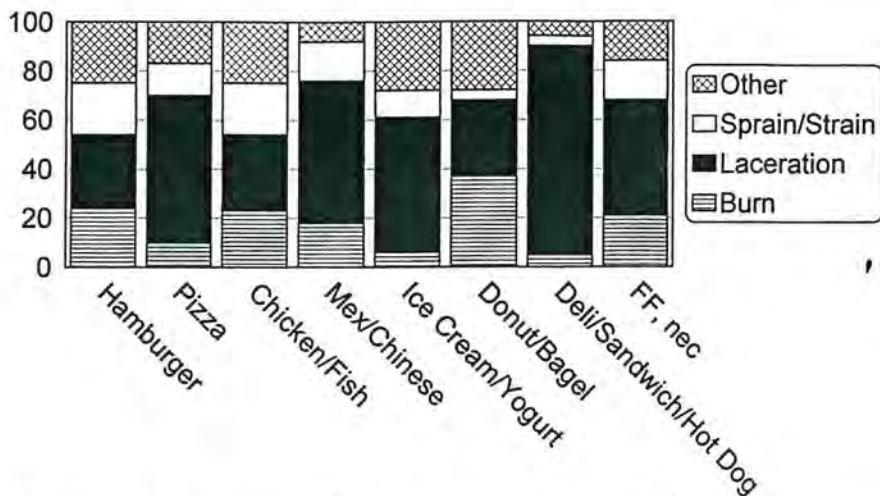


Fig. 3. Attending physician's diagnosis by type of restaurant. FF, Fast Food; nec, not elsewhere classified.

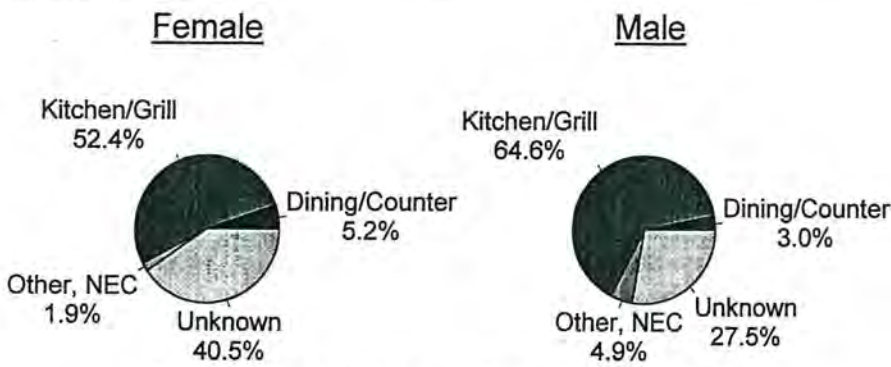


Fig. 4. Location of injury by sex. NEC, not elsewhere classified.

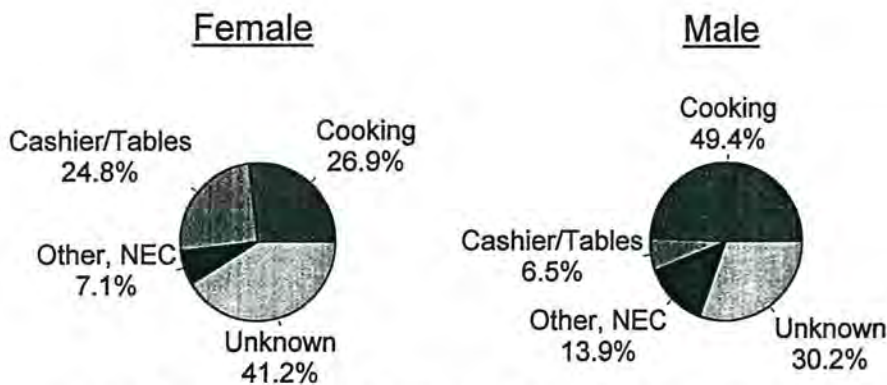


Fig. 5. Work task at time of injury by sex. NEC, not elsewhere classified.

Findings and Comparisons With Previous Research

The retail trade industry, and E&DEs in particular, have previously been identified as a leading source of occupational injury to youth. To our knowledge, however, this is the first study to examine injuries in the fast food sector at the

national level. We found that 26% of all adolescent injuries treated in hospital emergency departments occurred in fast food restaurants.

An interesting finding was the relative similarity of injury rates found between males and females. Previous studies, examining all industries, have shown that the injury rates for

males were 2 to 3 times higher than those for females.^{3,4,6,26,27} Yet in this study, the rates for males and females in E&DEs were 7.2 and 5.6/100 full-time equivalents, respectively (RR = 1.3). The injury rate ratio for males to females in all other industries was RR = 2.1, which is much closer to the injury rate ratios previously reported. This is particularly interesting in light of the finding that the data indicated that males and females were performing different work tasks in different locations of the fast food restaurants. The previously discovered sex differences may be an artifact of dissimilar workplace exposures. Additional research is needed to determine the relative importance to injury risk of intrinsic factors of restaurants (eg, work pace or demands, and similar management and safety training) compared with the actual tasks being performed.

