U.S. Consumer Product Safety Commission

Want to help SAVE LIVES?

Prevent ***injuries*** and make a ***real difference***!

CHAIRMAN'S CHALLENGE

August 2015

We never know who will invent the next safety innovation.

COULD IT BE YOU?

THE CHAIRMAN'S CHALLENGE

Dear Innovators,

I need your creativity, passion and drive to solve pressing safety problems that take lives and cause life-altering injuries. This is not a contest. The items in the following list are real safety problems. Every challenge is intended to provoke your creativity. Your inventiveness has the potential to prevent real pain and suffering. Your efforts could save lives.

I want to promote innovation in injury prevention and find solutions to safety problems with creative thinking. These are the kinds of problems that keep me awake at night. If you like to think innovatively, no matter what your background, interests or chosen career field, this list is for you. Here's your chance to have a positive and lasting influence on our world.

I promise to applaud your efforts and ensure that credit goes where credit is due. Your ideas belong to you. Please share your solution with me so that I may publicly recognize your ingenuity and problem solving.

The following lists are in no particular order and are only loosely categorized according to the type of hazard. I am sure that you'll find something challenging. Some topics might prompt you to re-frame a challenge to solve a safety problem that you have noticed, but may not be mentioned in this document. There are no rules for innovation. Some of the challenges may seem outlandish but the point is to trigger creative thinking.

I challenge you to find safety solutions that save lives. Prevent injuries with your creativity.

Sincerely,

Elliot F. Kaye
Chairman,
U.S. Consumer Product Safety Commission
@ElliotKayeCPSC

"I challenge you to find safety solutions that save lives.

Prevent injuries with your creativity."

-- CPSC Chairman
Elliot F. Kaye

THE UNITED STATES CONSUMER PRODUCT SAFETY COMMISSION

WHO ARE WE?

The CPSC is an independent federal agency made up of professionals such as scientists, engineers, communication specialists, attorneys and others who are passionate about protecting the American public from hazards associated with consumer products.

WHAT DO WE DO?

Since 1973 when the Consumer Product Safety Act created the U.S. Consumer Product Safety Commission (CPSC), our staff of federal civil servants has worked diligently to fulfill the important mandate assigned to the agency, namely,

- To protect the public against unreasonable risks of injury associated with consumer products;
- To assist consumers in evaluating the comparative safety of consumer products;
- To develop uniform safety standards for consumer products and to minimize conflicting state and local regulations; and
- To promote research and investigation into the causes and prevention of product-related deaths, illnesses, and injuries.

Thousands of types of consumer products are within the CPSC's jurisdiction. Deaths, injuries, and property damage from consumer product incidents cost the nation more than $1 trillion annually.

This is where you come in!

TOPICS

CHALLENGE KEY

Each challenge type is indicated by its correlating icon(s).

Mechanical 

Electrical 

Apps 

Chemical 

Social Science 

DROWNING PREVENTION

Between 2010 and 2012, an average of **382 DEATHS**[1] associated with pool or spa submersions involving children younger than 15 years of age were reported annually. Drowning happens quickly and silently. It's not like the movies: victims don't thrash around or yell for help.

From 2012 through 2014, an estimated annual average of **5,400 CHILDREN**[1] younger than 15 years of age were treated in U.S. hospital emergency departments for injuries associated with pool or spa submersions. Some children are **PERMANENTLY BRAIN DAMAGED** by these incidents.

PROBLEM: POOL ACCESS

76% of drowning fatalities are children younger than 5 years old.[1]

Barriers around pools and spas keep young children from gaining unsupervised access to these areas. How do we make layers of protection easier to use or easier to live with?

CHALLENGES

- Invent adaptable, portable, easier to install, less expensive, and/or more attractive barriers, covers and gates to enhance the likelihood that people will install the much-needed fourth side to their pool fencing.
- Design active barriers that automatically deploy when needed to prevent pool access. A barrier that remains hidden until needed might be more likely to be installed.
- Invent a pool cover or barrier that serves other purposes when not in use so that the investment in the safety device is a more attractive purchase for consumers.
- Invent barriers for portable pools like fences or weight-bearing covers.
- Invent temporary barriers that can be used during times when young visitors are present, like at grandparents' homes or during special events when supervisors may be distracted.
- Invent child-resistant pet doors. You'd be surprised how many young children slip through pet doors and drown in a pool.

