DHS | Putting Data to Work
Oregon Worker Illness and Injury Prevention Program (OWIIPP)
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Oregon Department of Human Services,
Public Health Division,
Office of Environmental Public Health
Toxicology, Assessment & Tracking
Services Section (TATS)

800 NE Oregon Street #640
Portland, OR 97232

Phone: 971-673-0977
Fax: 971-673-0979

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Burn Injuries

Introduction

Tracking the number of and preventing occupational burn injuries is a priority in Oregon because the number of work-related burn injuries in the state has remained relatively constant since 2000. In addition, these injuries result in thousands of dollars in health care costs and lost days at work and in some cases can result in death. Occupational burn injuries are preventable with appropriate education, worker training, personal protective equipment (PPE), engineering and administrative controls, and safe work practices.

This issue of "Putting Data to Work" provides partners with a scope of the problem summary, epidemiological data in Oregon, information about burn injuries, case summaries, and strategies and resources to prevent work-related burn injuries.

Scope of the problem

Work-related burns are a leading cause of occupational injury in the United States.[1-3] An estimated 20 to 30 percent of all hospitalizations due to burn injuries result from workplace exposures.[4]

Treating burn injuries can take long periods of time and is expensive. An unpublished analysis conducted by the Oregon Worker Illness and Injury Prevention Program (OWIIPP) using Oregon worker compensation medical encounter data* showed that the average cost per burn claim was $7,554 and the median cost per burn claim was $1,054 between 2004 and 2006 in the state.

* Insurance companies and self-insurers with at least 100 accepted disabling claims are required to report medical data within 45 days of the end of each quarter.

OWIIPP STAFF

Jill Brackenbrough
Office Specialist

Jae Douglas, PhD, MSW
TATS Section Manager

Mandy Green, MPH
Epidemiologist

Lauren Karam, MPH
Program Coordinator

Russ Reasoner
Industrial Hygienist

Jaime Walters, MPH
Research Analyst

NIOSH National Institute for Occupational Safety and Health
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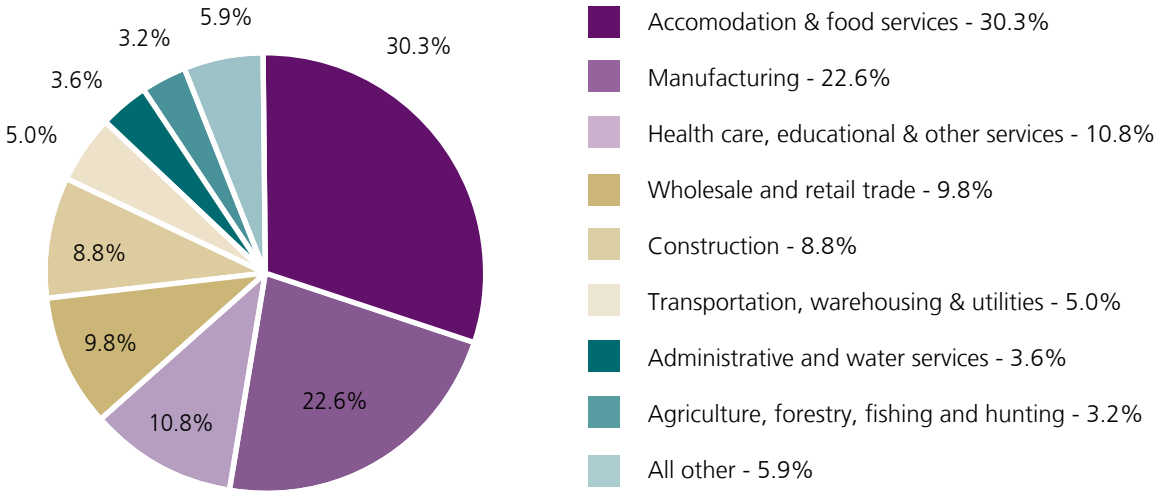
Epidemiological Data

Using data from the Information Management Division of the Oregon Department of Consumer and Business Services (DCBS), OWIIPP analyzed occupational burn injuries in Oregon from 2001 – 2006† to understand where and how often these injuries occur.