The sex differences in relation to work tasks, location, and nature of injury were not surprising, however. In a participant observation study conducted in one fast food restaurant, females were more likely to be placed in the front of the restaurant, whereas males were more likely to be placed in the back or kitchen, possibly for aesthetic purposes.²⁸ As we hypothesized on the basis of Reiter's findings, males experienced more injuries while working as cooks and females while working as cashiers or servicing tables. This also helps to explain why males report more lacerations and burns incurred while doing such duties as food preparation and cooking, and females sustain more contusions in the dining area. The difference found between the sexes for the nature or diagnosis of injury is consistent with other studies.^{6,23}

Previous studies have shown that grease burns are the most severe injuries that take place in this industry.^{7,10} Our finding that nearly half of all burn injuries involved hot grease supports these previous findings. Interventions to prevent burns include

improved training and ensuring that grill-cleaning appliances (eg, grill screens, bricks, and scrapers) be equipped with handles and used only with gloves.¹⁰ Another major contributor to burns in fast food restaurants is the process for changing grease in deep fryers and their exhaust filters. Some of the recommendations for safer work practices in this area have included allowing grease to cool before carrying it, wearing appropriate gloves and foot protection at all times, having secure lids on all grease containers, and using deep fryers with built-in filtering systems and with the exhaust vents in closer proximity to the fryer.^{10,11}

Additionally, the percentage of falls related to unsafe floor conditions deserves attention. Many falls may have been preventable had the floors been maintained properly. In the Hayes-Lundy study, 11% of the burn injuries resulted from an initial slip on a wet or greasy floor, then subsequent contact with the heat source.¹⁰ In 1991, the CPSC reported 700,000 injuries that required treatment in an emergency department that were associated with slips and flooring mats.²⁹ Furthermore, a study of work-surface related injuries showed that 28% of falls in E&DEs were the result of the work surface.³⁰

There have also been many suggestions for preventing slips and falls. Two factors that have been shown to be effective are slip-resistant work surface materials and proper maintenance of the work area. Recommendations specific to E&DEs include the use of coarse quarry tiles for flooring and frequent cleaning regimens using a grease-cutting agent.^{10,30} Although many establishments use mats around grill and fry areas, when mats become greasy they can become more hazardous than the floor.¹⁰ It is apparent that some type of modifications to current procedures are needed; these suggestions may be a good beginning.

When examining the many hazards that adolescents face in the fast food sector, the lack of training provided to the youth is startling.^{7,31} Increases in training, proper supervision, and safety practices could help to prevent many of the injuries that adolescents suffer. Further research is needed to both develop and evaluate safety and health training specific to adolescents working in restaurants, and in fast food restaurants in particular. Restaurant managers and employees must be informed about the appropriate upkeep of flooring for a safe work environment, including the use of grease-cutting agents on floors and proper footwear for employees, and other burn prevention strategies, such as safer methods of grease filtration.

In summary, this research demonstrates the magnitude of the injury problem and hazards adolescents experience while working in fast food restaurants. Because this research focuses on youth, many of whom may be working for the first time, they may not be familiar with occupational hazards and the safety standards that are in place for their protection. Therefore, interventions should include efforts to increase awareness in the areas of workplace safety standards, engineering controls to address task-specific risk factors, and changes in administrative practices that could help reduce the severity and incidence of adolescent occupational injury.

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When to Date

When it comes to dating, timing is everything. The kind of man's face a woman finds attractive varies with her menstrual cycle, according to a study in the journal *Nature* that underscores the hold biology still has on us, no matter how highly evolved we like to think we are. When a woman is ovulating or ready to conceive, she is likely to prefer men with more masculine features. When she is menstruating or least likely to get pregnant, she is apt to prefer softer, more feminine looks. These findings suggest that a man who gets rejected by a woman might have more success if he asked her out again in a week or two.

