

Work-Related Injuries in the Meatpacking Industry

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National Institute for Occupational Safety and Health (NIOSH) surveillance efforts are directed towards identifying and studying high-risk industries. This research describes injuries and worker characteristics and suggests how these injuries may be prevented in one industry—the meatpacking industry. This industry has maintained the third highest injury rate among all U.S. manufacturing industries from 1976 through 1985. According to NIOSH data, 25 workers died from work-related injuries during 1980–1985. Injury data from the Bureau of Labor Statistics Supplementary Data System show that 76% of injured workers suffered strains, sprains, lacerations, contusions, or abrasions. The two major types of injury are: Struck by or against objects (25%) and overexertion including lifting, pulling, and throwing (31%). Handtools are involved in almost one half of all injuries. The occupations of over half of all injured workers are meat cutter (49%), butcher (2%), and packer and wrapper (4%). These findings suggest aiming preventive efforts towards workers in these jobs. However, more comprehensive and detailed surveillance systems are needed to further study workers at risk and evaluate preventive efforts.

The National Institute for Occupational Safety and Health (NIOSH) surveillance efforts are directed towards describing industries in which there is a high risk of injury. Although national information on work-related injuries is limited, what is available can be used to identify injury trends and target areas for further study. This paper provides information on work-related deaths in one industry (meatpacking) by using a new source of national fatality data. It also updates information from an earlier NIOSH report (Pezaro, Leffingwell, & Ma-

haffey, 1985) which identified meatpacking as a high-risk industry.

DATA SOURCES

Three data sources were used to investigate fatal and nonfatal injuries in the meatpacking industry. The National Traumatic Occupational Fatality data base (NTOF) (Division of Safety Research, NIOSH, 1988) provides data on work-related deaths. The Bureau of Labor Statistics (BLS) Annual Survey of occupational injuries and illness in the U.S. (1982, 1983, 1984, 1985) and Supplementary Data System (1982, 1983, 1984) both provide information on injuries in specific industries. These data sources can be

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used to describe potential risk factors for injury to workers in the meatpacking industry.

The NTOF provides new national information on work-related traumatic deaths in the United States. Death certificates are used as a source for this data base. Death certificates are included in the system if they meet the following criteria: "Injury at work" item on death certificate is checked yes, underlying or contributory cause of death (International Classification of Diseases, 9th Revision) is external, and age at death is 16 years or older. Occupation is coded by the 1980 Census Index of Industries and Occupations, industry is classified by the 1972 Standard Industrial Classification (SIC) (Office of Management and Budget, 1972), and external cause of death is categorized by injury description.

The BLS annual survey provides incidence rates based on a national stratified random sample of approximately 280,000 private-sector establishments in the United States. Workers in companies that have less than eleven employees, public-sector employees, and self-employed workers are excluded from this sample. All injuries recorded on each company's OSHA 200 log (required by the Occupational Safety and Health Administration) are supposedly reported; by definition, these include injuries resulting in medical treatment beyond first aid, loss of consciousness, lost work time, or restricted job activities. The BLS defines occupational injuries as injuries "which result from a work accident or from exposure involving a single incident in the work environment." Injury rates are calculated based on employees working 40-hour weeks and 50 weeks per year, but are reported as rates per 100 employed persons. Rates are reported by industry and are not specific for occupation or other worker characteristics.

The SDS provides information on nature of injury, external cause, occupation, and body part injured. The SDS uses the Census codes for occupation of worker, the SIC codes for industry, and the American National Standards Institute Z16.2 standard (ANSI, 1962) for injury characteristics.

SDS data are obtained from states that voluntarily supply workers' compensation claim information to the BLS. In most states

all public-sector employees and self-employed persons who are injured are excluded. Definitions of injury and reporting criteria vary from state to state as shown in Table 1.

RESULTS

A descriptive analysis of these data sources yielded the following profile of occupational traumatic injuries in the meatpacking industry.

