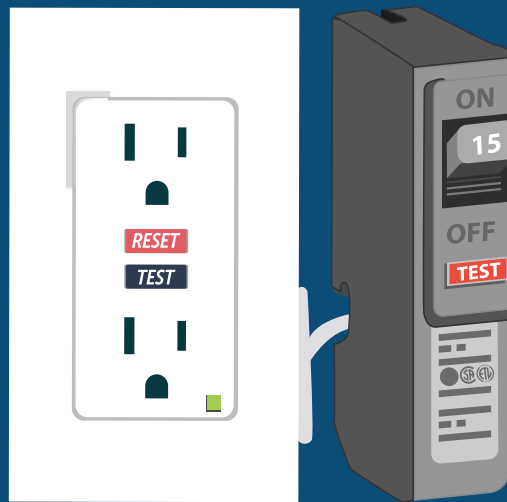


Ground Fault Circuit Interrupters (GFCI) and the National Electrical Code (NEC)

Revised: 3/28/2022



Electrical Safety Foundation International
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A Word from ESFI's President

Thank you for your interest in the Ground Fault Circuit Interrupters (GFCI) and the National Electrical Code (NEC) book. We welcome you to utilize this free resource and share it throughout your community. It is ESFI's mission to educate the public about why these devices are so critical to decreasing overall instances of electrical shock and electrocution.

ESFI understands that reaching the right people with this information is not easy. This quick resource guide was designed to help make your job easier by breaking down the high points of why the code should be adopted with GFCI protection intact. This book can be shared with consumers and governing bodies alike.

ESFI is here to address concerns and questions that you may have, so please reach out to us at the contact information below. I am also available to speak with you to assist you in your NEC adoption efforts.