—Schogol M. Personal Briefing. *Philadelphia Inquirer*, June 28, 1999, p C3

EDITOR
Paul W. Brandt-Rauf, MD, ScD, DrPH
Columbia University
New York, NY

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ORIGINAL ARTICLES

- Predictors of Occupational Low Back Disability: Implications for Secondary Prevention** 1024
Michael Feuerstein, PhD, Steven M. Berkowitz, PhD, and Grant D. Huang, MS
- An Ergonomics Program Designed to Reduce the Incidence of Upper Extremity Work Related Musculoskeletal Disorders** 1032
Edward J. Bernacki, MD, MPH, Jill A. Guidera, RN, BSN, John A. Schaefer, MFS, Robert A. Lavin, MD, and Shan P. Tsai, PhD
- Detection of Methyl Ethyl Ketone in Urine Using Headspace Solid Phase Microextraction and Gas Chromatography** 1042
Jui-Shu Chou, MS, Tung-Sheng Shih, ScD, and Chi-Ming Chen, PhD
- A Clinical and Immunologic Study to Assess Risk of TMA-Induced Lung Disease as Related to Exposure** 1048
Leslie C. Grammer, MD, Martha A. Shaughnessy, BS, Bruce D. Kenamore, MD, and Paul R. Yarnold, PhD
- Fatal Injuries in the United States Construction Industry Involving Cranes 1984-1994** 1052
Anthony Suruda, MD, MPH, Diane Liu, MStat, Marlene Egger, PhD, and Dean Lillquist, PhD
- Support Groups for Injured Workers: Process and Outcomes** 1059
Javier Mignone, MHSA, and Tee L. Guidotti, MD, MPH
- Improving Readiness and Fitness of the Active Military Force through Occupational Medicine Tenets** 1065
Stephen E. Popper, DO, PhD, MPH, Michael S. Yourkavitch, SSgt, USAF, Bradford W. Schwarz, Maj, USAF, BSC, Mark W. Wolfe, MSgt, USAF, Mark McDaniels, TSgt, USAF, S. Todd Hankins, TSgt, USAF, and Theodore E. Curtis, SSgt, USAF
- Structure and Function of Occupational Health Services Within Selected Department of Energy Sites** 1072
Mary K. Salazar, EdD, RN, Timothy K. Takaro, MD, MPH, MS, Kathy Ertell, MS, Michael Gochfeld, MD, PhD, Sally O'Neill, MN, RN, Catherine Connon, PhD, RN, and Scott Barnhart, MD, MPH
- A Meta-Analysis of Risk Estimates for Prostate Cancer Related to Tire and Rubber Manufacturing Operations** 1079
Ronald E. Stewart, MS, Leslie K. Dennis, PhD, Deborah V. Dawson, PhD, and Martin I. Resnick, MD
- Chest Illnesses and the Decline of FEV₁ in Steelworkers** 1085
Daniel E. Banks, MD, Anuradha A. Shah, MD, Marco Lopez, MD, and Mei-lin Wang, MD

Continued on Next Page

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A Case-Control Study of Lung Cancer Among Refinery Workers 1091
Kim Rosamilia, PhD, Otto Wong, ScD, and Gerhard K. Raabe, DrPH

Effects of Fire Fighting Uniform (Modern, Modified Modern, and Traditional) Design Changes on Exercise Duration in New York City Firefighters 1104
K. S. Malley, MA, Lt, A. M. Goldstein, MD, T. K. Aldrich, MD, K. J. Kelly, MD, M. Weiden, MD, N. Coplan, MD, M. L. Karwa, MD, and D. J. Prezant, MD

The Effect of Male Occupational Exposure in Infertile Couples in Norway 1116
Ågot Irgens, MSc, Kirsti Krüger, MSc, and Magnar Ulstein, MD, PhD

Effect of Workplace Smoking Policies on Smoking Cessation: Results of a Longitudinal Study 1121
Lois Biener, PhD, and Amy L. Nyman, MA

Abnormal Liver Function in Workers Exposed to Low Levels of Ethylene Dichloride and Vinyl Chloride Monomer 1128
Tsun-Jen Cheng, MD, ScD, Mei-Lan Huang, MS, Nai-Chieh You, MS, Chung-Li Du, MD, PhD, and Tang-Tat Chau, MD

Mortality in a Cohort of Toluene Exposed Employees (Rotogravure Printing Plant Workers) 1134
Hans Wiebelt, PhD, and Nikolaus Becker, PhD

An Analysis of Occupational Homicides Involving Workers 19 Years Old and Younger 1140
Christopher Allen Janicak, PhD

Adolescent Occupational Injuries in Fast Food Restaurants: An Examination of the Problem From a National Perspective 1146
Kitty J. Hendricks, MA, and Larry A. Layne, MA

Mortality Study of Two Overlapping Cohorts of Photographic Film Base Manufacturing Employees Exposed to Methylene Chloride . . . 1154
F. Terry Hearne, MS, and James W. Pifer, MA

DEPARTMENTS

Letters to the Editor
Lower Back Pain Management in Injured Workers 1021

General
People and Events 1170
Calendar of Meetings 1171
Book Review 1172

Annual Index: Volume 41
Subject Index 1173
Author Index 1180

POSTMASTER

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