

**In this issue:**

OSHA Proposes Changes to Workplace Injury & Illness Tracking	<b>2</b>
On The Lighter Side	<b>2</b>
Dear EH&S	<b>2</b>
The Holy Grail of Safety: A Single, All-Encompassing Safety Leading Indicator	<b>3</b>
Web Bytes	<b>3</b>
Did You Know?	<b>4</b>
Bringing Safety Home	<b>4</b>
What We're Working On	<b>4</b>

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## The Safety Net



### On-Campus Clinic Looks After BU Ears

Nestled in a cozy corner on the second floor of Neill Morris Hall is a little-known jewel of Baylor University—an Audiology clinic. EH&S Staff recently had an opportunity to sit down with Dr. Carrie Caviness, the Clinical Audiologist, and talk about what they do at the clinic.

The clinic does what you would expect an Audiology clinic to do: test hearing. Their patients are pediatric, geriatric, and every age in-between. They serve the campus community, and also the community at large. They can establish a baseline hearing level to compare future tests against, or they can test for current hearing loss.

But hearing tests are just the beginning of the services the clinic offers.

The clinic can custom-fit earplugs that are far superior to those one-size-fits-all plugs you can buy at a store. They will frequently do this for personnel and students from the Music School, who need to protect their hearing while at the same time preserving their sensitivity to the whole frequency spectrum. They can also custom fit other hearing protection devices, for instance devices that will protect your hearing while at the same time connecting to a two-way radio (clients here would include racecar drivers and motorcycle operators). They can also custom-fit earplugs for people who are frequently on headsets

for long periods of time (security, for example).

For those who are suffering hearing loss, they can fit your hearing aids. What they can do goes far beyond what you think of as your standard hearing aid. They can fit you with a hearing aid that has Bluetooth, so you can hook to your ipod, smart phone, or other technology that is Bluetooth compatible— and connect the device audio straight to your hearing aid.

Perhaps your needs are more limited than a hearing aid. Perhaps you only have trouble hearing the TV or the phone. The clinic can help you with Hearing Assistive Technology Systems (HATS). These systems might include telephone amplifying devices or a special alarm clock. They may also include devices that flash a light when someone rings a doorbell. There are many possibilities that exist.

The clinic sees about 25 patients a week, both from Baylor and from the larger community. Baylor Faculty and staff can get their hearing tested for half price, and Baylor insurance will pay up to 80% of costs for hearing aids. The clinic is also partnered with the Lions Club and Sertoma Club to provide assistance to persons in the community who are financially disadvantaged.

Dr. Caviness explained how hearing works (see Did You Know? column on page 4) and said that

even a single exposure to a high decibel event can lead to hearing loss—either immediately or delayed. Case in point, the clinic did free hearing testing for residents of West after the fertilizer plant explosion, which was a single event.

The largest demographic for hearing loss, according to Dr. Caviness, is young adults aged 18-25. The reason for this is due to frequent and prolonged usage of ear buds to listen to music on their ipods or smartphones. The doctor's advice to those young adults? Turn it down. If other people can hear your music, chances are that it's too loud. If they can hear it across the room, it's *definitely* too loud.

### Got Questions?

If you have any questions concerning your hearing, or if you wish to set an appointment at the Audiology Clinic, please contact:

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## OSHA Proposes Changes to Workplace Injury and Illness Tracking

The Occupational Safety and Health Administration is proposing a rule to improve workplace safety and health through improved tracking of workplace injuries and illnesses. The proposed rule followed the Bureau of Labor Statistics' release of its annual Occupational Injuries and Illnesses report, which estimated that three million workers were injured on the job in 2012.

"Three million injuries are three million too many," said Assistant Secretary of Labor for Occupational Safety and Health Dr. David Michaels. "With the changes being proposed in this rule, employers, employees, the government and researchers will have better access to data that will encourage earlier abatement of hazards and result in improved programs to reduce workplace hazards and prevent injuries, illnesses and fatalities. The proposal does not add any new requirement to keep records; it only modifies an employer's obligation to transmit these records to OSHA."

The proposed rule was developed following a series of stakeholder meetings in 2010 to help

OSHA gather information about electronic submission of establishment-specific injury and illness data. OSHA is proposing to amend its current recordkeeping regulations to add requirements for the electronic submission of injury and illness information employers are already required to keep under existing standards, Part 1904. The first proposed new requirement is for establishments with more than 250 employees (and who are already required to keep records) to electronically submit the records on a quarterly basis to OSHA.

OSHA is also proposing that establishments with 20 or more employees, in certain industries with high injury and illness rates, be required to submit electronically only their summary of work-related injuries and illnesses to OSHA once a year. Currently, many such firms report this information to OSHA under OSHA's Data Initiative.