Brett Brenner
President
Electrical Safety Foundation International

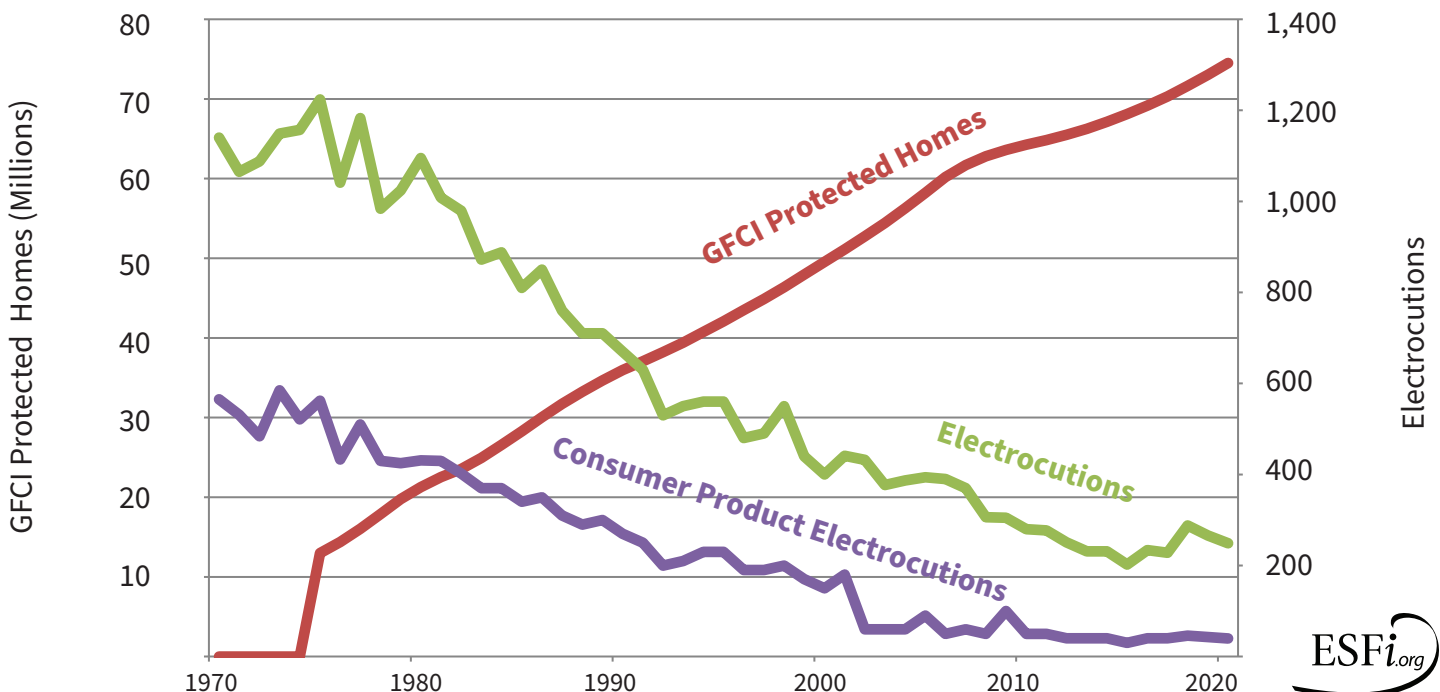
ESFI Statement

The lifesaving capabilities of ground fault circuit interrupters (GFCIs) cannot be overstated. These devices have saved thousands of lives and significantly reduced the number of home electrocutions since they were first required in the bathrooms of homes by the National Electrical Code (NEC) in 1975. Since then, the number of GFCI requirements has grown as in-home electricity use with the risk of contact with water has increased.

In the ten years between 1971 and 1980, there was an estimated average of 1,101 electrocutions in the United States, including 491 consumer product electrocutions every year. As GFCI requirements expanded, the number of electrocutions dropped significantly. Between 2011 and 2020, there was an estimated average of 246 electrocutions per year, including 41 consumer product electrocutions. This has led to an 80% drop in electrocutions since the introduction of GFCI protection in bathrooms and a 93% drop in consumer product electrocutions between 1975 and 2020. Since 1978, the median year the average American home was built, GFCI requirements have expanded to include six additional locations in homes.

Electricity is a necessary part of our lives that we tend to take for granted, but using it safely is vitally important. Thousands of people in the United States are critically injured and electrocuted as a result of electrical accidents in their own homes each year. As more aspects of our lives and homes use electricity than ever before, the safety devices required by the NEC have become increasingly important. Since the 1970s, GFCIs have saved thousands of lives and have helped significantly reduce home electrocutions. If GFCIs did not exist, or if the NEC was not adopted in full, consumer electrocutions would have continued to tragically increase.

GFCI Protection 1970 - 2020





The National Electrical Code

The National Electrical Code® (NEC), developed by the National Fire Protection Association (NFPA), has been the foundation of the country's electrical safety system since 1897. The NEC® is created through an exhaustive stakeholder consensus process that is accredited by the American National Standards Institute (ANSI) and the foundation of this process is built on the fundamental tenants of openness, due process, transparency, and balance of represented interests.

The NEC® is revised every three years to allow for new technologies and improved installation safety practices, and any changes are thoroughly vetted and supported by technical evidence. The process of reviewing the NEC® brings together over 500 volunteer electrical safety experts to participate in this activity and includes a broad range of expertise representing electrical contractors, designers, inspectors, and manufacturers, electrical testing laboratories, utilities, enforcing authorities, insurance and labor organizations, and other users including representation from the National Association of Home Builders. The balance part of the process requires that no more than 1/3 of these industry representatives can sit on the committee, and changes to the NEC® require 2/3 majority in support.

Public Expectation

In 2017, the NFPA Fire & Life Safety Policy Institute commissioned an independent survey titled "Meeting Expectations." The survey found that 86% of people believe that if they purchased a newly-constructed home today, it would meet the most up-to-date codes, while 74% of people trust their state and local leaders to adopt the latest fire and electrical safety codes for residential construction. Consumers and the unsuspecting public simply expect their electrical systems to be safe and meet the latest safety requirements.

Code Adoption

Promulgating bodies that adopt and use the NEC® have the benefit of a document that has been developed and maintained by qualified technical committees that have a single-minded purpose in advancing electrical safety through an open consensus process.

As electrical equipment has become more complex and widespread, the NEC® has adapted to meet new challenges. Revisions allow for new technologies and improved installation safety practices, and as a result, the NEC® is a ready-to-use, comprehensive code suitable for adoption without amendment.