Children drown even with lifeguards or other adults present. How do we effectively notify bystanders that a child is drowning?

PROBLEM: DROWNING

CHALLENGES

Invent devices that can be used to track children's locations or warn if a child moves beyond a certain distance or in range of a certain known hazard in the home, such as the pool.

Design underwater drones that will automatically position beneath any object that falls into the pool and then lift it out of the water.

Invent devices to enhance lifeguard vigilance (aerial views, underwater views, etc.) or warn lifeguards when someone has been underwater for too long and their location in the pool.

Invent pool surveillance systems that can be rented for pool parties and used when people are distracted.

Invent child detectors that can provide a safety system for a pool or spa entryway that remains armed but without nuisance alarms. Height, weight and literacy can all be used to differentiate children from adults.
*See *http://www.sciencedirect.com/science/article/pii/S0022437506000272*

For more information or to bounce ideas off of, contact:
leadership.cpsc.gov/kaye | Jonathan Midgett | jmidgett@cpsc.gov | 301.504.7881

POISONING AND CHEMICAL EXPOSURE

U.S. consumers are exposed to a multitude of chemicals in their day-to-day lives. While the CPSC has an interest in decreasing **CHRONIC EXPOSURES** that may eventually cause **ILLNESS** or **DEATH**, the full range of chemical exposures is unknown.

Monitoring exposures is an important step in ascertaining the full body burden of toxic exposures over time.

PROBLEM: CO POISONING

Carbon Monoxide (CO), a colorless, odorless gas, is the "invisible" killer responsible for more than 400 deaths annually.[11]

Carbon monoxide is produced by burning fuel. Therefore, any fuel-burning appliance in your home is a potential CO source. Improperly operating appliances can produce fatal CO concentrations in your home.

CHALLENGES

- Invent a cover or activation switch for the ignition of a portable generator that requires the operator to interact with a danger label or some other educating device before turning the generator on.
- Invent a generator that cannot be operated inside.
- Invent a generator that does not release carbon monoxide.
- Invent a sensor for appliances, such as furnaces, that alarms and/or shuts off fuel flow if the appliance is operating improperly.
- Design a carbon monoxide alarm that has visual and auditory indicators that are clear and easy to understand.

No one, especially a child, should ever be poisoned by a consumer product.

PROBLEM: CHEMICAL EXPOSURES

CHALLENGES

Invent apps and hardware for smartphones that can accurately monitor air quality.

Invent apps for smartphones that track patterns of daily routines, activities and time spent in various locations to help estimate exposures to potential hazards.

Determine the ventilation needs of 3D printers to lower exposure levels of fumes to users and bystanders in the home. Design an appropriate system for air quality control of household 3D printer fumes.

Develop standards and systems to keep potentially harmful chemicals out of homemade or recycled 3D printer feed stock plastics. Develop a method for consumers to identify which plastics are not safe for recycling in a 3D printer.

Invent wearable devices that help estimate exposures to potentially hazardous chemicals.

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CHILDREN'S PRODUCT SAFETY

There are an estimated **74,900 NURSERY PRODUCT-RELATED INJURIES**[3] among children younger than 5 years old that were treated in U.S. hospital emergency departments in 2013. Many of the **FATALITIES** are associated with known hazards, such as pillows and soft bedding being placed in the infant's sleep setting, but some are hidden hazards.

A child **dies** almost **every month** from strangulation on window covering cords.[3]

PROBLEM: SUFFOCATION, CHOKING AND STRANGULATION

Infants are susceptible to hazards that cause blockages to airways due to poor control of their heads or the inability to extricate themselves from entrapment and entanglement.

CHALLENGES

- Design a valid and repeatable test method to distinguish high-risk from low-risk soft goods intended for use as a crib liner.
- Infants can smother in a sleeping environment with pillow-like items. Design a method for determining when a children's item is too pillowy to be safe.
- Infants have very poor head control. When in handheld carriers, swings, slings and bouncers infants may slump forward if their backs are elevated too high, thereby endangering their breathing: Design a method for ascertaining the maximum seat back incline to prevent airway obstruction without needing to place human subjects in a potentially harmful situation.
- Children are strangled to death on cords in window coverings: Design a cover or other device for window covering cords that prevents strangulations AND can be installed on window coverings that are already in use.
- Design a solution to keep children from getting their arms and legs stuck in between the slats without introducing hazards to the crib, such as soft bedding, cords, or straps.