OSHA plans to eventually post the data online, as encouraged by President Obama's Open Government Initiative. Timely, establishment-specific injury and illness data will

help OSHA target its compliance assistance and enforcement resources more effectively by identifying workplaces where workers are at greater risk, and enable employers to compare their injury rates with others in the same industry.

On Jan. 9, 2014, OSHA held a public meeting on the proposed rule in Washington, D.C. The public comment period ran until March 8, 2014, during which time many industries submitted written comments on the proposed rule.

Under the Occupational Safety and Health Act of 1970, employers are responsible for providing safe and healthful workplaces for their employees. OSHA's role is to ensure these conditions for America's working men and women by setting and enforcing standards, and providing training, education and assistance.

### On The Lighter Side

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"Oh, that. OSHA stopped by the other day..."

### Dear EH&S

Dear EH&S

How do we dispose of the gloves we use in our lab?

-Curious

Dear George,

The short answer to that question is: it depends.

Now the longer answer. In most cases, gloves used in a lab are disposed of in the regular trash. There are a few instances, however, in which this may not be appropriate.

For example, if your glove has become contaminated with something that is a

hazardous waste material, then the glove itself is considered hazardous waste and must be treated as such. Or, if your glove has become contaminated with a biohazard, it would be treated as such. Or if it were contaminated with a radioactive material, it would be treated as such.

So ask yourself what you're working with and what you got on your gloves, and go from there.

And, as always, if you have questions about specific instances, feel free to ask someone from EH&S.

## The Holy Grail of Safety: A Single, All-Encompassing Safety Leading Indicator

I have good and bad news on the topic of leading indicators for safety. First, the bad news: A single, all-encompassing safety leading indicator is like the fountain of youth – it probably does not exist. However, there is some good news: There is a single leading indicator that seems to stand above all the rest with regard to its ability to explain and predict workplace injuries. This leading indicator is the information that is derived from conducting safety inspections and observations.

A research study conducted in partnership with a team from Carnegie Mellon University (CMU) found that 75 percent of the variation in the frequency of safety incidents can be explained by the information derived from safety inspections and observations. Further, this team was able to build a computer model that could predict future incidents with accuracy rates as high as 80 to 97 percent.

How'd they do this? You guessed it: using inspection and observation data.

The team was given access to four years of real-world safety-inspection and observation data from several different companies. They matched this data with the safety-incident data from these same companies across this same time period. Then, they fed a portion of both data sets to high-powered computers. These sophisticated machines "learned" by examining this big data that included millions of inspections, observations and incidents.

After a period of "learning," the systems derived several predictive models that used 90 days of safety inspections and observations to predict the safety incidents over the next 30 days. These models were then tested for accuracy against a data set that the computers had not yet seen. The best models proved to be accurate at predicting overall incident levels 80 to 97 percent of the time.

From this analysis, it was determined that safety inspections and observations can explain and even predict safety incidents with dramatic accuracy and thus, are one of the most compelling safety leading indicators available today.

How can inspection and observation data be so predictive? What about other leading indicators such as training, process controls and even culture?

Safety inspections and observations are so powerful because they are both a direct and indirect view into the myriad factors that affect workplace safety such as training, process controls and culture.

If inspections and observations are done correctly, they directly can measure things like adherence to proper process controls. For instance, they can determine if employees actually are following safety procedures for things like lockout/tagout, fall protection and proper machine guarding.

But further, inspections and observations also indirectly can measure other risk drivers like training and culture. For instance, if during an inspection an employee is found not following the proper fall protection procedures, a quick conversation with that employee can determine why. The employee might respond by saying, "I had no idea we had such procedures ... this is my first week on the job!" This probably would suggest a new-hire training issue that needs to be addressed. However, if the employee responds with, "I've been doing this work this way for 20 years and have never been hurt," then probably there is a cultural issue that needs to be addressed.

Regardless, when done properly, observations of the conditions on the worksite and the behaviors of employees within those conditions can provide information about both the direct and indirect causes of future safety incidents. The Carnegie Mellon University team's analysis proved this, and savvy safety professionals intuitively have believed this for decades.

Like any system analysis, it is important to review the inputs of the process in order to understand – and even predict – the outputs. Safety observations and inspections give us insight into the inputs so that we can explain the outputs. In this case, the outputs are occurrence of safety incidents – or better yet, the lack thereof.

While helpful, it's not necessary to have a team of world-class data scientists and machine-learning experts at your disposal to make use of inspection and observation data. Much of the team's work simply has confirmed what many safety folks have been professing for years: Safety inspections and observations are a

critical component to operating a world-class safety function.

In fact, just the process of systematically and regularly conducting safety inspections and observations can yield better safety outcomes, especially if employees are engaged during the process by discussing the safe and unsafe observations that are found. The researchers concluded that the safest jobsites often involved non-safety personnel in the inspection process. If you can involve operations employees in your process, you can instill a focus and perspective on safety that goes outside just the safety functional group.

