

## HyGreen

University of Florida



### **Alcholo Sniffer Gives Hospitals a Hand Tackling Super Bug Infections**

According to the Centers for Disease Control and Prevention (CDC), health care-associated infections (HAIs) are the fourth leading cause of death in the United States. This despite the fact that something as simple as hand washing could drastically reduce the death rate.

HAIs can be fatal and are often highly resistant to antibiotics. Prevention, primarily through stringent hygiene practices to avoid transferring infections between patients, is the only known means of curtailing these deadly unintended effects of health care.

#### **HyGreen Sniffs out Poor Hand Hygiene**

Now, thanks to researchers at the University of Florida hospitals and other health care settings have a new tool to help enforce hand-washing adherence. They recognized that their work on a project to detect alcohol and other volatile compounds could easily be adapted to aid hand-hygiene practices in health care environments. Since proper hand hygiene practices are the first line of defense in the prevention of HAIs, it made sense to develop a system that

ensures this simple hygiene protocol is always followed.

Enter HyGreen — a transparent system that ensures health care workers wash their hands before delivering care and, thus, prevents the spread of infection from one patient to another. The system consists of a badge, an alcohol sniffer, a bedside monitor and a wireless reporting system.

“Virtually all hand-hygiene products — both soap and waterless — contain an alcohol,” explains Richard Melker, Ph.D., M.D., the primary inventor and professor at University of Florida’s College of Medicine, Anesthesiology. “A hand-wash station is positioned wherever these products are dispensed and detects the presence of the alcohol on the health care workers’ hands immediately after they practice hand hygiene. The health care worker wears a badge that broadcasts a unique identifier so the database knows who washed their hands and where they were washed.”

This is just the first step of the system’s process. The following step is designed to protect the next patient the health care provider approaches.

“The invention provides a safety net around the patient, so that a health care worker can only enter a safe area around the patient if his or her hands are clean,” says Melker. “If not, the “unclean” badge status is communicated to a bed monitor, which, in turn, activates the badge to provide a series of vibrations reminding the health care worker to wash before entering the safe area around the patient,” he continues.

The system also wirelessly records all interactions in a central database so that the hospital, clinic or health care facility is notified in real-time which health care workers are complying with hand-hygiene recommendations and which are not. This allows the health care institution to intervene quickly if necessary and keep accurate incident records. It also provides a means to report to entities such as the CDC for accurate national incident trend tracking.

### **Change Saves Lives and Money**

While saving lives has always been of high importance to health care workers and institutions, recent developments have heightened concerns over HAI rates.

“The change in reimbursements by Medicaid and Medicare really was a significant influence on the market acceptance of this invention,” explains Bruce Clary, assistant director of the Office of Technology Licensing at the University of Florida.

As part of the Deficit Reduction Act of 2005, Congress required the Secretary of Health and Human Services (HHS) to identify a number of circumstances that are preventable, avoidable or containable and that adversely affect health care delivery or outcomes — so-called never events, since they should not occur and are not the reason the patient was admitted to the hospital. HAIs are counted among those circumstances.

Thus Medicare and Medicaid will not pay hospitals for treating infections the patient did not arrive with (nor allow them to charge the patient directly). In other words, health care institutions are required to provide care for HAIs but will not be paid for delivering treatment for these infections.

This is a significant change in insurer reimbursements, but it’s a move that is likely to be popular with health care consumers concerned with the consequences of HAIs.

“Health care-associated infections account for over 250 deaths every day in the United States,” exclaims Melker. “Imagine what the public outcry would be if a commercial jetliner crashed every day in the U.S.!”

HHS considers the change in Medicare and Medicaid reimbursements as an important part of its mission to make American health care safer and more affordable. It is largely accepted that private insurers will soon follow suit and refuse payment for the treatment of HAIs. This is no surprise considering the impact of these unintended diseases on both the health care system and health care consumers.

“Health care-associated infections are the fourth leading cause of death in the United States and cost the U.S. health care system between \$30 and \$40 billion per year,” says Clary.

### **A Chance Remark Leads to a Handy Discovery**

Despite the obvious need for better hand hygiene systems, however, the inventors of HyGreen, who, in addition to Melker, included Nikolaus Gravenstein, M.D., Christopher Batich, Ph.D., and Donn Dennis, M.D., did not start out to tackle the problem of HAIs. They heard the cry for a solution while they were working on another project.

“A colleague commented that hand hygiene was a problem in hospitals and was a major cause of health care-associated infections and asked if we might come up with a solution,” explains Melker. “There was an immediate Eureka! moment, since we were already working on the detection of ‘taggants’ and ethanol for other products.

“Our experience with sensors for ethanol and other compounds made it very easy for us to develop a prototype/proof-of concept system,” he adds.

### **Good Chemistry Facilitates Clean Deal-Making Process**

Also relatively easy, says Melker, was getting the product to market. “It took a very short time to prepare a patent disclosure to the University of Florida and to begin development of the technology at Xhale Inc.,” says Melker. “In this instance, the university licensed the technology to a company in which the inventors were actively involved, so commercial interest dramatically helped in the very rapid development of the technology.”

Indeed, two of the inventors — Melker who serves as Xhale’s chief technology officer, and Dennis, who is Xhale’s chief science officer — were co-founders of the company, which is also located in Gainesville. “We had licensed other technology from these inventors two years earlier, while we were creating the company,” says Richard Allen, chief executive officer of Xhale.

“We had started the company to work on the other suite of patents, so we were already working with this group of inventors when they conceived of HyGreen,” explains Allen. “In this case the first idea came from a team of University of Florida researchers who were already tied into Xhale, and, therefore, the licensing effort and ‘commercial finish’ were a bit easier than normal,” he concludes.

Xhale invested \$5 million to speed HyGreen’s development.

“*“The process was very serendipitous right from the start,” agrees Clary. “The chemistry between the primary inventor, Richard J. Melker, M.D., and Xhale’s CEO Mr. Richard Allen was terrific. So our role as the Office of Technology Licensing was very easy, simply protect the intellectual property, quickly get a license agreement in place and allow the Xhale team to run with it.”*

Clary says the most important thing in this story was the close and collaborative working relationship the University of Florida had with the licensee, Xhale. “We tried to place as few hurdles in front of them as possible and to be a positive influence,” he says. “They responded by really creating value and moving through the product development cycle

amazingly fast.”

Allen says HyGreen has enjoyed a huge amount of market interest since the change in hospital reimbursement by Medicaid and Medicare. “So no, the economy hasn’t dampened interest at all in HyGreen. It seems to be the right time for this,” says Allen.

He expects interest to climb with the passing of the health care reform bill. “When the government is striving to save money and lives in health care, this is a good fit,” he says.

The highest cost tied to HAIs, however, is calculated in terms of human lives. “It feels good to save lives, to prevent disease and to make a difference,” says Melker.

— *Pam Baker, Better World Report, 2010*

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