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**Clinical studies under way at Sac State would benefit an aging population**

The oldest baby boomers, a generation of 77 million Americans born between 1946 and 1964, turned 65 two years ago. That population faces health issues that may become an enormous financial burden on society.

Sacramento State biomechanics Professor David Mandeville has launched two clinical studies to address major vulnerabilities among older people: the high incidence of knee osteoarthritis in middle-aged women, which he believes may be related to the menopause transition, and the likelihood that any elderly person will suffer a devastating fall.

“There is a high cost associated with falling, and we’re talking billions of dollars (in terms of medical care),” says Mandeville. “More importantly, the mortality rate increases following a fall event, so we want to be able to alert elders when they’re at risk of falling, and we want to do this with a wearable biotech device.”

The device could be a tool in the growing field of telemedicine.

Ideally, elderly people wear the small apparatus as they go about their daily lives. Should they become unsteady and in danger of falling, it would alert a remote clinic staffed round the clock by medical professionals, who could monitor hundreds of patients at once.

“They would know who is showing signs of a fall and be able to make a timely intervention,” Mandeville says. “The goal would be to keep elders functionally independent and to maintain their quality of life in their own home for as long as possible.”

The fall-risk-reduction study is funded by the Dean’s Leadership Circle, a group of donors who support faculty research in the University’s College of Health and Human Services. Mandeville is collaborating with Sacramento State microwave engineering Professor Milica Markovic, who built a prototype biotech device. Their work is ongoing.

In the second study, Mandeville is among a small group of researchers across the country asking whether the hormonal changes that take place during the menopause transition can contribute to the increased prevalence of knee osteoarthritis
in women. The study is one of the first to use motion-capture cameras and biomarkers for assessing knee forces of women in the menopause transition.

“It’s a novel interdisciplinary study,” he says.

Sacramento State recently acquired a state-of-the-art motion-capture camera system for its biomechanics laboratory. It also is being used by biomechanics and health science professors for a football placekicking study.

Mandeville, assisted by graduate students in the Department of Physical Therapy, has completed the first phase of the knee osteoarthritis study. Funding came from a National Institutes of Health (NIH) Extramural Associates Research Development grant, awarded to Bonnie Raingruber, a professor in Sacramento State’s School of Nursing. Mandeville collaborated with doctors from the UC Davis Sports Medicine Clinic in Sacramento, where the female test subjects – average age 52 – had been diagnosed with knee osteoarthritis.

“The goal is to identify whether diminishing levels of estradiol (hormones) across the menopause transition are involved somehow in the disease process of knee osteoarthritis,” he says. “The reason we think there might be a connection is that men and women track their prevalence rates pretty closely until about age 50, and then the incidence of knee osteoarthritis increases dramatically for women but not for men. Not many studies have looked at this.”

The study’s value, he says, is because the majority of health care costs for knee osteoarthritis occur in the disease’s advanced stage. There is no cure, and the standard treatment is a knee replacement.

The Journal of the American Medical Association recently reported that total knee-replacement procedures rose 162 percent between 1991 and 2010. Approximately 600,000 surgeries take place each year in the United States, at a cost of $9 billion. By 2030, demand for knee replacements may be as high as 3.48 million a year.

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