During this period, 1,570 work-related burn injuries were reported to DCBS. Figure 1 shows the percent of burn injury claims by industry during this period. The accommodation and food services industry, which includes hotels, motels, resorts, and restaurants, accounted for 475 work-related burns or 30.3 percent of burn injury claims. Manufacturing, which includes food production, and metal and wood manufacturing, ranked second with 22.6 percent of the claims.

FIGURE 1: PERCENT OF BURN INJURY CLAIMS BY INDUSTRY IN OREGON, 2001 – 2006



About OWIIPP

The Oregon Worker Illness and Injury Prevention Program (OWIIPP) in the Oregon Department of Human Services, Public Health Division has been identifying and preventing work-related illnesses, injuries and deaths for nearly 20 years. Through funding from the Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health (NIOSH), the program conducts surveillance to identify patterns of illness and injury. OWIIPP also works with partners to address concerns related to priority conditions, populations, occupations and industries.

OWIIPP focuses on burn injuries, acute pesticide poisonings, work-related asthma, musculoskeletal disorders and other illnesses and injuries. The program is currently collecting data on 19 occupational health indicators, which are measures of work-related illnesses, injuries or factors associated with worker health. Examples include counting the number of work-related deaths and work-related pesticide poisonings. OWIIPP is also conducting work-related burn injury surveillance and working with partners to reduce the number of burn injuries in the workplace.

The most common sources of work-related burns between 2001 and 2006 were:

» Hot steam, vapor and liquid (20 percent of all reported burns);

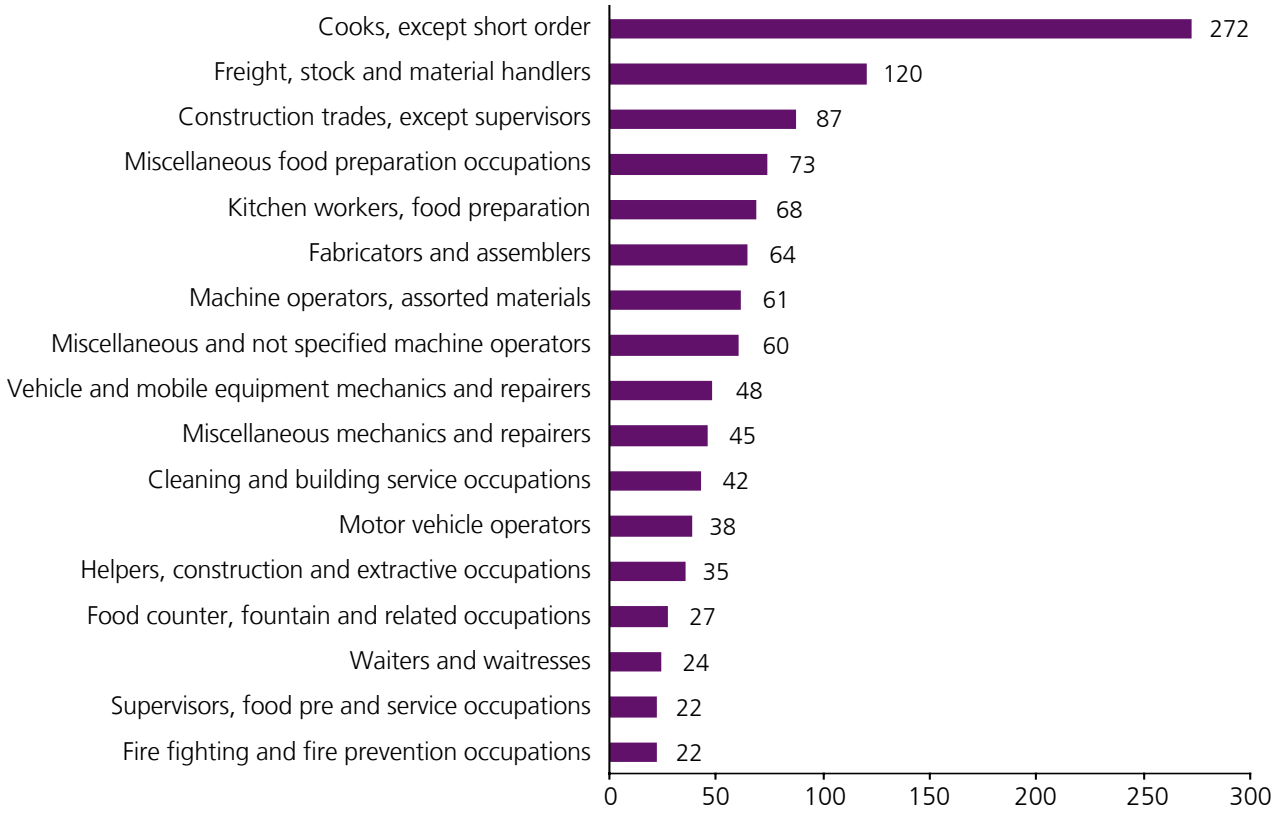
» Chemicals and chemical products (18 percent);

