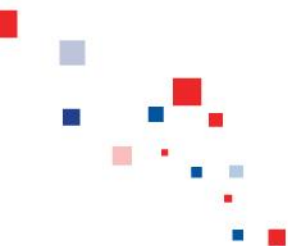
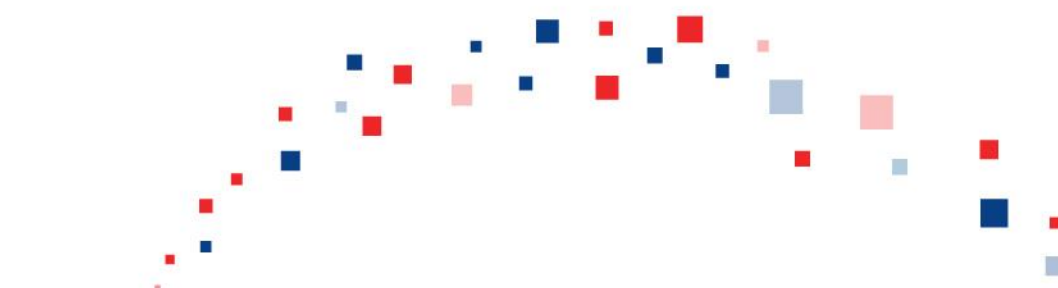
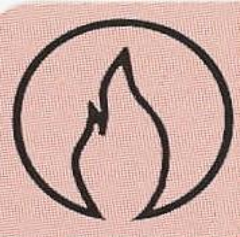


**LEGACY**  
HEALTH



EMANUEL Medical Center	GOOD SAMARITAN Medical Center	MERIDIAN PARK Medical Center	MOUNT HOOD Medical Center	SALMON CREEK Medical Center	
THE CHILDREN'S HOSPITAL Legacy Emanuel		LEGACY MEDICAL GROUP	LEGACY LABORATORY	LEGACY RESEARCH	LEGACY HOSPICE

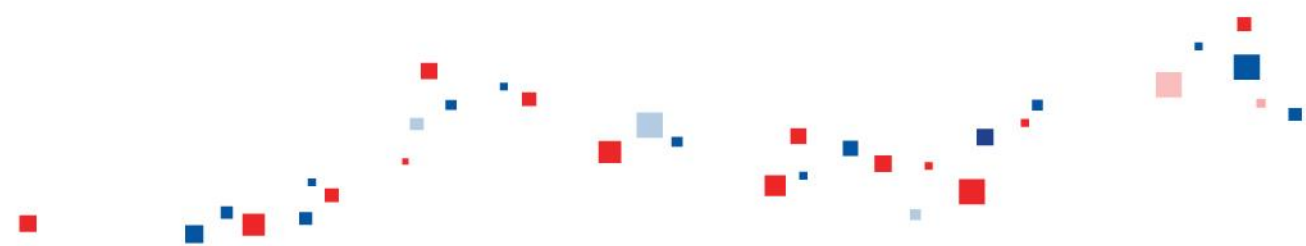


Legacy is yours.



# Electrical Injuries Presentation

Oregon Burn Center  
Legacy Health System



Center	GOOD SAMARITAN Medical Center	MERIDIAN PARK Medical Center	MOUNT HOOD Medical Center	SALMON CREEK Medical Center
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# Oregon Burn Center

- Only burn center in Oregon and SW Washington
- 16 beds, 20,000 square feet
- Regional burn center for 41 years
- Offering experienced burn care, on site therapy, pharmacy and family centered care



# Oregon Burn Center Education and Prevention Program

- ***Sponsored by:***
- PacifiCorp
- IBEW workers
- PGE
- Northwest Natural Gas
- Legacy Emanuel Medical Center







# OBC Team

- Physicians, Nurses, Pharmacy Residents, Nurse Practitioner and Physician Assistants
- Physical and Occupational Therapy
- Chaplain Services
- Social Services
- Nutrition
- Child Life and Art Therapy



# Partners With the OBC

The OBC works with Life Flight and other emergency transports systems to get the patient to appropriate care as quickly as possible.