PROBLEM: CHEMICAL BURNS FROM COIN CELL BATTERIES

A child can swallow a button battery and suffer dangerous chemical burns in as little as two hours.[4]

Coin cell batteries are sometimes ingested by children and become lodged in the esophagus or the intestines where the formation of hydroxide can chemically burn surrounding tissues and lead to death or life-threatening internal injuries.

CHALLENGES

- Design a coin cell battery that cannot be ingested.
- Design a coin cell battery that does not create hydroxide chemical burns in the body.
- Coin cell victims have sometimes found batteries that were in the trash or laying out within reach. Even used batteries have enough power to injure. Design a recycling program that enables consumer awareness and protection of children from battery ingestion.

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FURNITURE AND TELEVISION SAFETY

Falling furniture, electronics and appliances caused at least **363 FATALITIES** in the U.S. from 2000 through 2012, approximately **1 DEATH EVERY 2 WEEKS**. About 82 percent of victims in these incidents were younger than 8 years. Emergency department-treated injuries associated with product instability have been estimated to occur at a rate of 38,000 per year (all ages). That's around **4 INJURIES PER HOUR** or 2,920 per month.[5]

PROBLEM: TIP-OVER

The majority of all falling furniture incidents, injuries and estimated fatalities occurred in consumers' homes. Head injuries, injuries from being crushed under falling electronics, furniture or appliances, constitute the most common injuries.[5]

CHALLENGES

- Design televisions, furniture and appliances that are much more stable, such as dressers, chests, free-standing shelves and stoves.
- Invent anchoring systems for televisions, furniture and appliances that do not require tools to install them.
- Invent anchoring systems for televisions, furniture and appliances that do not damage the walls and floors when installed.

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HEAD AND BRAIN INJURY PREVENTION

Each of the most popular sports sends **TENS OF THOUSANDS** of players to the hospital every year with a head injury. Researchers are finding that concussions and other repetitive trauma to the brain can have lifelong effects. Multiple concussions are associated with **DEPRESSION** and **SUICIDE** in later life.[6]

Wearing a helmet may not prevent getting a concussion, but it can prevent skull fractures. For many recreational activities, wearing a helmet can reduce the risk of a severe head injury and even save your life.

PROBLEM: HEAD AND BRAIN PROTECTION

From 2001 to 2010, rates of brain injury-related emergency department visits increased by **70%**.[7]

CHALLENGES

- Design an effective and comfortable helmet that is favorably accepted by people who are usually averse to helmet use.
- Design a helmet or some other intervention that decreases the likelihood of wearing the helmet incorrectly.
- Design a helmet that can be proven to decrease the likelihood of getting a concussion.
- Design a product that can help with accurately identifying when a player is at risk for a brain injury.
- Design a youth helmet that meets the specific physiological and anatomical needs of children and a way to characterize its performance.
- Design a method to assess the effectiveness of head and brain protection devices.

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FIRE SAFETY

There were an estimated annual average of **360,400 FIRES, 2,170 DEATHS, 12,720 INJURIES** and $6.49 billion in property loss from 2010–2012. Cooking equipment accounted for the largest percentage of fires. Heating and cooling equipment fires constituted the second largest share of total residential fires. With respect to item first ignited, upholstered furniture was involved in the greatest number of fire deaths. With respect to heat source, smoking materials were the largest contributor to deaths, associated with an annual average of **430 DEATHS FROM 2010 TO 2012**. Among products that are heat sources, candles were involved the second highest number of deaths.[8]

PROBLEM: CONSUMER UNDERSTANDING OF HAZARDS

The **DEATH RATE** from fires in homes that had at least one smoke alarm was **ONE-THIRD LOWER** than in homes that had no smoke alarms.[8]

In many cases, consumers may not understand hazards associated with a product or situation. Effectively communicating those hazards and how a consumer may address them is a goal of the CPSC and the injury prevention community.

CHALLENGES

- Identify the key safety facts that consumers need to know when purchasing home heating appliances. How is this type of safety information best organized and presented for easy use at the point of purchase? How can the safety information be presented on the product to effectively prevent fires?
- Design a system that allows consumers to identify where a GFCI/AFCI fault is located.
- Design a program to educate and motivate consumers to invest time and money in fire safety.
- Design a study to ascertain when and why people choose to fight fires and when they choose to call the fire department.
- Design a program to encourage proper installation of GFCI/AFCI outlets and breakers.

