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Team examines chronic disease in workplace

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The science of physical activity at work remains understudied despite widespread acceptance that it plays an important role in health. Now, researchers at the Colorado School of Public Health at the University of Colorado Anschutz Medical Campus have published a comprehensive review of ways to monitor physical activity and tools for occupational exposure scientists.

The article describes techniques used to measure physical activity at work and elsewhere, focusing on pedometers, accelerometers and Global Positioning System technology. According to lead author Kenneth Scott, a PhD student in the Colorado School of Public Health's Department of Epidemiology, it is the most comprehensive review of methods studying the connection between physical activity in the workplace and chronic ailments like heart disease.

"Our economy has changed since the early 1900s when the field of occupational health was coming into its own," Scott said. "Now we have more workers who are sedentary during the work day, even in industries that we think of being very physically demanding such as mining. Workers, like many Americans, are facing common chronic diseases associated with physical inactivity."

Inspired by midcentury studies connecting heart disease to inactivity among London bus drivers, the study proposes that the health effects of physical activity on the job can be better understood through careful study, similar to other well-characterized occupational exposures such as noise and lead. The article, Occupational Physical Activity Assessment

for Chronic Disease Prevention and Management: A review of methods for both occupational health practitioners and researchers, was recently published in the *Journal of Occupational and Environmental Hygiene*. It summarizes data on the public health implications of physical activity at work, highlighting complex relationships with common chronic diseases. And like so many CU Anschutz studies, it applies research to real world problems.

According to the study, the intensification of work and increased length of the working day have likely impacted the health of sedentary and active workers alike. Too little physical activity can lead to an energy imbalance in which a person consistently consumes more energy than they expend. The evidence on occupational physical activity (OPA), though, indicates that there can be too much of a good thing. Excessive physical activity is associated with repetitive stress injuries, heat illness, fatigue and heart damage. It's possible that the type of physical activity people get at work has different physiological impacts than the type they get in the gym.

Occupational health practitioners stand to benefit from understanding the strengths and limitations of physical activity measurement approaches, such as accelerometers in smartphones, which are already ubiquitous in many workplaces and in some worksite health programs. Such methods can be used to improve health as well as study it. Though no single technology yet measures physical activity perfectly, and there is no single gold standard for OPA measurement, a combination of methods and advanced tools can improve accuracy.

"The devices that measure physical activity are being integrated with devices that measure physiological indicators like heart rate and body temperature," Scott said. "Those technological advances will help us understand what the impacts of physical activity at work are - how much activity is enough and how much is too much."

So far, objective measurements have rarely been used to examine the relationships between specific occupational factors, physical activity levels and health outcomes. More accurate and precise measurement may help clarify its relationships with stress and cardiovascular disease risk, as well as with arthritis, depression, injury risk, and other health conditions.

"People are beginning to realize that the workplace is a good place for positive health interactions," Scott said. "The more we expand opportunities for health in the workplace, the better."

The study's co-author is Raymond C. Browning, PhD, of Colorado State University.

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