2020 National Electrical Code Changes:

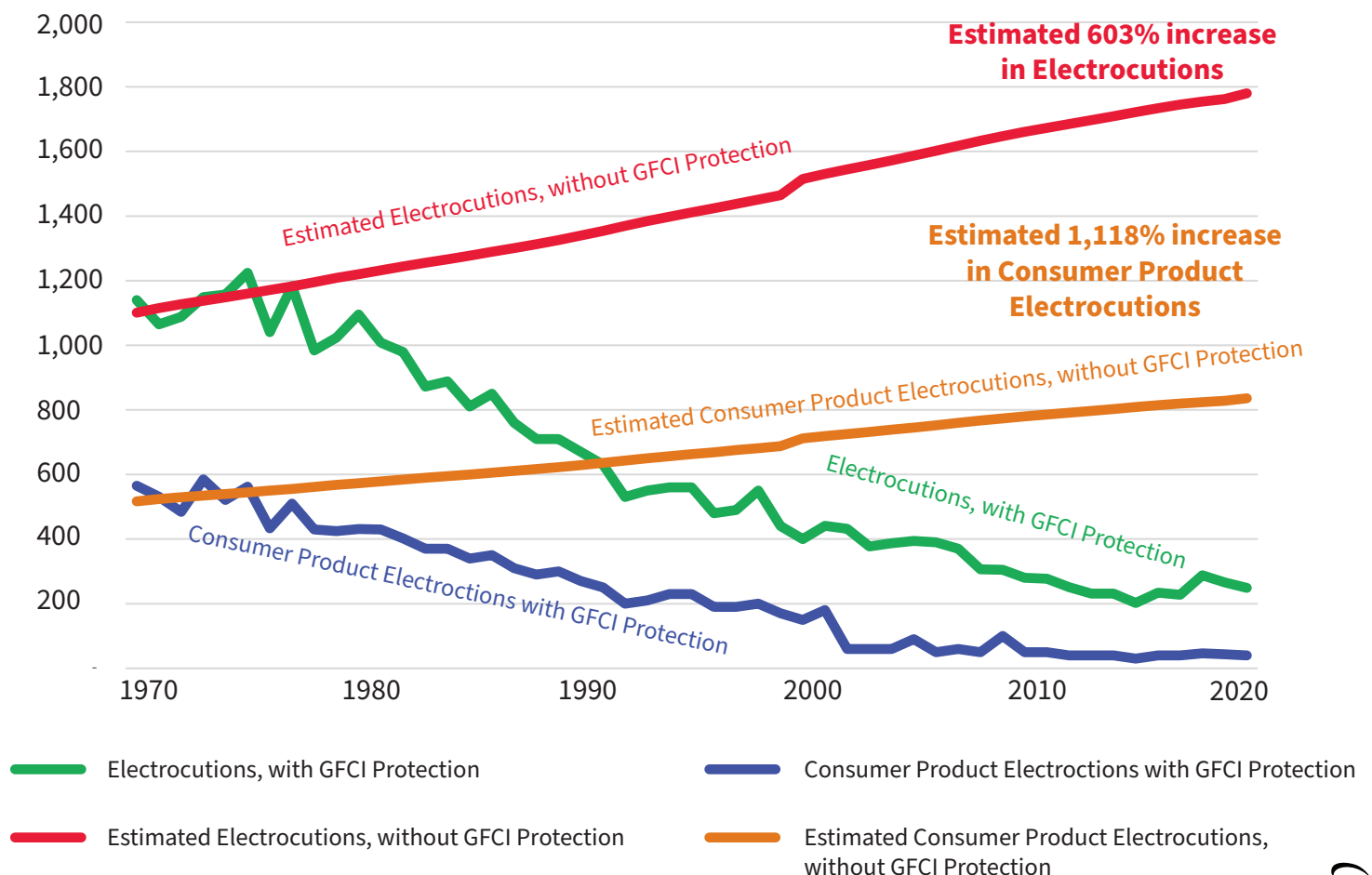
- **210.8(F) GFCI Protection for Outdoor Outlets**

The 2020 edition of the NEC® now requires GFCI protection on residential outdoor outlets such as air conditioners. “All outdoor outlets for dwellings, other than those covered in 210.8(A)(3)”

- **210.8(A)(5) GFCI Protection for Basements**

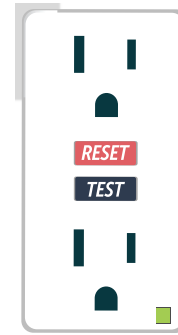
The 2020 edition of the NEC® now requires GFCI protection on basement receptacles regardless of whether the basement is “finished” or “unfinished.”

