Digital Measures

## Digital Measures in Activinsights' Technology

Activinsights has a library of over 150 digital measures generated from open-format raw and event-based data collected with our remote monitoring technologies.

These digital measures are the building blocks of potential clinical trial endpoints and meaningful digital health biomarkers. They are formed from a natural hierarchy and are organised into domains that represent the major facets of human behaviour and lifestyle.

Activinsights' digital measures go beyond traditional actigraphy and the confines of clinic-based physiological outputs to measure an individual's lived experience in every moment of their life.

These digital measures are used across 20+ different therapeutic areas, classifying and characterising everyday living behaviours across a wide range of different populations.

Our team can help explain the most relevant and meaningful measures to meet the objectives of a study or research programme.
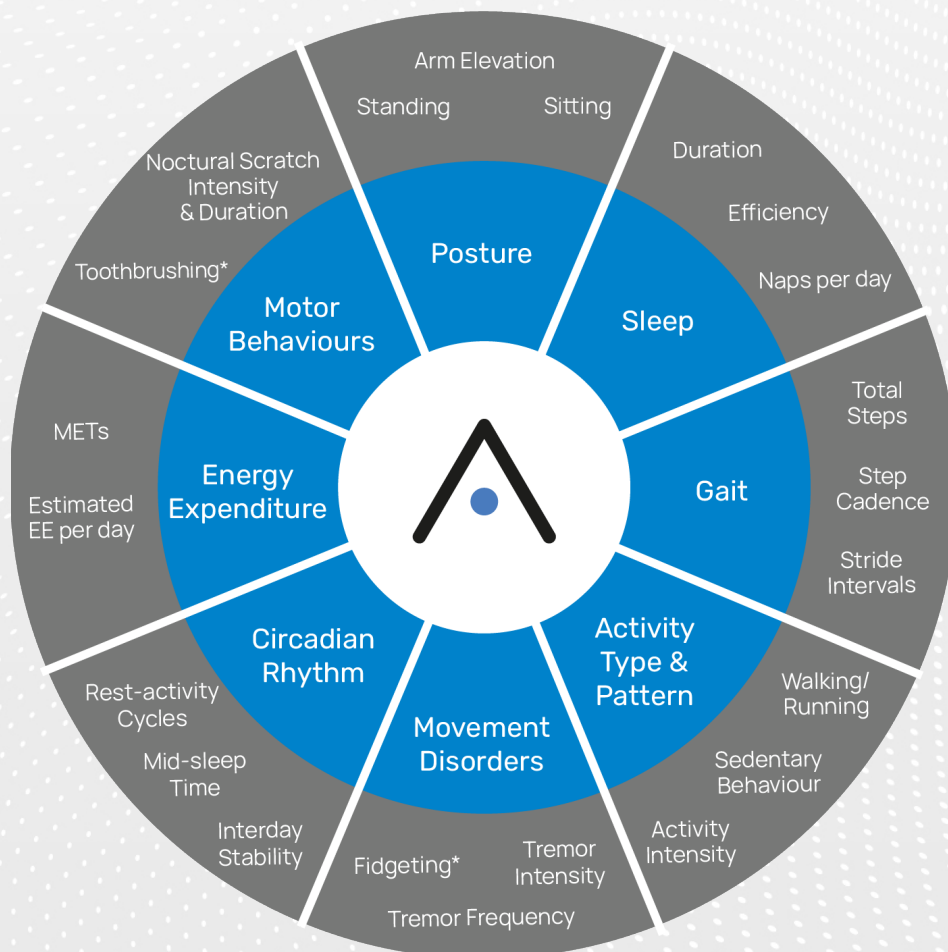
Please note this diagram is not exhaustive. Additional measures in each domain are available. *In development

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Often, novel studies will need new configurations of measures or entirely new algorithms – our combined scientific, clinical and data analytics team is on-hand to support the development and validation of new measures. Activinsights' digital measures also provide data quality oversight measures, such as non-wear duration per day.

Domain	Activity Type & Pattern	Sleep	Posture	Gait	Energy Expenditure	Circadian Rhythm	Movement Disorder	Motor Behaviour
No. of Digital Measures	100	23	13	18	8	5	8	4

As measurement experts, we lead the way in understanding different postures and behaviours from raw data accelerometry, predominantly from wrist-worn data. Our advanced event-based analysis approach enables patterns of behaviours to be established and quantified.

Behavioural and physiological classifications can then be inferred using a range of analysis techniques. This can be layered to understand individual and group insights over short periods, or over a day, separating nocturnal and diurnal periods or summarising data over multiple days for a population including life stage and seasonal changes.

We use a framework of verification, analytical validation and clinical validation (V3) framework to develop, refine and prove our digital measures. Algorithms are developed by our team in partnership with academics, researchers, health experts and clinicians.

Our long-standing commitment to open data analytics gives us access to the widest possible pool of global talent in algorithm development.

The verification stage demonstrates that our code implements these algorithms correctly. In the analytical validation, we use academic papers and study results to show that the algorithm we have implemented in code measures what we expect it to measure.

Finally, the clinical validation demonstrates the usefulness of the measure in a specific health context. As regulators such as the FDA and EMA increasingly include digital measures and primary and secondary endpoints and health biomarkers, we constantly work with regulators and sponsors in this evolving landscape.

Our ability to incorporate data from other sensors and data types, such as sleep diaries and clinical data builds context. The power of raw data means this library of measures consistently grows. It will rapidly exceed the 150 digital measures here, as we understand different postures, behaviours and lifestyle characteristics in different population groups.

New measures are constantly in research and under evaluation in response to specific client/study needs, new publications or as part of the Activinsights innovation pipeline.

The activities of daily living that build our lives are intricate and intriguing - Activinsights' precision measurement tools help to reveal this complexity while creating actionable insights.

Contact us to learn more

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