Incidence

The meatpacking industry (SIC 2011) has the third highest injury rate among all U.S. manufacturing industries; this rank has persisted from 1976 through 1985. The annual BLS survey shows an average incidence rate of 27.6 injuries per 100 workers per year during 1982–1985. This rate is slightly lower than the rate (31.4 per 100 workers per year) reported for 1976–1981 (Pezaro et al., 1985). The average annual incidence rate for lost-work-day injuries is also lower (13.5 per 100 workers) than during 1976–1981 (15.0 per 100 workers). During 1982–1985 an average of 145,000 people were employed in the meatpacking industry each year.

Mortality

Information for fatally injured workers is limited to death certificate data included in the NTOF. Twenty-five such deaths were identified for the meatpacking industry during 1980–1985. The average annual rate is almost 3 deaths per 100,000 workers. The distribution of death varies by occupation: meat cutters account for 13%; meat packers, 13%; maintenance workers, 28%; truck drivers, 13%; and truck loaders, 4%. The causes of death include one electrocution, three falls, two unintentional stabbings, three intentional firearm wounds, and eight motor-vehicle-related deaths. Other deaths are primarily caused by blunt force trauma resulting in crushing injuries. There is no pattern by age distribution, and only one woman died.

Morbidity

The findings on nonfatal injuries are based on the workers' compensation infor-

TABLE 1
CRITERIA FOR RECORDABLE WORKERS' COMPENSATION CLAIMS IN STATES PARTICIPATING IN
SUPPLEMENTARY DATA SYSTEM, 1982-1984

State	Criteria
Alaska	Death or injury
Arizona	All injuries
Arkansas	Death or injury
California	Death or "serious injuries" or 1 day lost time or more than first aid required
Colorado	Death or injury with 3 or more lost-time days
Delaware	Death or injury
Hawaii	Death or at least 1 lost work day
Indiana	Disability of 1 day or more
Iowa	Disability of more than 3 days
Kentucky	Disability of 1 day or more
Maine	All injuries (did not participate in 1984)
Maryland	Disability of more than 3 days
Michigan	Death or disability of at least 1 week, "specific losses"
Minnesota	Death or serious injury or disability of at least 3 days
Mississippi	Disability of 1 day or work shift
Missouri	Death or injury with 3 or more lost-time work days in 1982-1983; changed to death or injury in 1984
Montana	All injuries
Nebraska	Death or injury
New Mexico	All injuries
New York	All injuries
North Carolina	Disability of 1 day or more
Oregon	"Serious" injuries
Tennessee	Disability of at least 1 week
Utah	All injuries
Vermont	Disability of at least 1 day and requiring medical care
Virginia	All injuries
Washington	All injuries requiring medical attention
Wisconsin	Disability of more than 3 days
Wyoming	All injuries

mation reported by states and included in the SDS. During 1982–1984, the 29 states listed in Table 1 participated in the SDS.

The data show that 86% of the injured workers are men. The two primary types of injuries (struck by/against objects and overexertion) vary according to gender. About 28% of women are injured by an object compared to 45% of men. However, almost 44% of injured women have overexertion injuries compared to only 29% of men. This difference may reflect different work-related tasks.

The distribution of injuries by age reveals that 55% of the injured workers are between 20 and 34 years of age. Almost 23% are 20 to 24 years old, and only 5.3% of injured workers are over 54 years old. Age is unknown for 9% of all injured workers. There is no significant difference between men and women in the age distributions of injured workers.

The occupation of injured workers is important to consider when studying work-related injuries. Over half of all injuries reported during 1982 to 1984 occurred to butchers (2%), meat cutters (49%), and meat packers and wrappers (4%). Material handlers (7%), laborers (9%), and operatives (7%) account for almost one quarter of injuries. Because certain occupations account for proportionately more injuries, meat cutters, butchers, packers, and wrappers are evaluated in more detail. Thirty-one percent of the injuries to these workers are lacerations. Butchers receive lacerations for almost 55% of their injuries; cutters, 40%; wrappers, 21%; and packers, 9%. Strains and sprains account for 34% of all injuries to this occupational group. Strains and sprains accounted for 21% and 26% of all injuries to butchers and cutters compared to 45% for meat wrappers and packers.

