LEGAL ISSUES AND NEUROETHICS OF BRAIN-IMAGING BASED "PAIN-O-METERS": FRIEND OR FOE?

Chair: Karen Davis, PhD, Toronto Western Research Institute, University Health Network, University of Toronto

Speakers:

- Karen Davis, PhD, Toronto Western Research Institute, University Health Network, University of Toronto
- Tor Wager, PhD, University of Colorado Boulder
- Amanda Pustilnik, BA, JD, Harvard Law School and University of Maryland School of Law

Symposium Abstract:

The inherent subjective nature of pain can be a roadblock to confirming its existence. This clinical challenge imposes a hardship for patients to "prove" they have chronic pain without an objective measure acceptable by insurance providers and the courts. Thus, "pain-o-meter" objective tests of pain based on brain imaging has thus become sought after. This workshop will present 1) an overview of the capabilities and limitations of fMRI for this purpose, individual differences, new pain theories for consideration for test development ("dynamic pain connectome" and a brain "pain switch"), and ethical issues pertaining to false negative findings, and the impact on free will and privacy, 2) more advanced technological approaches (e.g., using machine learning and multivoxel pattern theory) that could hold promise for developing pain-o-meter tests, and 3) insight into how the legal system and courts view pain, the brain, admissible evidence, and the impact of pain-o-meter tests on policy.

Learning Objectives:

1. To understand the societal need to develop a brain imaging-based objective measure of pain (i.e., a “pain-o-meter”), and will be aware of the capabilities and limitations of current brain imaging technologies and potential future developments to establish such a test.
2. To gain insight into the complexities of shared brain resources for pain and suffering (emotion).
3. To have an understanding of the legal framework, and objective measures of pain with which claims of chronic pain are assessed.

Towards a brain imaging-based pain-o-meter test: Capabilities and limitations of fMRI
Karen Davis, PhD, Toronto Western Research Institute, University Health Network, University of Toronto

The clinical need and advances in MRI-based brain imaging have brought to the fore, the issue of whether there are brain biomarkers of pain that can be used to diagnose and verify the presence of chronic pain. This talk will first present the latest concepts of about how pain is represented in the brain based on the “dynamic pain connectome” (Kucyi and Davis, 2015) and
the “pain switch” (Davis et al., 2015), and then discuss the important capabilities and limitations of fMRI to identify pain in the brain that must be considered factors to develop a pain-o-meter. Finally, broader issues will be discussed including: the need and use of a pain-o-meter, quality control, the role and responsibility of neuroscientists and clinicians to set guidelines, privacy issues, and the social stigma and impact of being diagnosed with a “bad brain” on access to medical treatment, insurance or employment.

**Neuroimaging of pain and emotional harm: Implications for law and policy**
Tor Wager, PhD, University of Colorado Boulder

Neuroimaging measures of pain physiology have profound implications for law and policy. They impact how we might assess and determine the functional impact of pain in the future, and are already the basis of several commercial endeavors that are marketing brain imaging for use in legal settings. What can we conclude about pain and suffering based on brain scans? What are the limits of such claims, and what standards of evidence should be required? Neuroimaging is also changing how we think about emotional harm: If emotional harm shares brain circuitry with nociceptive pain, should it be treated the same way in legal and policy contexts? In this talk, I review current evidence on what neuroimaging can and cannot say about suffering and pain-related brain ‘damage’, focusing on three considerations relevant in legal and policy settings: the cause of any observable brain findings, the evidence linking brain changes to suffering and harm, and the attribution of responsibility for brain findings to the injured party versus other agents and factors. Finally, I provide a perspective on how to accumulate relevant evidence on the relationship between brain measures and suffering across studies, and what kinds of evidence should be required for arguments made in legal and policy-making settings.

**Legal Paradigms and Pain-o-meters**
Amanda Pustilnik, BA, JD, Harvard Law School and University of Maryland School of Law

Chronic pain is one of the major reasons that people seek recourse from their countries’ legal systems. Chronic pain that limits a person’s ability to work may entitle him or her to state-provided disability benefits. If a person is injured in an accident or medical error, he or she may sue the party at fault for compensation. In the United States, legal claims relating to pain account for billions of dollars of government benefits and private claims. But pain claims also present difficulties and carry a stigma: Pain is often invisible and hard to prove; further, chronic pain often is suspected of being manufactured (“made up”) for material or emotional gain. Accordingly, legal regimes relating to pain are set up to doubt claims of pain that are not accompanied by gross bodily damage – which is not how most chronic pain arises or persists. How can legal systems do better at understanding and compensating genuine chronic pain, while still screening out fraudulent claims? Part of the answer is to change the paradigm: Legal systems must understand that chronic pain is a brain-based phenomenon the persistence and intensity of which may have little to do with visible tissue damage – and that the absence of tissue damage does not mean that the pain is “psychogenic.” The other part of the answer may be pain-o-meters: Can various kinds of chronic pain be detected with reasonable reliability and accuracy, so that claimants can demonstrate their pain and legal systems can limit their concerns about fraud and malingering? This talk will present the current difficulties with legal regimes...
relating to chronic pain, suggest a revision to the frame or paradigm with which legal systems consider chronic pain, and will propose use-cases and limits on any future pain-o-meter.