

CAN YOU CHANGE THE GAME IN...

# Pain Management

How to alleviate acute and chronic pain conditions?

EIT Health seeks to support and invest in teams with the most disruptive and cost effective, technology-driven solutions advancing pain management.



## 1. Background information

The Global Burden of Disease Study 2016 reaffirmed that the high prominence of pain and pain-related diseases is the leading cause of disability and disease burden globally.<sup>1</sup>

By any measure, pain is an enormous health problem. Globally, it has been estimated that 1 in 5 adults suffers from pain and that another 1 in 10 adults are diagnosed with chronic pain each year.<sup>2</sup> While pain affects all populations, regardless of age, sex, income, race/ethnicity, or geography, it is not distributed equally across the globe. The four largest causes of pain are cancer, osteo- and rheumatoid arthritis, operations and injuries, and spinal problems, making the etiology of pain a multidisciplinary affair.

## 2. Opportunities

Pain is not just a symptom, but an entire condition that requires specialised treatment. Pain is different for everyone and the experience and symptoms depend not only on the type of condition, but also the individual patient. By understanding how and why pain is generated in a variety of conditions, innovative pain solutions will have a truly meaningful impact on patient lives.

By correctly managing pain conditions, patients' quality of life and satisfaction with care can be improved. Clinical resource management could be enhanced, and long-term costs of care could be reduced.

Some initiatives are out there trying to reinforce prevention: the International Association for the Study of Pain (IASP) has announced that 2020 will be the Global Year for the Prevention of Pain.

1. Vos T., Allen C., Arora M. Global, regional, and national incidence, prevalence, and years lived with disability for 328 diseases and injuries for 195 = countries, 1990–2016: a systematic analysis for the Global Burden of Disease Study 2016. *Lancet*. 2017; 390:1211–1259.

2. Goldberg, Daniel & McGee, Summer. (2011). Pain as a global public health priority. *BMC public health*. 11. 770. 10.1186/1471-2458-11-770.



## 3. Challenges

Pain management poses several challenges. Since the measurement of pain is not objective, the answers to questions regarding how to best manage the problem are not always self-evident. Acute pain is usually self-limiting when a reversible element can be identified. If acute pain is undertreated, it may become chronic in nature with the attendant problems of prolonged pain. Chronic pain creates psychological and social problems that are difficult and frustrating for both patient and physician. Some of the challenges in chronic pain are related to how to make non-opioid pharmacologic therapies available, accessible and affordable. Pain management is a field where it is hard to get a good proof of concept and where clinical trials usually fail in phase III and/or present high effect in the placebo population.

## 4. Possible areas of intervention

### Pain management

People can experience pain as an acute, chronic, or intermittent condition, or a combination of them. Specifically, chronic pain is a complex condition embracing physical, social and psychological factors, consequently leading to disability, loss of independence and poor quality of life. It seems clear that there is a need for Public Health to address pain as a disease itself, rather than a simple symptom, in order to provide better interventions for the management and the prevention of pain.<sup>3</sup>

Pain often leads to secondary problems such as disturbed sleep, anxiety, depression and decreased cognitive and physical functioning. There is a high need for improving the management of patients suffering both acute and chronic pain, as pharmacotherapy of these conditions is often inadequate. In part, this is due to poor translation of results from preclinical models into clinical trials, and also to a lack of sophistication in outcome reporting and of stratification in clinical trials. Unsuccessful pain relief is costly, due to unnecessary physical, psychological and financial burdens, as well as direct healthcare expenses caused by increased duration of stay, additional treatment and hospital readmissions.<sup>4</sup>

#### **Nociception level assessment**

Pain is subjective, although nociception activity is not. There is a need to develop an instrument to indicate and homogenise the level of pain, based on objective measurements.

#### **Coordination of disease pathways**

To get a holistic approach and tailored treatment plans.

#### **Self-management**

This approach could replace organizational management and allow patient empowerment.