# Safety at Home







# Burn Injuries in Oregon

- Approximately 400 patients seen per year at the Oregon Burn Center
- 1/3 of the patients are children – most under the age of 5
- Children most often scalded in kitchen
- Adults most often burned while putting accelerants on a heat source
- Hospital length of stay from 2 days to 9 months



Many, many more injuries are seen in ED's, doctors offices or never treated at all



# Children



- Children have thin skin that burns deeper and quicker than an adult.
- Children can receive severe burns at lower temperatures than an adult.
- Children do not perceive danger and have less control over their environment.



# Scald Prevention – Kitchen

- *Don't drink hot liquids while holding a child*
- Pots and pans
  - > Turn handles back away from the stove edge
- Microwave
  - > Stir and test foods before serving
  - > Do not use to heat baby bottles
- Cooking appliances
  - > Cords coiled and away from counter edge



Water Temperature	Length of Time to Receive a Severe Burn
156°	1 second
149°	2 seconds
140°	5 seconds
133°	15 seconds
127°	60 seconds
124°	3 minutes



# Tap Water Burn





# Scald Prevention - Hot Water Heater

- Turn water heater down to 120° F. Or 48° C.
- Always run cold water first, then add hot water.
- Always supervise children in the bathroom.

# Flammable Liquids

- Do not pour lighter fluid on barbeque coals once a fire has started.
- Do not add fuel to a hot lawnmower or motor bike.
- Do not use gasoline as a cleaning agent.
- Do not use gasoline around any device with a heating element – including drop lights.

# Why Do We Need This Program?

- Prior to 2000 the Oregon Burn Center did not have a formalized education and prevention program.
- Injuries were increasing in the high-risk workers, pediatric, and geriatric populations.
- All burn injuries are preventable with education.