» Hot oil and fat (13 percent); and

» Fire, flame and smoke (10 percent).‡

The frequency of burn claims by occupation appears in Figure 2. Cooks were most likely to have on-the-job burns (17 percent of all claims), and freight, stock and material handlers followed with 8 percent of all claims.

FIGURE 2: OCCUPATIONS REPORTING 20 OR MORE DISABLING BURN CLAIMS IN OREGON, 2001 – 2006



Between 2001 and 2006, 11 percent of workers with burns required hospitalization; 85 percent of these workers were men.

For the same time period, 11 workers died from on-the-job burn injuries in Oregon. Six of these deaths were caused by fire, four were due to vehicle crashes, and one was due to a chemical burn. Three of the 11 deaths were workers in the manufacturing industry, and three in the agriculture, forestry, fishing and hunting industry.

† Data are from the Information Management Division of the Oregon Department of Consumer and Business Services (DCBS), which collects workers' compensation claims from insurers in Oregon. These data represent accepted disabling claims for burn injuries occurring from 01/01/01 – 12/31/06. A claim is accepted when the insurance company agrees to pay for the claim. Disabling status is defined by missing three or more days of regularly scheduled work, hospitalization, or possibility of permanent disability.
‡ Not all burns were classified with source category.

Description of burn injuries

Burns are injuries caused by heat, cold, electricity, chemicals or radiation. Occupational burn injuries are those that occur "on-the-job." Burn injuries can be very serious causing scarring and nerve damage and in some cases death. Burns are classified by level of involvement of the skin and underlying structures on a scale of first-degree to sixth-degree. The following table describes this scale:

TABLE 1: A DESCRIPTION OF TYPES OF BURN INJURIES

Degree	Affected Layer of Skin	Symptoms	Healing	Life threatening
First-degree	Epidermal	Redness, swelling, white patches at site of injury	10 days with little scarring	No
Second-degree: superficial	Epidermal and upper portion of dermal layer	Red, moist, may blister, skin may peel; minimal nerve damage	If not infected, heals in 10 days; minimal nerve damage	No
Second-degree: deep	Epidermal and dermal	Like second-degree: superficial but whiter appearance and less pain due to nerve damage	If not infected heals in 10 days; more nerve damage	No
Third-degree	Epidermal, dermal and subcutaneous tissue	Hard, leather-like scabs, purple fluid and no sensation or pain at burn site	Usually involves surgery to aid healing and prevent infection; can destroy blood vessels and nerves	Yes, if burn is over a large area
Fourth-,fifth-, and sixth-degrees	Epidermal, dermal, subcutaneous and tissues under subcutaneous layer (e.g., muscle, bone)		Surgery is required and long-term therapy; depending on degree, skin, muscle, or bone is permanently damaged or lost	Yes