3. [https://www.physio-pedia.com/Epidemiology\\_of\\_Pain](https://www.physio-pedia.com/Epidemiology_of_Pain)

4. [https://www.researchgate.net/publication/227830835\\_The\\_challenge\\_of\\_caring\\_for\\_patients\\_in\\_pain\\_From\\_the\\_nurse's\\_perspective](https://www.researchgate.net/publication/227830835_The_challenge_of_caring_for_patients_in_pain_From_the_nurse's_perspective)



## Chronic pain

Worldwide, the burden caused by chronic pain is escalating: 1.9 billion people were found to be affected by recurrent tension-type headaches, which were the most common symptomatic chronic condition. Measuring years lived with disability, low back and neck pain have consistently been the leading causes of disability internationally, with other chronic pain conditions featuring prominently in the top 10 causes of disability.<sup>5</sup>

Pain has multiple, serious sequelae including but not limited to depression, inability to work, disrupted social relationships and suicidal thoughts. Of those living with chronic pain, the median time of exposure to pain is 7 years.<sup>6</sup>

There are several chronic pain conditions, clustered in 7 broad categories following the new ICD-11. Amongst the most prevalent are:

- **Peripheral Neuropathic Pain (PNP)**, accounting for 40% of all neuropathic pain cases. The peripheral neuropathy underlying the neuropathic pain can have several causes, most prominently hyperglycaemia due to diabetes or cancer treatment via chemotherapy.
- **Chronic post-surgical pain (CPSP)** is a common complication of surgery, affecting up to 30% of adults undergoing surgical procedures. The prevalence of CPSP is estimated at 55 million people across the US and EU, with approximately 2 million new cases per year.
- **Chronic low back pain (CLBP)**: Approximately 80M patients have a formal diagnosis of chronic back pain in the US and EU. However, 90% of low back pain cases cannot be attributed to a pathoanatomic cause and are thus referred to as 'non-specific'. Hence, 53% of patients must wait more than 1 year to get the right diagnosis of the cause of their pain.<sup>3</sup>
- **Osteoarthritis** was, in 2013, the single most common cause of disability in older adults globally. Currently, more than 40 million people across Europe are affected by OA. Risk factors for OA can be grouped in 3 factors: systemic (age, gender and ethnicity), local joint (previous damage) and extrinsic (obesity and sport activities).

### Peripheral Neuropathic Pain (PNP)

There is a combination of sensory loss with hypersensitivity in the painful area. PNP is characterized by abnormal and unpleasant symptoms.

### Chronic post-surgical pain (CPSP)

Complex disorder in which acute pain develops or increases in intensity following a surgical procedure and gets chronic. The painful symptoms often relate to the distribution of nerves in the surgical area; therefore, the type of pain depends on the operation itself.

- Prevention
- Treatment

5. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6676152/>

6. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3201926/>



## Chronic low back pain (CLBP)

It is among the top 5 most prevalent disorders in the EU. Some of the main risk factors are occupational hazards, e.g. jobs that require repetitive bending, sedentary lifestyle, excess weight and poor posture.

- Diagnosis: Shorten the time to diagnose and manage the condition
- Treatment: Improving functional endpoints where avoidance of interventional procedures would create significant benefits to the patient

## Osteoarthritis (OA)

All forms of OA are characterized by a loss of cartilage, with a bidirectional interplay between cartilage, bone and synovial fluid. Most common symptoms include pain, stiffness, swelling and weakness.

- Treatment: stop the progression of cartilage damage

## Acute pain

Acute pain is a type of pain that typically lasts less than 3 to 6 months and that is directly related to soft tissue damage (e.g. sprained ankle or an injury). Normally, acute pain gradually resolves as the injured tissues heal. Despite substantial advances in pain research in recent decades, inadequate acute pain control is still more the rule than the exception. In the United States alone, nearly 100 million surgeries take place annually. More than 80% of these surgical patients report postoperative pain. Numerous studies show that fewer than half of postoperative patients receive adequate pain relief.

Patients arriving at emergency departments with significantly painful conditions fare no better, as emergency medicine physicians tend to underuse pain medications.

## Post-operative management

Post discharge management to prevent chronicity is needed. About 10% of all hospital-based surgeries are at risk to develop chronic CPSP.

## Burn

As a continuous acute pain

## External pain

Avoidable, external pain

## 5. Why is EIT Health addressing this problem?

Pain Management is a topic that has been unaddressed from a healthcare perspective, lacking a holistic view of the problem and not acknowledging its importance. It has always been considered as a symptom, rather than a disease as itself.

Addressing this topic with the Wild Card challenge holds the promise of finding ways to correctly assess and treat pain in its different forms and support patients that most of the time live with a chronic painful disease.

7. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3878786/>

8. Sarah R. Kingsbury, Hillary J. Gross, Gina Isherwood, Philip G. Conaghan, Osteoarthritis in Europe: impact on health status, work productivity and use of pharmacotherapies in five European countries, *Rheumatology*, Volume 53, Issue 5, May 2014, Pages 937–947, <https://doi.org/10.1093/rheumatology/ket463>