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# UNH Research Enhancing Patient Care With "Smart" Hospital Beds

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Media Relations

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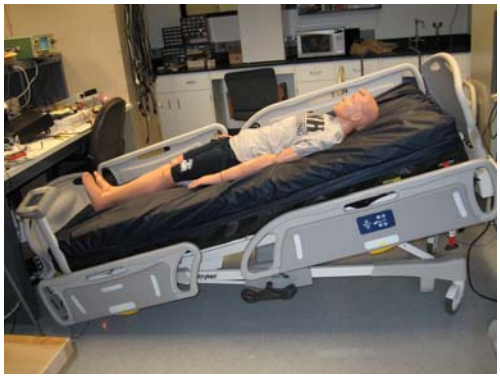

Jonathan Waters, a University of New Hampshire graduate student in electrical engineering, is adapting smart hospital bed technology to treat sleep apnea, a condition which causes sufferers to periodically stop breathing while sleeping. Microprocessors in the bed sense when breathing has ceased and will move the bed into the Trendelenberg (top photo) or reverse Trendelenberg position so breathing resumes.

DURHAM, N.H.-- A University of New Hampshire professor's research into hospital bed technology could soon represent a giant leap forward in patient care.

John LaCourse, professor and chair of UNH's Department of Electrical and Computer Engineering, is currently negotiating with hospital bed manufacturers to adopt his programmed algorithm technology, which could become the basis for "smart" computerized hospital beds.



As LaCourse explains, these smart hospital beds would communicate with and respond to medical devices that monitor a patient's condition. "Perhaps a sleeping patient moves, causing a drop in blood pressure. The blood pressure monitor would communicate this change to the bed and the bed, in turn, would move up or down until the patients' blood pressure is stabilized," he says.

Conversely, the bed would analyze faulty readings interfering with patient care. "Someone sits on the edge of the hospital bed and it appears that the patient's blood pressure has fallen," says LaCourse. "The bed would send a signal to the monitor not to be alarmed – the reading is due to the visitor's presence and not because the patient's condition has deteriorated."

Post-surgical needs may also be met with this technology. "Procedures such as retinal surgery require exact blood pressure levels as part of the healing process," says LaCourse. "A smart hospital bed would periodically adjust itself to maintain these levels for patients."

Even quality-of-life conditions such as bed sores could be addressed. "Instead of requiring hospital staff to move the patient, monitors could send signals to the bed to roll the patient to his left or right to avoid bed sores," says LaCourse.

Ongoing research by Jonathan Waters, a 2006 UNH graduate currently finishing UNH's masters of science degree program in electrical engineering, may add a home care dimension to this project. For his master's thesis, Waters is seeking to adapt the smart hospital bed technology to treat sleep apnea, a condition which causes sufferers to periodically stop breathing while sleeping.

"Microprocessors installed into the bed measuring respiration patterns will sense when breathing has ceased, as well as move the bed in such a way that the individual resumes breathing," he explains. Waters has since been recruited by IXXAT, corporate sponsor of the sleep apnea initiative, to complete his research.

The ultimate success of LaCourse's project, which also features contributions by graduate and undergraduate students, rests with incorporating a plug-and-play component to his technology. plug-and-play means that medical devices – everything from blood pressure monitors to breathing machines – "share a common technology so they can, in effect, talk to each other and share patient information which greatly reduces care errors," explains LaCourse.

To realize plug-and-play capability, however, LaCourse's technology must become the industry standard for hospital bed manufacturers. In this way, medical devices could seamlessly connect to and exchange patient data with smart hospital beds.

LaCourse is making significant progress in his quest. "We've had discussions with two major bed manufacturers – Stryker and Hilrom – and both were receptive to our protocols," says the UNH researcher. He is hopeful that, within two to three years, his technology may be accepted by most if not all hospital bed companies.

This is a short time frame within the larger world of technology licensing, according to Maria Emanuel, licensing manager of UNH's Office of Research Partnerships and Commercialization.

"The research and licensing process takes years to complete," says Emanuel, whose office seeks patents and other legal protections for UNH research that have practical applications. "So, two to three years for Dr. LaCourse's technology to come on line means that his project is moving along fairly quickly."

Emanuel sees great potential – both for UNH and the general public – in the smart hospital bed technology. "His project is representative of the research being done at UNH," she says. "That is, laboratory work which is very meaningful for society. Dr. LaCourse's efforts could lead to significant improvements in patient care."

For LaCourse, his technology is part of a larger scheme of innovation. "I am always looking for what else is out there – how can I take a product idea, build it, and create something that helps humanity."

The University of New Hampshire, founded in 1866, is a world-class public research university with the feel of a New England liberal arts college. A land, sea, and space-grant university, UNH is the state's flagship public institution, enrolling 12,200 undergraduate and 2,300 graduate students.

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**Photographs available to download:**
http://www.unh.edu/news/cj_nr/2010/dec/bp06trendelenberg_01.jpg
http://www.unh.edu/news/cj_nr/2010/dec/bp06trendelenberg_02.jpg

Caption: Jonathan Waters, a University of New Hampshire graduate student in electrical engineering, is adapting smart hospital bed technology to treat sleep apnea, a condition which causes sufferers to periodically stop breathing while sleeping. Microprocessors in the bed sense when breathing has ceased and will move the bed into the Trendelenberg (top photo) or reverse Trendelenberg position so breathing resumes.

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