FIGURE 3: TYPES OF BURN INJURIES

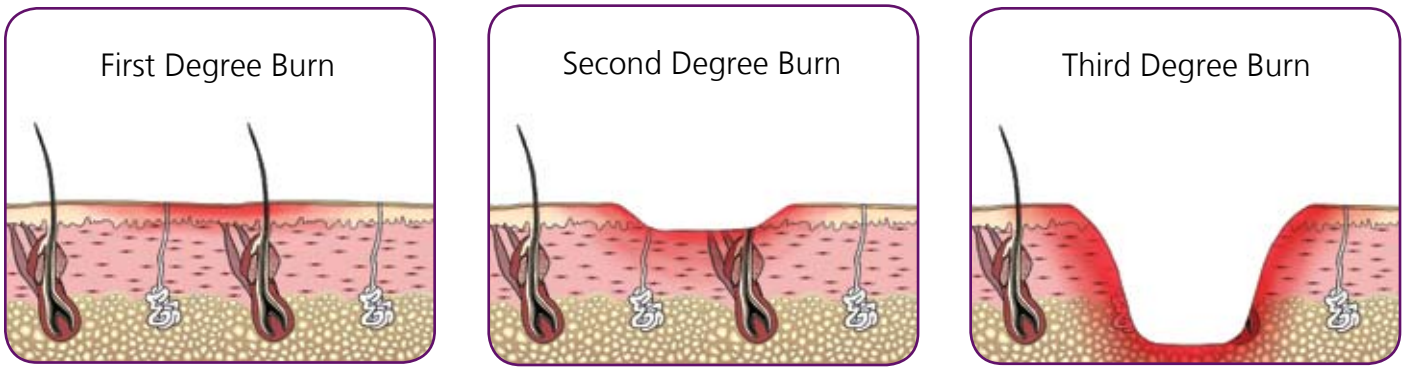


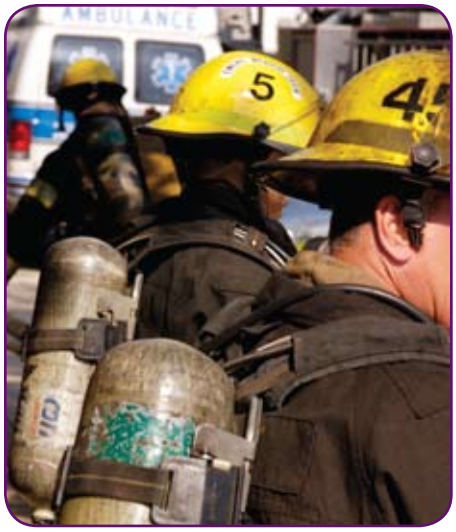
Figure developed by the Construction Safety Association of Ontario based on an image from the National Institute for Occupational Safety and Health.

Case summaries

CASE 1 – BURN AT A FAST FOOD RESTAURANT

A 20-year-old employee of a fast food restaurant sustained a burn injury while on-the-job. The employee had been following the restaurant's standard procedure for cleaning exhaust filters located approximately 5 feet above a deep fryer. She had placed a wooden cover over three of the fryer's four bins, all four of which contained hot grease; no cover was available for the fourth bin. While standing on a chair she had placed on the wooden cover to reach and remove the filters, she fell, sustaining second- and third-degree burns over 10 percent of her body when she immersed her arm and shoulder in the hot grease contained in the uncovered fourth bin. She was hospitalized for four days and later required plastic surgery for scarring.[2]