Estimated Electrocutions if GFCI Protection Did Not Exist

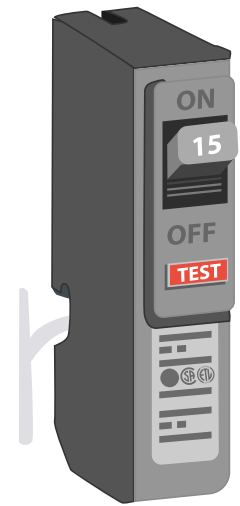


What is a GFCI?

- GFCI devices operate by recognizing and de-energizing a circuit when a hazardous or potentially deadly event of electricity flows outside the normal path, which can move through the human body.
- You may be familiar with GFCI receptacles in your bathrooms, garage, and outdoors, or a GFCI circuit breaker in your home electrical panel.
- Since the inception of GFCI technology in the 1970s, there has been a significant decrease in consumer electrocutions, which has resulted in saved lives.



GFCI Receptacle



GFCI Breaker

Where are GFCIs Required?

Dwelling Units

All 125-volt through 250-volt receptacles installed in the locations specified below and supplied by single-phase branch circuit rated 150 volt or less to ground shall have GFCI protection:

- Bathrooms
- Garages
- Crawl spaces
- Basements
- Kitchens
- Sinks
- Boathouses
- Bathroom and shower stalls
- Laundry areas
- Indoor damp and wet locations

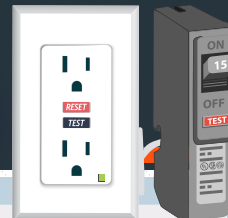
Other Than Dwelling Units

All 125-volt through 250-volt receptacles supplied by single-phase branch circuit rated 150 volts or less to ground, 50 amperes or less, and all receptacles supplied by three-phase branch circuits rated 150 volts or less to ground, 100 amperes or less, installed in the locations specified below shall have GFCI protection:

- Bathrooms
- Kitchens or areas with a sink
- Rooftops
- Outdoors
- Sinks
- Indoor damp and wet locations
- Locker rooms
- Garages
- Crawl spaces
- Unfinished areas of basements
- Laundry areas
- Bathtubs and shower stalls

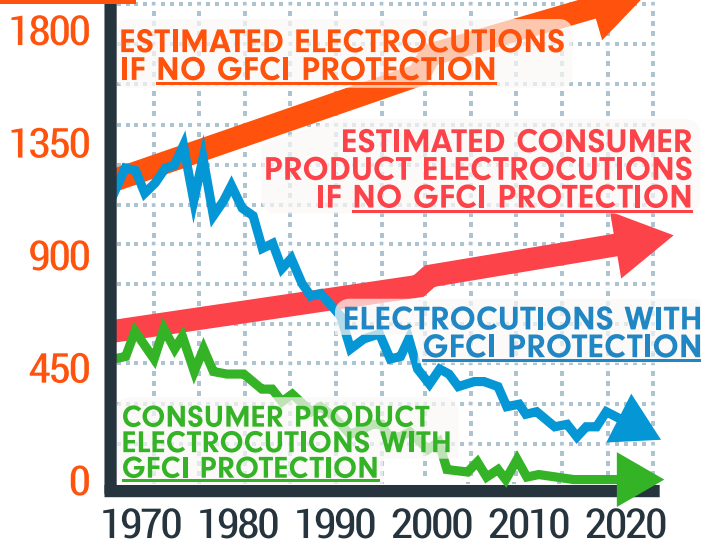
GROUND FAULT CIRCUIT INTERRUPTERS (GFCI) PREVENT AGAINST ELECTROCUTION

What if GFCIs did not exist?



Ground Fault Circuit Interrupters (GFCI) were first introduced in the bathrooms of homes as required by the **1975 edition of the National Electrical Code**. Prior to 1975, only outdoor receptacles and receptacles near swimming pools required GFCI protection. Since then, **GFCI requirements grew** as in-home electricity use and the amount of potential contact with water and electricity in homes increased.