PROBLEM: SMOKE ALARM BATTERIES

Smoke alarms most often **FAIL** to alarm because of missing, drained or disconnected batteries.[8]

CHALLENGES

- Low frequencies are better at waking people and more likely to be heard by seniors: Invent a low-frequency alarm that can be produced with battery power.
- Determine the cause of early failure of 10 year batteries and what can be done to extend their lifespan.
- Design a smoke alarm base and power supply pigtails that are standardized, simplified or fit into an existing electrical feature like a light fixture.
- Design a smoke alarm battery that can be charged remotely.
- Design a smoke alarm that drops a battery compartment down on a wire within reach of the homeowner when the battery is nearly dead and retracts back to the ceiling once a new battery is placed in the compartment.
- Design a smoke alarm that has the battery located at a lower level (on a light switch) and the sensor on the ceiling.
- Design a decorative floor or wall lamp that reaches up to the ceiling and has an integral smoke alarm with a battery in the base that is easily replaced without climbing a ladder.
- Design a battery-less fire alarm system with separate detectors distributed around the home that trigger a one-time burst of signal that then sets off alarms connected to hardwired power in different locations from the detector.

PROBLEM: SMOKE ALARM EFFECTIVENESS

A smoke alarm is critical for the early detection of a fire in your home and could mean the difference between LIFE AND DEATH.[8]

CHALLENGES

- Design a smoke alarm that can distinguish between bathroom steam, cooking smoke, dust or dirt on the sensor or other false alarms so that nuisance alarming is decreased.
- Design a smoke alarm that communicates with other household devices, like cell phones, televisions, electrical systems or computers to better alert occupants with hearing problems.
- Design a method of characterizing smoke that improves on the current methods and allows more effective designs of smoke alarms to be identified and manufactured.
- Design a standardized interconnection communications protocol for the smoke alarm market.

PROBLEM: SMOKE ALARM INSTALLATION

3 OUT OF 5 home fire **DEATHS** resulted from fires in properties without working smoke alarms.[8]

CHALLENGES

- Design an easy method for tracking the smoke alarm installation and maintenance across a community so that recalls or future efforts can be more efficient.
- Design a study to ascertain why some homes do not have any smoke alarms.
- Design a smoke alarm installation program that alleviates distrust and uncertainty that homeowners may feel with allowing volunteers into their homes.
- Design a sustainable service business model that will maintain and replace smoke alarms for homeowners at a reasonable cost.
- Design a smoke alarm that is installed without any tools.
- Design a study to ascertain the affordability of smokealarm installation in low-income residences.
- Characterize the costs and benefits of various incentives for having working smoke alarms systems in a residence such as, fire inspections, upgrades to alarm systems, tax breaks and property insurance premium reductions.
- Design a system to facilitate firefighters' ability to provide higher quality data while making it easier on them to respond.
- Design a method for small localities to pool their resources to get better data about their communities' fire safety needs
- Design a study to ascertain the characteristics of households that are more prone to engage in behaviors that increase risks of fires and/or increase the risks of fire-related injuries.

Consumers sometimes leave appliances like stoves or heating equipment unattended, leading to fires.

PROBLEM: UNATTENDED APPLIANCES

Cooktop related fires are the #1 cause of in-home fires.[8]

CHALLENGES

- Design a gas or electric stove that regulates itself before it burns food and causes a fire.
- Define what special safety precautions are needed for appliances and household devices that can be turned on when the user is not present.
- Invent a space heater and/or clothes dryer that prevents fires.
- Incorporate safety features into remote controlled or smart phone controlled appliances.

PROBLEM: HUMAN FACTORS

In order to address hazards, we need to understand more about why they happen and the impact of potential solutions.

CHALLENGES

- Design a study to ascertain what effect background noises have on the conspicuity and intelligibility of a smoke alarm during a fire.
- Design a program to counteract consumer temptations to disable alarms.
- Design a study to better characterize what is going on in the kitchen when nuisance alarms are sounded.
- Design a program to teach caregivers about best practices for planning for a fire emergency, given the alarm audibility limitations of children and seniors.[12]
- Design smoke alarm instructions that are more credible and more likely to be followed by consumers.
- Design a program to ensure that smoke alarm indicators, both visual and audible, are explicit for consumers who have not read the smoke alarm packaging and instructions.
- Design smoke alarm packaging that reduces confusion about what to buy.
- Design a system of presenting information about a smoke alarm at the point of purchase so that consumers can make better informed purchasing and installation decisions with information about the performance of a smoke alarm by feature, effectiveness and cost.
- Design an unobjectionable and permanent smoke alarm marking or feature that tells what year they were made without needing to take them down and look on the back.
- Design a smoke alarm that is made more attractive or has some other additional utility that will increase the likelihood that it is installed in a home.

