To help doctors and patients, researchers are developing a 'vocabulary of pain'

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All over the world, patients with chronic pain struggle to express how they feel to the doctors and health-care providers who are trying to understand and treat them.

Now, a University at Buffalo psychiatrist is attempting to help patients suffering from chronic pain and their doctors by drawing on ontology, the branch of philosophy concerned with the nature of being or existence.

The research will be discussed during a tutorial he will give at the International Conference on Biomedical Ontology (icbo.buffalo.edu/), sponsored by UB, that will be held in Buffalo July 26-30.

He describes the goals of his work in a video interview:

"Pain research is very difficult because nothing allows the physician to see the patient's pain directly," says Werner Ceusters, MD, professor of psychiatry in UB's School of Medicine and Biomedical Sciences, and principal investigator on a new National Institutes of Health grant, An Ontology for Pain and Related Disability, Mental Health and Quality of Life.

"The patient has to describe what he or she is feeling."

That is a serious shortcoming, Ceusters says, because each patient's subjective experience of pain is different. Descriptions of pain therefore

lack the precision and specificity that is taken for granted with other disorders, where biomarkers or physiological indicators reveal what health-care providers need in order to assess the severity of a particular disorder.

"If we want to more effectively help people suffering from chronic pain, we need to study a population that is consistent, patients who have features in common," Ceusters says. "The problem with pain is, it's very hard to build up a group with the same sort of pain. People don't have the same vocabulary or linguistic capabilities or even the same cultural backgrounds. It's something pain researchers have struggled with for decades," Ceusters says. "We need to develop a vocabulary of pain."

That's where ontology comes in.

"The philosophical definition of ontology is the study of things that exist and how they relate to each other," says Ceusters, who also is director of the Ontology Research Group of UB's New York State Center of Excellence in Bioinformatics and Life Sciences. "I am a person and you are a person so we share something. Suppose I drop dead. What lies on the floor? Is that still a person? If it is no longer a person, is it still the very same thing that was sitting here as a person but now is a corpse?"

Ceusters says that in much the same way, definitions of pain and especially of chronic pain need to be much more precise; ontology provides methods of distinguishing among categories and describing data in uniform and formal ways.

While the philosophical approach to ontology naturally has its roots in ancient Greece, a computational approach to ontology began in the latter part of the 20th century, when computer scientists interested in artificial intelligence wanted to create software programs that perform reasoning they way humans do. To do so, they began to draw on ontology.

"Here at the University at Buffalo, we excel at combining the two approaches; we have a very strong foundation in the philosophical approach to ontology with Barry Smith, who is a pioneer in contemporary ontology, especially related to biomedical applications," says Ceusters, "while we also have a very strong presence in computational approaches, especially to biomedical ontology. These computational approaches allow us to devise systems of communication in which there is a consistent meaning for terms used in different language systems and conceptual frameworks."

With the $793,571 NIH grant, Ceusters and colleagues will study data gathered from thousands of patients in the U.S., the United Kingdom, Sweden, Israel and Germany who suffer from oral and facial pain, including temporomandibular disorder (TMD).

Ceusters will work with his colleagues, including Richard Ohrbach, DDS, PhD, associate professor of oral diagnostic sciences in the UB School of Dental Medicine, to develop an ontology that allows the data to be described in a much more uniform way.

"The goal is to integrate the data together so that we have a large pool of data that will allow us to obtain better insight into the complexity of pain disorders, specifically the assessment of pain disorders and how they impact mental health and a patients' quality of life," Ceusters says.

The grant will build on past work that Ceusters conducted with a grant from the Oishei Foundation related to improving the classification, diagnosis and treatment of psychiatric conditions.

Ceusters, who has degrees in knowledge engineering and information science as well as in neuropsychiatry, says that the current effort grew out of his work on that grant and also from a meeting with pain researchers that he attended in 2009.

"At that meeting, we discussed how we might build an ontology so that it could represent what pain is and how it relates to body parts and their activities and functions," he says. "Our goal is to create a software program that will allow all pain specialists to express themselves in crystal clear terms," he says, "We will create a symptom checklist that can be understood by computers. We have to define the terminology of pain. This can only be solved by the kind of ontology we are doing here at the University at Buffalo."

Provided by University at Buffalo