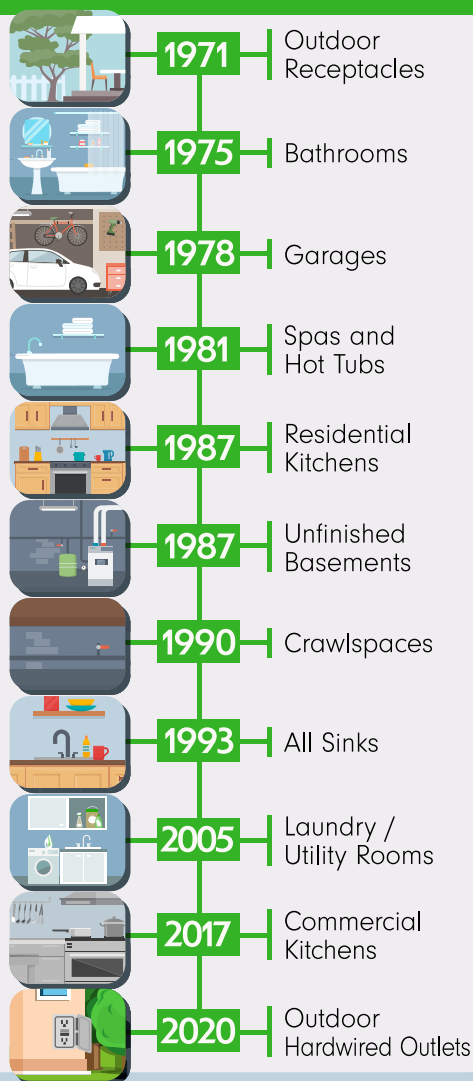
DEATHS



Source: Centers for Disease Control and Prevention

In the ten years between 1971 and 1980, there was an estimated average of **1,101 electrocutions** in the United States, including **491 consumer product electrocutions** every year. As GFCI requirements expanded, the number of electrocutions **dropped significantly**. Between 2011 and 2022, there was an estimated average of **246 electrocutions** a year, including **41 consumer product electrocutions**.

REQUIRED GFCI LOCATIONS



GFCI FACTS



80% drop in electrocutions since the introduction of GFCI protection in bathrooms in 1975



93% drop in consumer product electrocutions between 1975 and 2020

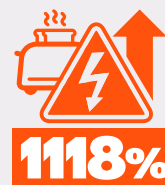


The median American home was **built in 1978**, GFCIs are now required in **six additional locations** in homes

WHAT IF GFCI PROTECTION WAS NOT REQUIRED?



There would be an estimated* **603% increase** in electrocutions



There would be an estimated* **1,118% increase** in consumer product electrocutions

According to the **U.S. Energy Information Administration**, residential U.S. energy usage has increased from 0.7 trillion kilowatt-hours in 1978 to 1.5 trillion kilowatt-hours in 2020, an **increase of 114%**

* Methodology: Average electrocution rate prior to GFCI protection (0.54 deaths per 100,000 population) x yearly population of USA. Consumer product electrocution rate prior to GFCI protection was 0.25 deaths per 100,000