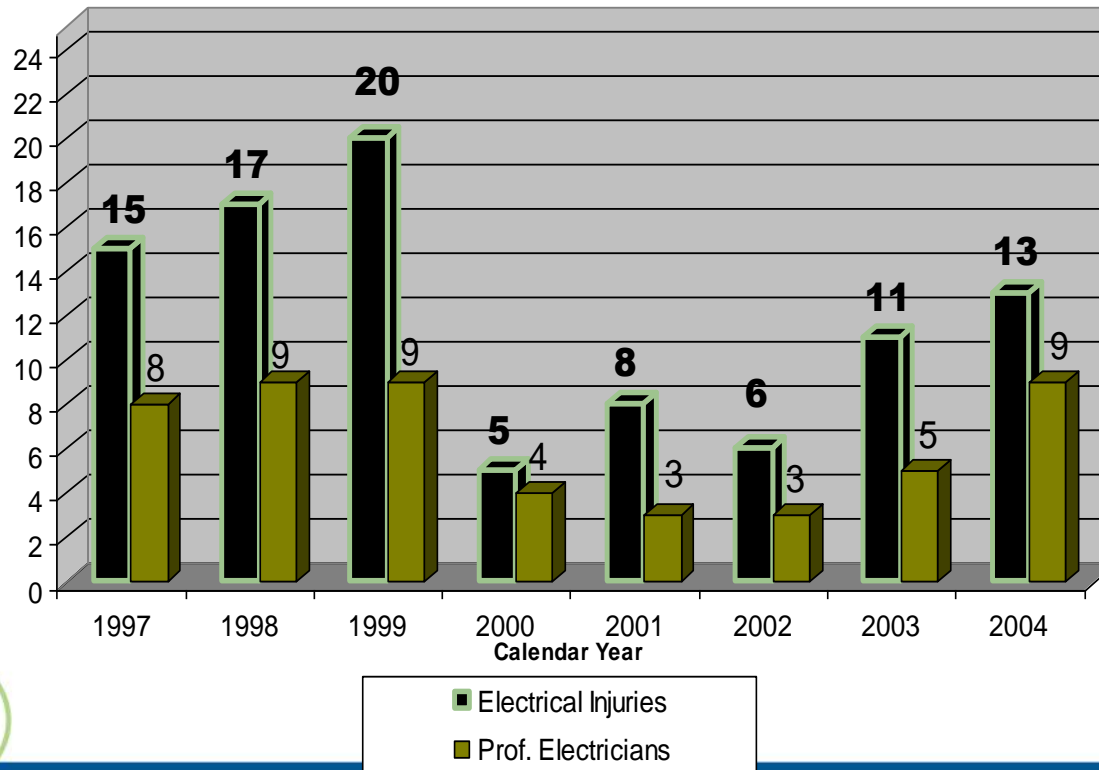


# Groups at High Risk for Receiving Electrical Injuries

- **Electrical workers** – on the job site, while working on the “live” wires.
- **Construction workers** – working around the high voltage lines.
- **Children** – playing around high voltage lines.

# Electrical Injuries Vs. Professional Electrical Workers

Electrical Injuries





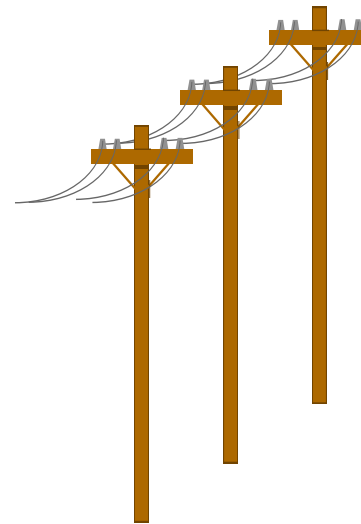
# Electrical Burn Injuries

- Electrical injuries are some of the most debilitating burns a body can endure.
- Actual flame burns.
- Deep hidden tissue damage.
- Loss of limb or multiple limbs common.
- Potential for neurological injury.