Injury characteristics are important to evaluate in terms of treatment and secondary prevention. Table 2 shows the distribution of nature of injury. Strains, sprains, lacerations, contusions, and abrasions are the most frequent injuries (76%). Inflamed joints account for almost 9% of reported injuries, and only about 5% of injuries are fractures or dislocations. The nature of injury patterns are similar to those reported for

TABLE 2
PERCENTAGE DISTRIBUTION OF NATURE OF
INJURY REPORTED BY WORKERS IN THE
MEATPACKING INDUSTRY, SUPPLEMENTARY
DATA SYSTEM, 1982–1984

Nature of Injury	%
Strain/sprain	32.7
Laceration	30.9
Contusion/abrasion	13.0
Inflamed joints	8.6
Dislocation/fracture	4.8
Burn (chemical/scald/welder flash)	2.5
Multiple injuries	1.4
Hernia rupture	1.3
Amputation	0.6
Concussion	0.2
Electric shock/cold injury/heat stroke	0.1
Not classified/other	3.9
Total	100.0

1976–1981, except for “inflamed joints” which previously accounted for only 5% of all injuries (Pezaro et al., 1985).

The distribution of injury by body part is shown in Table 3. The body parts involved in 50% of all injuries are the arm, hand (including fingers), and back. Over 22% of all injuries involve fingers. The back is involved in 15%.

Because of their serious and permanent nature, amputations are evaluated in detail. The reports show that over 93% of amputations involve fingers (although three hands, one arm, two toes, and two feet were also lost). Meat cutters and butchers account for over 30% of all amputations in meat packing workers; machinists account for over 10%; operatives for over 8%; and heavy equipment mechanics for over 7%.

Lacerations and strains/sprains are also

TABLE 3
PERCENTAGE DISTRIBUTION OF BODY PART
INJURED REPORTED BY WORKERS IN THE
MEATPACKING INDUSTRY, SUPPLEMENTARY
DATA SYSTEM, 1982-1984

Body Part	%
Finger	22.5
Back	15.5
Arm	11.7
Leg/hip (excluding knee)	9.4
Hand	8.6
Wrist	7.2
Shoulder	5.2
Multiple	4.6
Abdomen/trunk	3.6
Knee	2.8
Eye	2.6
Head/brain (excluding eye)	2.3
Chest	2.2
Neck	1.1
Not classified/other	0.7
Total	100.0

evaluated in more detail because they constitute a major proportion of all injuries. Lacerations involve arms, wrists, hands, and fingers about 83% of the time. In almost 55% of all lacerations, fingers are involved. For strains and sprains, 42% involve the back and 10% involve the shoulder; in fact, 87% of all reported back injuries are sprains or strains.

Table 4 shows the distribution by type of accident (external cause). Of all injured workers, 44% are struck by or against an object and 33% are injured by lifting, pulling, throwing, or overexertion. The "source of injury" also varies. Hand tools are asso-

ciated with 47% of injuries with known sources; knives (a type of handtool) alone account for about 19% of all injuries. Over 6% of injuries are associated with the "floor or ground". "Animals and their products" are involved in over 6% of all injuries.

DISCUSSION

The occupations associated with the most injuries in the meatpacking industry are butcher, meat cutter, meat wrapper, and packer. One reason may be the large proportion of these workers employed in this industry. The majority of their injuries are strains, sprains, lacerations, and contusions; the body parts commonly injured are the wrist, hand, and finger. These clinical findings are consistent with their job tasks—using hand tools, especially knives, and manipulating large animal carcasses. This information suggests preventive efforts should be targeted at decreasing injury occurrence among these workers.