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ALL-TERRAIN VEHICLE (ATV) SAFETY

As of December 31, 2013, CPSC staff received reports of **13,043 ATV-RELATED FATALITIES** between 1982 and 2013. Many deaths and injuries occur when an inexperienced driver loses control of an ATV, is thrown from an ATV, overturns the vehicle or collides with a fixed object or a motor vehicle.[9]

PROBLEM: ATV SAFETY

Of 13,043 ATV-related fatalities, 3,023 FATALITIES were CHILDREN younger than 16 years of age.[9]

ATVs are designed for interactive riding on off-road terrain. Riders can lose control of the vehicle due to unstable ground, passengers or inexperience.

CHALLENGES

- Design an ATV seat that cannot hold two riders and cannot be easily misused to carry passengers.
- Design an ATV that is less likely to roll over.
- Design an ATV that protects the driver during a rollover event.
- Design an ATV that detects when it is driven on a paved surface and limits the speed on paved surfaces.
- Design an ATV that a child can't use or cannot be modified by an adult intending to give it to a child.

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SENIOR SAFETY

Many older Americans are injured in and around their homes every year. CPSC estimates that on average **1.4 MILLION** people aged **65 AND OLDER** are treated in hospital emergency rooms each year for injuries associated with consumer products. Within this age group, the rate of injury is the highest for people 75 years of age and older. Falls in and around the home are a top cause of injuries to older adults. Older adults also are at greater risk than others of **DYING IN A HOUSE FIRE**.[10]

Despite seniors (adults 65 and older) making up only 13% of the U.S. population[13], they suffer nearly 65% of the 37,000 consumer-product related deaths per year[14].

PROBLEM: CHALLENGES WITH AGING

Falls are the most common cause of FATAL INJURY for older people.[10]

CHALLENGES

- Develop a consumer guide for identifying common household fall hazards and how to mitigate the risks.
- Invent a sensor device that can detect when a senior falls and automatically notifies caregivers.
- Invent a medication storage device that allows caregivers to track whether a senior has taken their medication or taken the wrong amount.
- Invent food storage containers that can detect or somehow prevent someone from eating spoiled food.

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FEDERAL RESOURCES

U.S. Consumer Product Safety Commission (CPSC)
www.cpsc.gov

CPSC Safety Education Centers:
http://www.cpsc.gov/en/Safety-Education/Safety-Education-Centers/

Safer Products (Search recalls and reports of harm or file reports of harm)
www.saferproducts.gov

National Electronic Injury Surveillance System (NEISS)
http://www.cpsc.gov/en/Research--Statistics/NEISS-Injury-Data/

Centers for Disease Control and Prevention
http://www.cdc.gov/injury/

CDC's WISQARS™ (Web-based Injury Statistics Query and Reporting System)
http://www.cdc.gov/injury/wisqars/

National Center for Injury Prevention and Control's WISQARS Injury Mortality Reports:
http://webappa.cdc.gov/sasweb/ncipc/mortrate10_sy.html

National Center for Injury Prevention and Control's WISQARS Leading Cause of Death Reports:
http://webappa.cdc.gov/sasweb/ncipc/leadcaus10.html

National Institutes of Health
http://www.nih.gov/

Health Resources and Services Administration
http://www.hrsa.gov/index.html

National Library of Medicine's PubMed (medical literature database)
http://www.ncbi.nlm.nih.gov/pubmed

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CITATIONS

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[2] http://www.cpsc.gov//Global/Research-and-Statistics/Injury-Statistics/Carbon-Monoxide-Posioning/NonFireCarbonMonoxideDeathsAssociatedwiththeUseofConsumerProducts2011AnnualEstimatesSept2014.pdf

[3] http://www.cpsc.gov//Global/Research-and-Statistics/Injury-Statistics/Toys/Nursery-Products-Annual-Report-2014.pdf