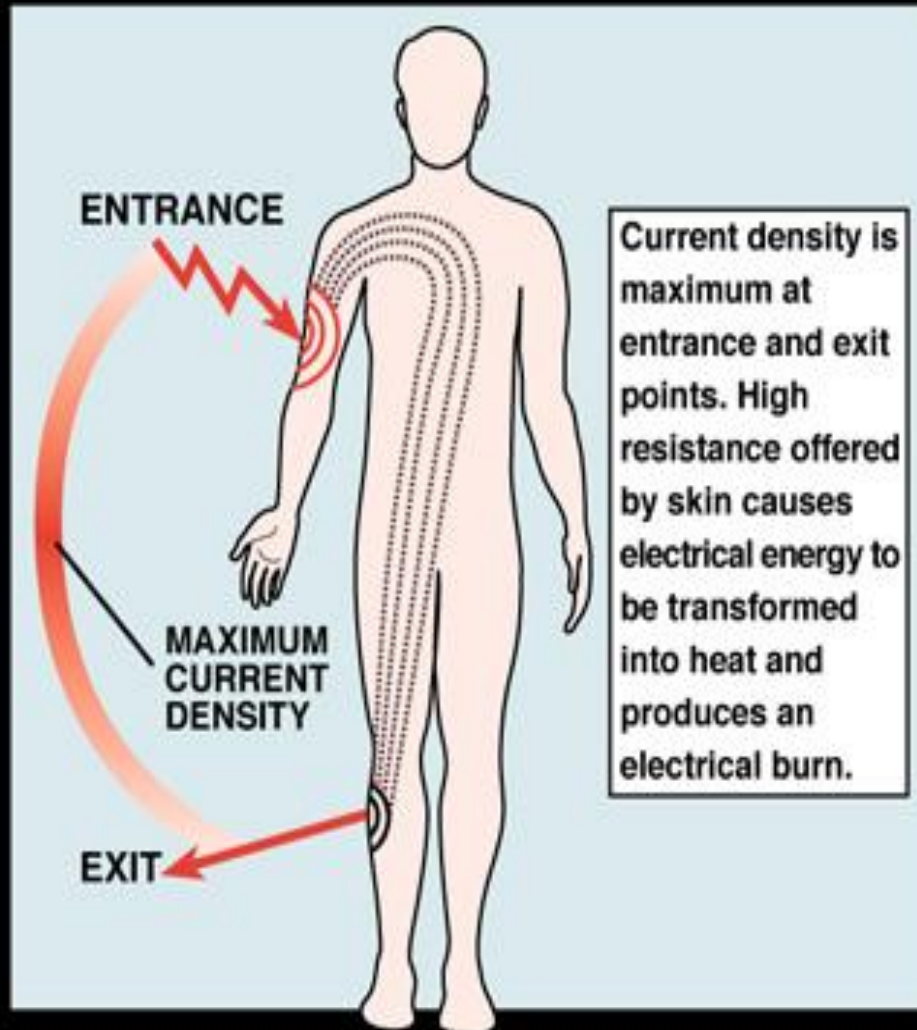


# Electrical Injuries

- Current
- Arc and/or flash flame



# Electrical Current





# Arc Injury

- Current does not pass through the tissue
- High heat, short duration
- No contact points
- No hidden tissue damage
- Rare cardiac arrhythmias
- Volts- 110, 220,480 (480 most common)



# Arc – Flash Flame Burn





# Arc – Flash Flame Burn



# Arc – Flash Flame Burn





# Arc or Flash Flame – Clothing on Fire



# Current Injury

- High Voltage = 600V or more
- Contact points present.
- Deep, hidden tissue damage present.
- Risk of myoglobinuria and kidney failure.
- Limb loss common-usually multiple limb loss with high voltage.
- Flame injuries may also be involved.
- Requires overnight stay at OBC



# Electrical Burns

Severity is influenced by:

- Voltage and amperage
- Duration of contact
- Path of the current
- Resistance of tissue





# Deep Tissue Burn



# Contact Point





# Contact Point (Claw Grip) Caused by Muscle Tetany



# Initial Point of Contact

- May vary in size
- Generally small in comparison to a grounding contact point
- Potential to have less tissue loss than ground site

# Multiple Sites and Hidden Damage





# Low Voltage Injury





# Low Voltage Injury Grounding Contact Point



# Grounding Contact Point

- Can be larger than the entrance site
- Can result in large tissue loss-often will result in limb loss
- Common to have multiple sites