In the meatpacking industry, contact

TABLE 4
PERCENTAGE DISTRIBUTION OF ACCIDENT
TYPE REPORTED BY WORKERS IN THE
MEATPACKING INDUSTRY, SUPPLEMENTARY
DATA SYSTEM, 1982-1984

Accident Type	%
Struck by/against object	44.4
Overexertion/lifting/pulling/throwing	32.6
Working surface	5.0
Caught in/under collapsing material	2.3
Falls	2.2
Temperature (hot or cold)	1.6
Motor-vehicle-related	0.8
Electricity	0.1
Not classified/other	11.0
Total	100.0

with handtools—especially knives—appears responsible for causing a large proportion of all injuries (Myers & Trent, 1988). However, the ANSI system of injury coding does not identify the external cause of injury. As a proxy, “accident type” is used to identify the event resulting in injury or how the object (source of injury) contacts the person. Another limitation is that the ANSI “nature of injury” categories include energy agents and injury outcomes (such as loss of function) in addition to injury descriptions. These attributes of the ANSI coding system inhibit descriptions of external cause or nature of injuries based on work-related injuries reported in the SDS.

In the meatpacking industry, the external cause associated with fatal injury differs from nonfatal injury; motor vehicle-related injury is more often a cause of death than a cause of nonfatal injury. This may occur because there is a greater magnitude of energy concentration with motor vehicle-related injuries, resulting in more severe injuries not compatible with life. Motor vehicle-related deaths may even be underreported in the NTOF because of the criteria for death certificate inclusion (Broberg, 1984). A prevention program designed to reduce injuries in the meatpacking industry may not decrease the deaths because the external causes vary for nonfatal and fatal injuries. This should be considered when developing injury prevention programs in meatpacking plants.

Although the BLS surveillance systems can be used to evaluate time trends, they have some limitations in this area as well. The data show an apparent decrease in injury rate incidence during 1982 to 1985 compared to 1976 to 1981. However, the annual survey is sensitive to reporting variation and the decrease may reflect changes in reporting. One incentive for underreporting is the change in OSHA policy that prevents inspections if an employer has an injury rate below average for its three-digit SIC. Other limitations of using data collected for OSHA are addressed by a report supported by the Department of Labor (Pollack & Keimig, 1987).

Similarly, the states in the SDS participate voluntarily and may change their re-

porting criteria, compensation criteria, and information collected over time. It is unlikely that all injuries are reported voluntarily. Worker's compensation claims are collected not for injury research, but in response to economic concerns of employers, legal responsibility to provide a safe work environment, and worker recognition of risk (Bale, 1988). Another researcher (Robinson, 1988) has noted that economic factors such as hiring rate, productivity, and labor and management relations affect injury rates in manufacturing industries. SDS data are restricted to participating states. If injury incidence varies by geographic location of plant, then these data may not be representative of all meatpacking plants.

It is not possible, using these surveillance systems, to evaluate the impact of nonfatal injuries upon a worker's quality of life or work production. For example, a worker suffering finger amputation would have a *moderate* injury based on the Abbreviated Injury Scale (American Association for Automotive Medicine, 1985). Although some states participating in the SDS include extent of disability information as a proxy for injury severity, there are limitations to these data. First, it is only reported by states submitting “closed cases” to the BLS. In the meatpacking industry, during 1982–1984, only 25% of injury claims had this information. Second, extent of disability is not an accurate measure of injury severity; it is influenced by the worker's job requirements, company policy, and other variables besides the anatomical or functional severity of the injury.

In conclusion, this study confirms earlier research (Broberg, 1984; Carlsson, 1984; Pezaro et al., 1985) suggesting that injury prevention efforts in the meatpacking industry should be directed towards butchers, meat cutters, meat packers, and wrappers. These workers either use knives or handle heavy pieces of meat during work. This research provides clues as to which injuries occur most often. Because the meatpacking industry has remained a high risk industry over the past 10 years, it deserves to be a high priority industry to initiate preventive programs. However, on-site surveillance sys-

tems (Klaucke, Buehler, Thacker et al., 1988) are needed to further study workers at risk and evaluate preventive efforts.

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