[4] http://www.cpsc.gov/newsroom/news-releases/2011/cpsc-warns-as-button-battery-use-increases-so-do-battery-related-injuries-and-deathstoddlers-and-seniors-most-often-injured-in-battery-swallowing-incidents/

[5] http://www.cpsc.gov//PageFiles/171154/InstabilityorTipoverReport2014Stamped.pdf

[6] http://www.cdc.gov/headsup/

[7] http://www.cdc.gov/traumaticbraininjury/get_the_facts.html

[8] http://www.cpsc.gov//Global/Research-and-Statistics/Injury-Statistics/Fuel-Lighters-and-Fireworks/2010-2012-Residential-Fire-Loss-Estimates.pdf

[9] http://www.cpsc.gov//Global/Research-and-Statistics/Injury-Statistics/Sports-and-Recreation/ATVs/2013-ATV-Annual-Rpt-of-ATV-Related-Deaths--Injuries.pdf

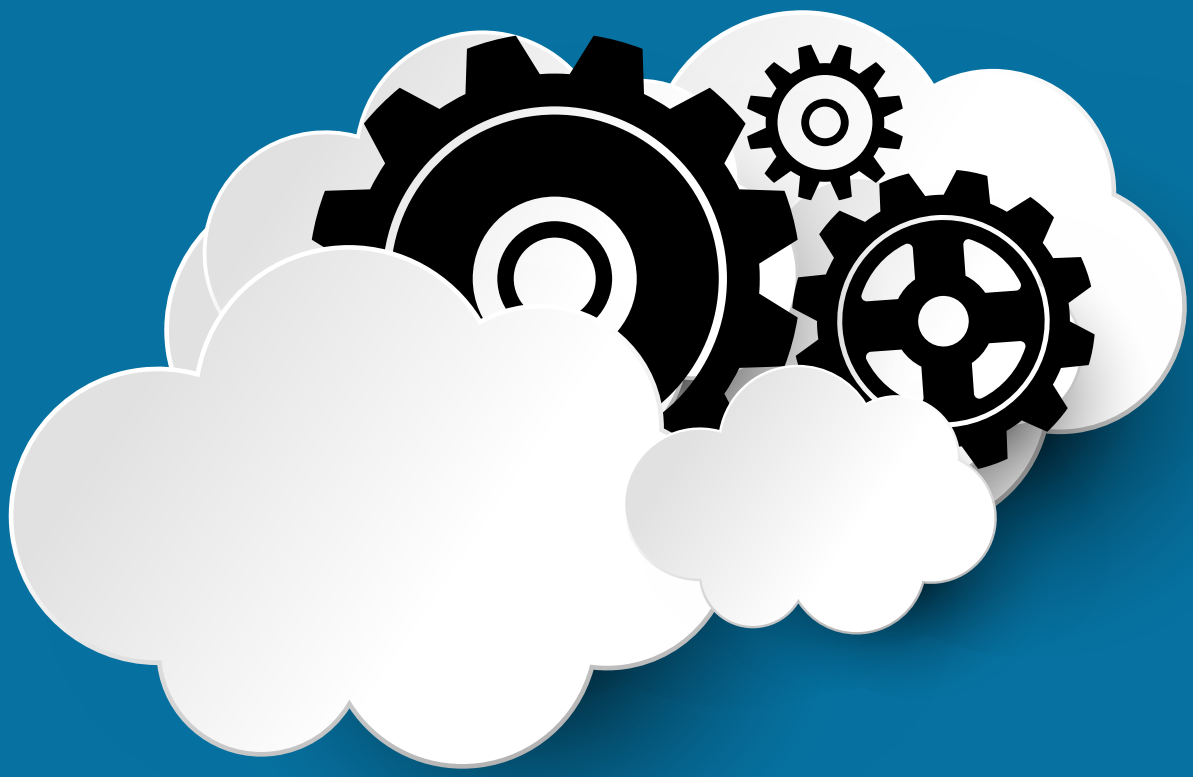
[10] http://www.cpsc.gov//PageFiles/122038/701.pdf

[11] http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6303a6.htm

[12] http://www.cpsc.gov/pagefiles/103389/audibility.pdf

[13] U.S. Census Bureau, Current Population Survey, Annual Social and Economic Supplement, 2012.

[14] U.S. Consumer Product Safety Commission internal report: Consumer Product-Related Injuries and Deaths in the United States: Estimated Injuries Occurring in 2012 and Estimated Deaths Occurring in 2010, August 2013.



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