EVIDENCE SNAPSHOT:

Pain

koneksa

Enabling More Meaningful Evidence in Pain Studies

Pain is complex and heterogeneous. It varies by duration, cause, and type, fluctuating day to day and affecting daily living in ways that differ widely by individual and social role.

While pain severity can be captured using patient-reported outcomes, pain interference and real-world impact are harder to measure. Despite significant day-to-day variability in pain perception, trials still rely heavily on infrequent, clinic-based assessments. These fail to capture between-visit fluctuations or reflect patients' lived experience and treatment response[1].

The consequences are well documented. Only 0.7 percent of pain therapies ultimately achieve approval[2], and more than 70 percent of investigational programs do not progress beyond Phase II[3], reflecting the persistent difficulty of detecting meaningful treatment effects in trials dependent on subjective, highly variable patient-reported outcomes (PROs). Increasing sample size alone has not resolved these fundamental measurement limitations.

Demonstrating meaningful treatment response in pain requires evidence that captures change over time, anchors to a patient-defined baseline, and reflects real-world function.

One effective approach is to combine physical and psychological measures collected frequently in daily life. Continuous data provide important context for subjective patient-reported outcomes, helping interpret variability and better understand treatment response beyond episodic clinic visits.

Common patient-reported scales used to assess pain severity include:

- Brief Pain Inventory (BPI)
- BPI Severity Subscale (BPI-S)
- Numeric Rating Scale (NRS-11)
- Verbal Rating Scale (VRS)
- Visual Analog Scale (VAS)

These measures provide limited insight into functional impact, variability, and lived experience between clinic visits.

Fewer than 1% of new pain therapies advance from Phase I clinical trials to FDA approval, a markedly lower success rate than the approximately 6.5% observed across novel drug development overall[2].

References:

1. Reinen JM, Agurto C, Cecchi G, et al. Defining and validating a multidimensional digital metric of health states in chronic back and leg pain. *npj Digit Med.* 2025.
2. Thomas D, Wessel C. The State of Innovation in Pain and Addiction. *BIO Industry Analysis*. 2023.
3. Wang J, Doan LV. Clinical pain management: current practice and recent innovations in research. *Cell Rep Med*. 2024.

Designing Measurement That Reflects Real-World Pain

Koneksa enables frequent, at-home data collection that integrates PROs with objective measures of activity, mobility, and physiology. Evaluating these signals longitudinally allows pain-related change to be interpreted in context, rather than inferred from isolated clinic visits.

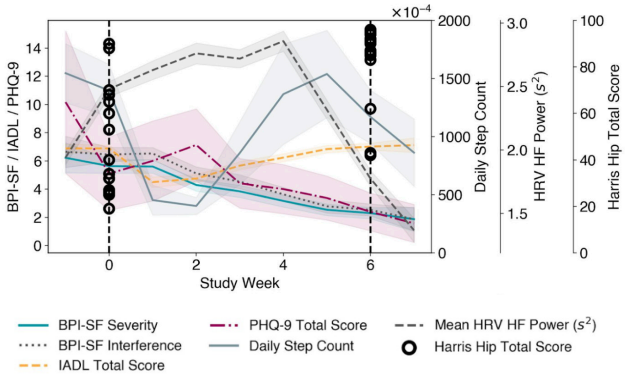
In pain-relevant contexts characterized by high symptom variability and episodic change, repeat at-home measures have demonstrated the ability to capture recovery trajectories, triangulate subjective pain interference with objective functional change, and surface patterns that would otherwise be nominal or missed using clinic-only assessment.

CASE STUDY

Detecting recovery trajectories between clinic visits

Hip replacement | Acute nociceptive and inflammatory pain

Longitudinal at-home measures capture recovery stages and inflection points that would be nominal or missed using episodic clinic-based assessments alone.



Repeated PROs and objective functional signals move together over time, enabling pain-related recovery to be interpreted in context rather than inferred from isolated visits.

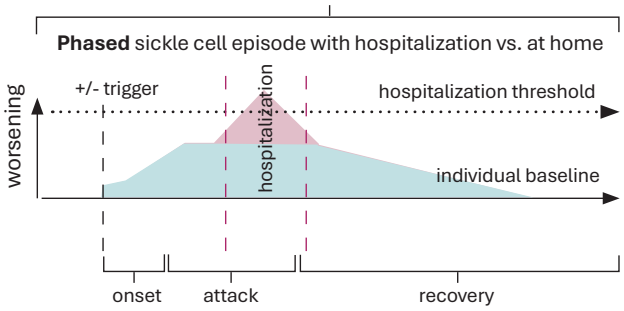
View the full hip replacement pain case study.

CASE STUDY

Pain episodes unfold relative to individual baseline

Sickle cell pain crises | Chronic and acute nociceptive and inflammatory pain

Pain episodes evolve across onset, escalation, and recovery, with meaningful burden occurring relative to an individual baseline across both at-home management and hospitalization.



These patterns illustrate why single timepoint assessments and fixed thresholds are insufficient, and why pain must be interpreted relative to personal baseline and across phases of daily living.

View the full sickle cell pain case study.

Why Interpretable Pain Evidence Can't Wait

Together, these case studies provide both quantitative and patient-driven evidence showing how contextual, repeat measurement can clarify variability and strengthen interpretation of pain outcomes.

In a competitive pain trial landscape, relying on legacy measurement approaches carries growing risk. The ability to generate interpretable, context-driven evidence is becoming a defining advantage in pain development programs. Koneksa brings proven experience enabling this approach in pain programs today.

Contact us to discuss how this approach could be configured for your study.