CASE 2 – OXYGEN REGULATOR BURNS FIRE FIGHTER



A 41-year-old male fire fighter (the victim) was severely burned when an oxygen regulator flashed while he was performing a routine check of the equipment. The victim had just started his morning shift, and was performing the daily routine equipment check on the engine to which he was assigned. Checking through the equipment, he pulled the airway supply bags from the engine airway equipment compartment. Department procedures required him to open the oxygen cylinder post valve, check the cylinder's pressure to verify it was sufficiently full for service, close the cylinder's post valve, and then release the oxygen remaining in the regulator. As the victim lifted the oxygen cylinder from the airway supply bag, he opened the oxygen post valve and the system immediately flashed, releasing two 4-foot flames from the regulator. His clothes ignited from the waist up as he turned and fell to the ground. Fire fighters who were washing the engine witnessed the incident and used a garden hose to extinguish the flames. On-duty fire fighters/paramedics administered medical treatment to the victim, who received first-, second- and third-degree burns over 36 percent of his body. He was transported to a local trauma center from where he was later airlifted to a burn center.[5]

Prevention recommendations

Many of the burn injuries that happen at work can be prevented. Employers can help prevent and reduce the number of work-related burn injuries by establishing workplace safety programs and eliminating/reducing hazards and exposure to chemicals. This section highlights prevention activities for employers.

HAZARD ASSESSMENT

A hazard assessment is the first step in preventing injuries at work. A hazard assessment is the process of identifying workplace hazards, like sources of burns, to prevent employee injuries. Assistance is available for those needing to conduct a hazard assessment. For a confidential and free consultation, contact the Oregon Occupational Safety and Health Division (OR-OSHA) at www.orosha.org/forms/consufrm.html. In addition, workers' compensation insurance companies or private safety and health professional firms may be helpful. The information acquired from a hazard assessment for burns is critical to develop and implement the second step — a burn prevention strategy.

SELECTING A STRATEGY

Selecting a prevention strategy is the next step in preventing injuries at work. A prevention strategy is a plan or approach to eliminate or reduce a hazard or exposure. Because there are a variety of burn prevention strategies, an employer should identify the hazard(s) or exposure(s) that they want to reduce or eliminate. Next they should evaluate the different types of workplace prevention controls as well as customize the strategy to fit the needs of their business or industry.

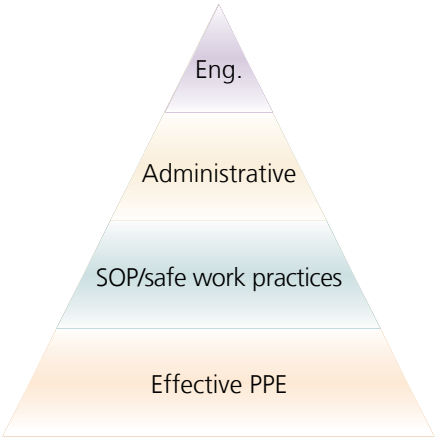
THE HIERARCHY OF CONTROL PRINCIPLE

Every burn prevention strategy should incorporate all or some parts of the hierarchy of control principle (see Figure 4). The hierarchy of control is used throughout the safety and health professional community to ensure that cost-effective hazard controls are utilized.

There are four parts that comprise the hierarchy of control:

- Engineering controls (e.g., elimination, substitution, process modification, ventilation);
- Administrative controls (may include safe work practices, e.g., scheduling, management of program, limiting personnel);
- Safe work practices (e.g., clear expectations, defined/approved procedures); and
- Personal protective equipment (PPE).

FIGURE 3: HIERARCHY OF CONTROL



Engineering controls

Engineering controls eliminate or reduce exposure to a hazard through the use or substitution of engineered machinery or equipment.[6] Common activities include replacing worn or out-of-date machines or materials, scheduling maintenance, etc. Engineering controls are usually the most cost-effective over a 20- to 30-year period, but may require an initial output of money. Engineering controls also are considered to be designed to reduce the amount of supervision once the operator is properly trained.

Administrative controls/safe work practices

Administrative controls (or safe work practices) are changes in work procedures such as written safety policies, rules, supervision, schedules, etc.[7] Examples of these types of activities include encouraging employees to follow company safety rules, labeling hazards, training supervisors, and conducting prompt investigations of work-related burn incidents.

Personal protective equipment

Personal protective equipment (PPE) refers to protective clothing, helmets, goggles or other gear designed to protect the wearer's body or clothing from injury by electrical hazards, heat, and chemicals.[8] PPE can be used as an effective barrier, but only after a proper hazard assessment to identify the types of PPE needed to perform the job.