*Griffin Schultz is the general manager of Predictive Solutions Corp., a fully owned subsidiary of Industrial Scientific Corp. Predictive Solutions' vision is to end death on the job in this century. Its strategy to achieve that vision is to predict workplace injuries so their customers can prevent them.*

### Web Bytes

Rather than write about the EHS website, we thought we'd widen our net and talk about some interesting health & safety apps that exist.

**Sound Meter:** Puts the ability to test sound levels right on your phone. It works pretty well in our experience, but you may have to do some initial calibration.

**Chemical Droid:** This application lets you see SDS information for thousands of chemicals, to help you store, transfer, and handle chemicals more safely.

**Occupational Health & Safety:** This application features discussions, webinars, and topics dealing with general occupational health & workplace safety.

**Weather Alert:** Keeps you notified of severe weather alerts. Very customizable and also has a tracking feature to keep you informed while traveling.

## Did You Know?

When sound waves enter the outer ear, the vibrations impact the ear drum and are transmitted to the middle and inner ear. In the middle ear three small bones called the malleus (or hammer), the incus (or anvil), and the stapes (or stirrup) amplify and transmit the vibrations generated by the sound to the inner ear. The inner ear contains a snail-like structure called the cochlea which is filled with fluid and lined with cells with very fine hairs. These microscopic hairs move with the vibrations and convert the sound waves into nerve impulses—the result is the sound we hear.

When we are exposed to a high-decibel noise (decibels are how sound is measured), this creates what amounts to a tidal wave in the cochlea, which can bruise or even break those tiny hairs. And, unlike what we typically think of hair, these don't grow back. The effects of this damage is cumulative, although a single exposure may be enough to sustain hearing loss.

OSHA sets legal limits on noise exposure in the workplace. These limits are based on a worker's time weighted average over an 8 hour day. With noise, OSHA's permissible exposure limit (PEL) is 90 dBA for all workers for an 8 hour day. Decibels are measured on a logarithmic scale which means that a small change in the number of decibels results in a huge change in the amount of noise and the potential damage to a person's hearing. The OSHA standard uses a 5 dBA exchange rate. This means that when the noise level is increased by 5 dBA, the amount of time a person can be exposed to a certain noise level to receive the same dose is cut in half.

How loud is 90 dBA? A train whistle at 500 feet or a motorcycle at 25 feet would both measure 90 dBA of sound.

## New Feature: Bringing Safety Home

Would you believe that more than one-half of the injuries suffered by workers occur off the job? Someone once said that your home is your castle. If this is true, castles are very dangerous places.

Approximately 24,000 individuals are killed each year in home accidents—an average of about 65 deaths per day. The National Safety Council reports that about 3.6 million people are injured in home accidents, which means that one person in 60 was disabled for one or more days in a home accident. About 100,000 of these injuries resulted in some permanent impairment.

With these statistics, it cannot be over emphasized that what you do away from your job is vitally important. At home, we become all too familiar with our environment. Then, to our surprise, we have an accident and wonder why it didn't happen sooner.

It's with this in mind that the Department of Environmental, Health & Safety is adding a new feature to the newsletter: "Bringing Safety Home". In each newsletter, we will be offering information and reminders to help you be safe away from the job.

We will begin in our April newsletter with a column that is timely for Spring in Texas, addressing severe weather.

If you have something you would like to be addressed in this column, or in any other area of the newsletter, please drop us a line at: [ehs@baylor.edu](mailto:ehs@baylor.edu).

## What We're Working On

The entire EH&S department is in the process of revising the department's website. This is currently in its early stages. Look for information in upcoming newsletters as the process unfolds and things begin moving around and changing. Special thanks to Melinda Dunn, who does an excellent job maintaining the site.

Brent Jones and Kenneth O'Connor are working on a hearing conservation program for the university.

Kenneth O'Connor is working on a shop safety program, complete with training and safety binders for all the student shops on campus.

The department has wheels! EH&S recently acquired a 4-seat John Deere Gator, to help us get around campus and serve you better. Look for some of our personnel to be zipping around on it.

The next Lab Safety Committee meeting will be held in April.

### Current Live Training Schedule:

<http://www.baylor.edu/ehs/index.php?id=98325>

### Training Matrix:

<http://www.baylor.edu/ehs/doc.php/203191.pdf>

*Online trainings available through Blackboard*

"The Safety Net" is a monthly electronic newsletter published by the Department of Environmental Health & Safety and intended to share information with the Baylor community, promote transparency within the university's safety program, and encourage the continued development of a culture of safety among university employees and students.

Comments, questions, and ideas for future stories are welcomed. Email: [ehs@baylor.edu](mailto:ehs@baylor.edu)