# Grounding Contact Points Can Vary in Size

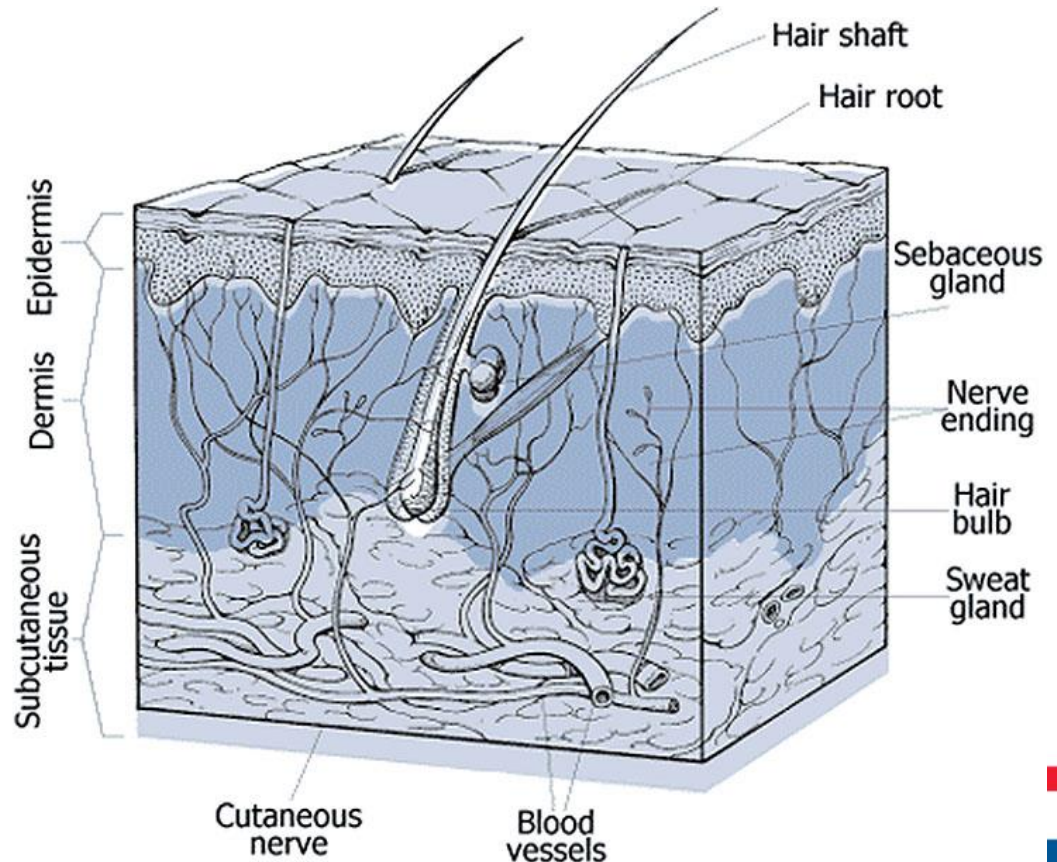




# Anatomy of the Skin

*(The Body's Largest Organ)*

- Epidermis
- Dermis
- Sub Q  
Tissue and  
capillary  
network



# The Functions of the Skin

- Protect against infection
- Prevent loss of body fluids
- Regulate body temperature
- Excrete body waste
- Produce vitamin D
- Serve as sensory organ
- Determine identity

The first three functions are critical to survival in the first 24 hours post burn injury and where attention should be focused.



# Superficial Burn Characteristics

- Intact skin
- Red appearance
- Painful
- Blanches upon pressure, demonstrates good capillary refill
- Burn is into epidermis
- Usually heals in 5-10 days

Example: sunburn





# Partial Thickness Burn

- Burn into epidermis and dermis
- Skin is not necessarily intact
- Moist, red appearance
- Blistered
- Subcutaneous edema may be present







# Full Thickness Burn

- Burned through epidermis, dermis, and subcutaneous tissue
- Dry appearance
- May be red, white, black, or brown in color
- Leathery in appearance





# Fourth Degree Burn

- Burned through epidermis, dermis, subcutaneous tissue, usually into muscle and/or bone
- Charred appearance
- May appear cracked
- Immobility of area
- Usually seen in electrical injuries or someone who has been on fire for extended amount of time





# First Aid

- What you will see and what to do if a worker is injured.







# Electrical Injuries

- Always remember to remove the source of electricity after confirming it is de-energized and grounded
- Cardiac arrhythmias are rare- if present they will be seen in the first 15-20 minutes post injury
- Can result in cardiac arrest
- More often respiratory arrest is seen





# You First

- Do not become a victim
- Check the scene first
- Remove source of electricity





## At the Scene

- Remove the heat/ turn off electricity.
- Call 911.
- Start CPR if necessary.
- Check for other injuries.
- Keep victim calm and in one place.





# At the Scene

- *Don't put anything on the burn* (lotions, creams, butter).
- Do not give the victim anything to eat or drink.
- Tell us what you know about the scene of the accident – volts involved, loss of consciousness, etc.





# At the Scene and Transportation

- Protect from hypothermia.
  - > No ice water, use cool water on the burn to stop the heat.
  - > Cover patient and keep warm and dry. Very important in large burns.





# Get All Electrical Contacts Checked Out By a Physician

- Potential for hidden damage
- Possible neurological symptoms



# Electrical Burns

## Hidden Damage



4 hours after injury



24 hours after  
injury





# Neurological Damage

- Any electrical contact should immediately be considered a candidate for potential brain and nerve damage.
- Some symptoms of neurological damage can be delayed, employees should be monitored for the following abnormal symptoms:



# Delayed Symptoms

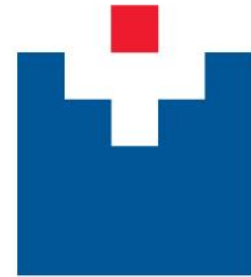
- Tremors
- Weakness
- Numbness
- Ongoing headaches
- Difficulties with speech
- Vision impairment or changes (double or triple vision)
- Problems with balance



# Best Solution To This Problem

## **Injury Prevention Through Education and Awareness**





**LEGACY**  
HEALTH

Thank you!



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