It is also important that the employer do the following things to maximize the benefits of PPE:

- Maintain and replace protective equipment;
- Make the equipment readily available to employees;
- Fit employees for PPE; and
- Train employees to use their PPE properly.

For more information, see Oregon OSHA's Web site at www.orosha.org/subjects/personal_protective_equipment.html and the "PPE Hazard Assessment" fact sheet at www.orosha.org/pdf/pubs/fact_sheets/fs03.pdf.

Usually, engineering and administrative controls need to be considered first before using PPE.

IMPLEMENTING AND EVALUATING THE STRATEGY

The final steps in preventing work-related injuries are implementing and evaluating the prevention strategy. The key components of implementation are identifying activities (i.e., who does what and how) and resources (i.e., what are you going to need and when).

Evaluating the prevention strategy (i.e., how to track what you are doing to see if it makes a difference) and modifying the strategy to increase its effectiveness are important steps toward reducing workplace injuries. A burn prevention plan will have a greater impact if it is implemented effectively and evaluated on a regular basis.

Conducting a hazard assessment and developing, implementing and evaluating a burn prevention strategy that incorporates all or parts of the hierarchy of control model will help prevent employee burn injuries.

Conclusions

Occupational burn injuries are preventable. While the overall number of work-related burns has remained fairly constant in Oregon, workers in certain industries, occupations, and special populations are disproportionately affected by these injuries. Efforts to raise awareness about occupational burns should be continued. Also, groups should continue efforts to develop and implement prevention strategies that are geared toward high-risk industries, occupations, and populations (e.g., young workers).

Additional resources

Additional information about burn injuries, emergency treatment and worksite prevention strategies can be found at the Web sites listed below. A complete list of resources can be found at www.oregon.gov/DHS/ph/owiipp/index.shtml.

» National Restaurant Association, Emergency Treatment for Burns (pdf) (www.lni.wa.gov/WorkplaceRights/files/EmergencyBurns.pdf)

» OR-OSHA, Fact Sheet: Eyewash and Safety Showers (pdf) (www.orosha.org/pdf/pubs/fact_sheets/fs02.pdf)

Restaurants/Food Preparation Services

» Washington State Department of Labor and Industries, Ten Steps for Avoiding Burns (pdf) (www.lni.wa.gov/IPUB/FSP0-906-000.pdf)

» Burnsurgery.org, Burn Injuries among Restaurant Workers (www.burnsurgery.org/Modules/prevention/highrisk/sec6.htm)

Hot Tar Roofing

» Washington State Department of Labor and Industries, Hazard Prevention, Hot Tar Burns in Roofing (pdf) (www.lni.wa.gov/Safety/Research/Files/TarBurnInjuryFacts.pdf)

» Washington State Department of Labor and Industries, Apprentice Roofer Slips and Falls into Hot Tar (pdf) (www.lni.wa.gov/Safety/Research/Files/ApprenticeSlips.pdf)

Metalwork, Welding and Cutting

» OR-OSHA, Welding Rules (www.orosha.org/subjects/welding.html)

» TWI World Centre for Materials Joining Technology (http://iorw.org/j32k/protected/band_3/jk29.html)

Foundry

» OR-OSHA, Program Directive, PPE: Foundries (pdf) (www.cbs.state.or.us/external/osha/pdf/pds/pd-113.pdf)

Electrical

» OR-OSHA, Electrical Rules (www.orosha.org/subjects/electrical.html)

Chemical use: acids/ bases, flammables, water reactive, peroxides and oxidizers

» CDC, NIOSH, Fatality Assessment and Control Evaluation Program, A boat repairman dies from burns received from a fire caused by an exploding battery (www.cdc.gov/niosh/face/stateface/ca/07ca004.html)

» The University of Vermont, Environmental Safety, Proper Storage of Chemicals (www.uvm.edu/~esf/chemicalsafety/chemicalstorage.html)

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