Device monitors infant's breathing

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Parents of newborns often invest in nursery monitors that let them hear or even see when their baby is awake or sleeping. And most know the importance of putting the infant to bed on his or her back so that breathing won’t be obstructed.

Now researchers at the University of Texas at Arlington have designed a device that offers parents more assurance that their newborn is breathing properly, with the goal of reducing the rate of sudden unexplained deaths.

Electrical engineering professor J.-C. Chiao, doctoral candidate Hung Cao and Heather Beardsley, a research engineer at UT Arlington’s Automation & Robotics Research Institute, have developed a wireless sensor system that detects carbon dioxide exhaled by babies as they sleep.

If a baby stops breathing, the device can alert parents quickly enough to allow for lifesaving intervention.

“Our sensors just let you know the baby is breathing normally without all the wires and breathing tubes most systems use now,” Chiao said.

“Our system is more accurate than current systems. Our system reduces false alarms that desensitize parents or caregivers.”

Sudden unexplained infant death -- a classification for deaths for which no underlying cause can be determined -- is the largest single category of death among infants.
no cause can be immediately observed -- and sudden infant death syndrome -- deaths that cannot be explained even after an investigation and autopsy -- occur in babies younger than 1 while they are sleeping.

In October, the American Academy of Pediatrics issued new recommendations for reducing the risk of SIDS and other sleep-related deaths. Besides placing the baby on its back, they include using a firm mattress, avoiding soft and loose bedding, keeping the child away from smokers, ensuring that the infant stays cool and breastfeeding for as long as possible.

The academy advises against using devices like special pillows and cardiorespiratory monitors that claim to reduce the risk of SIDS. No medical device has ever been approved to reduce the risk of SIDS, according to the FDA.

The device patented by the UTA team, however, doesn't touch the child's body, and manufacturers of nursery monitors should be able to integrate it into their products to give parents more peace of mind, said Chiao, who holds the Janet and Mike Greene, and Jenkins Garrett professorships in the UT Arlington College of Engineering.

The new sensors can be attached to a baby's crib or car seat. They are less cumbersome than current technology that requires the breathing apparatus to be around the baby's nose.

Cao said he was inspired to develop the new sensor after the birth of his first son in 2006.

"I was watching him through the glass in the hospital nursery and didn't see anyone taking care of him," Cao said. "I couldn't get in to check so I thought, 'How can I be sure he's OK?"

Cao was working at the robotics institute at the time on a project developing gas sensors for missiles. His work involved building sensors that could detect whether a missile had lost gas, which is needed to fire the missiles.

"I thought, 'Why couldn't that same type of system be used for detecting carbon dioxide, which all people breathe out?"' Cao said. "The sensors could be mounted around the baby to let people know whether he's breathing normally or not."

The team has worked to reduce the cost of the device to about $100.

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