PLEASE SHARE THIS FREE RESOURCE TO SAVE LIVES

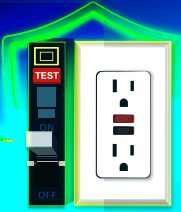


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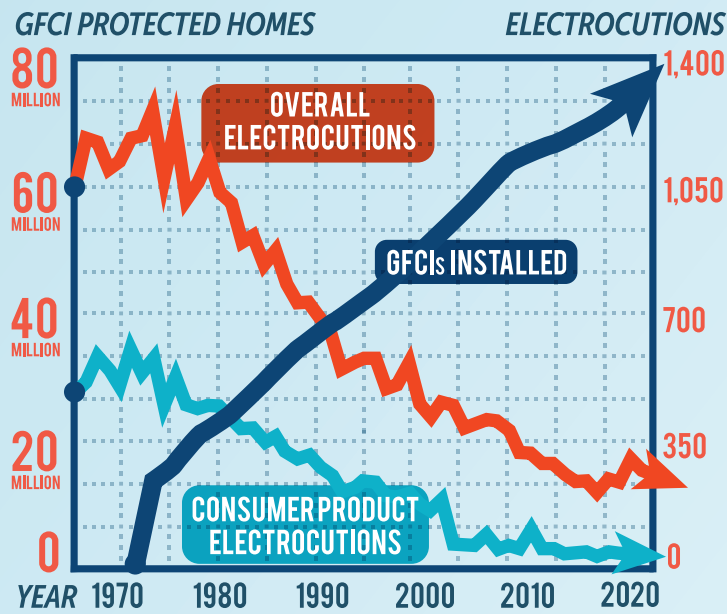
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GROUND-FAULT CIRCUIT INTERRUPTERS



PREVENTING ELECTROCUTIONS SINCE 1973



Since the first introduction of GFCIs in homes, there has been an:

83%
D**ROP** in electrocutions

95%
D**ROP** in electrocutions from consumer products

The Consumer Product Safety Commission estimates that:

47% of current electrocutions could be prevented with proper GFCI protection

50% of American homes were built before the introduction of GFCIs

There are potentially **43 MILLION** American homes without GFCI protection



WAS YOUR HOME BUILT BEFORE 1976?

Have a qualified electrician inspect your electrical system to ensure it's up to code.

THE IMPORTANCE OF A QUALIFIED ELECTRICIAN:

Licensed to work in your state.



Most states require continuing education for electricians to ensure the continual quality of work.

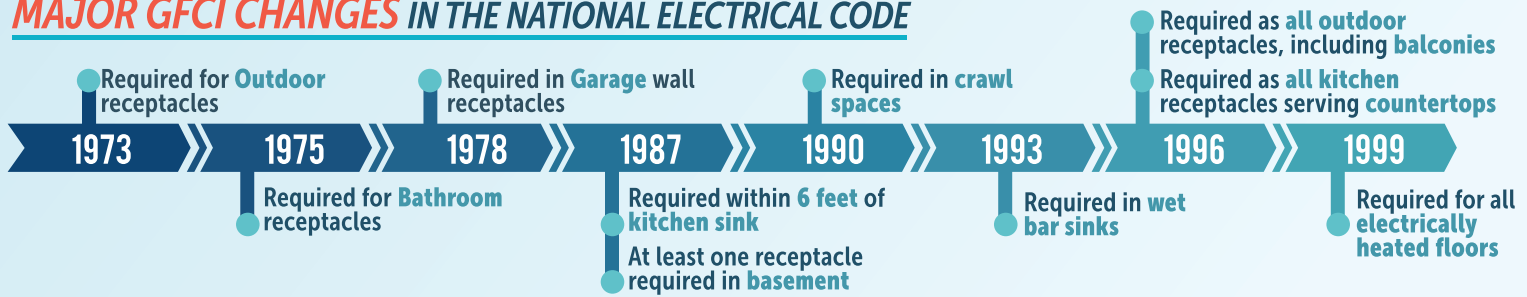


Qualified electricians are trained on the National Electrical Code – the minimum safety standard for electrical work.



Qualified electricians have 500–750 days of on the job apprenticeship training and 144 hours of classroom training before they are licensed to work on your home or business.

MAJOR GFCI CHANGES IN THE NATIONAL ELECTRICAL CODE



CURRENT REQUIREMENTS IN THE 2017 NATIONAL ELECTRICAL CODE

- BATHROOMS
- GARAGES
- OUTDOORS
- BALCONIES, DECKS, AND PORCHES
- KITCHEN COUNTERTOPS
- WITHIN 6 FEET OF SINK
- LAUNDRY AREAS
- WITHIN 6 FEET OF BATHTUB OR SHOWER



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The Electrical Safety Foundation International (ESFI) is the premier non-profit organization dedicated exclusively to promoting electrical safety at home and in the workplace.

Since 1994, ESFI has led the way in promoting electrical safety across North America. Over the years, ESFI has become highly regarded by industry, media and consumer safety partners alike by constantly reinvigorating the way electrical safety is addressed. ESFI creates unique awareness and educational resources designed to meet the diverse needs of a variety of at-risk groups.

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