



SleepLife



**SHARC**  
Sleep Health Analytics  
Resource Center

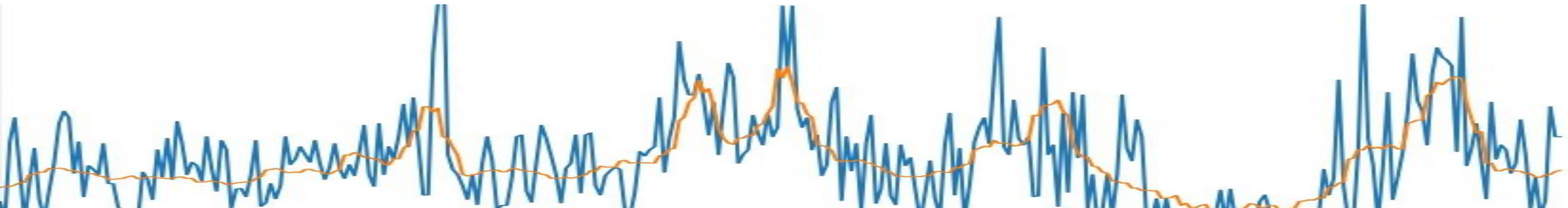
# Pediatric Precision Sleep Network (PPSN)

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# Pediatric Precision Sleep Network (PPSN)



A multi-site network that will leverage electronic health record data, the multidimensional sleep health framework, multimodal sleep monitoring, and advanced computational methods to:

## AIM 1

Develop and validate sleep signatures relevant to mental health in peri-adolescent primary care patients.

## AIM 2

Develop low-burden and scalable risk stratification algorithms using sleep modalities and signatures to identify youth with transdiagnostic mental health risk.

## AIM 3

Partner with the IMPACT-MH Data Coordinating Center.

# The SleepLife Study by PPSN

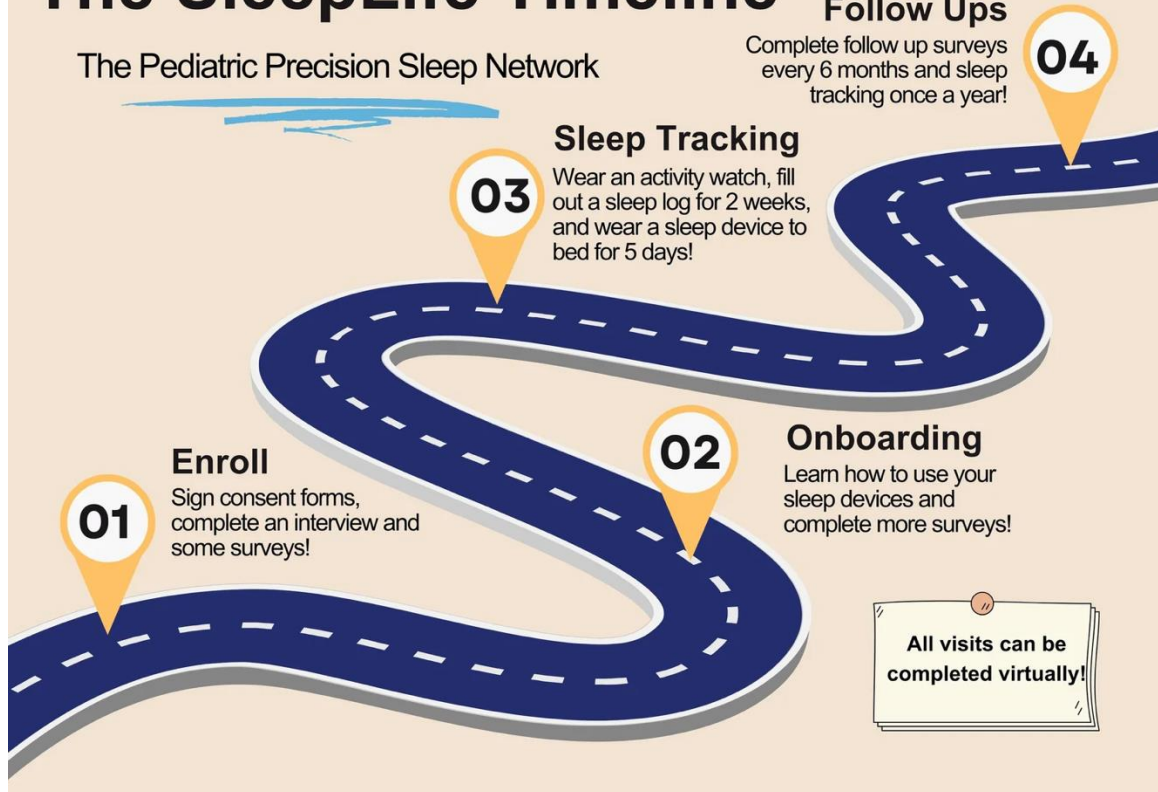


## The SleepLife Timeline

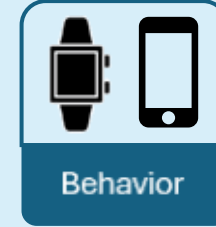
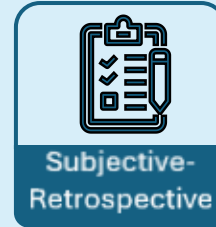
The Pediatric Precision Sleep Network

### Follow Ups

Complete follow up surveys every 6 months and sleep tracking once a year!



## Sleep Modalities



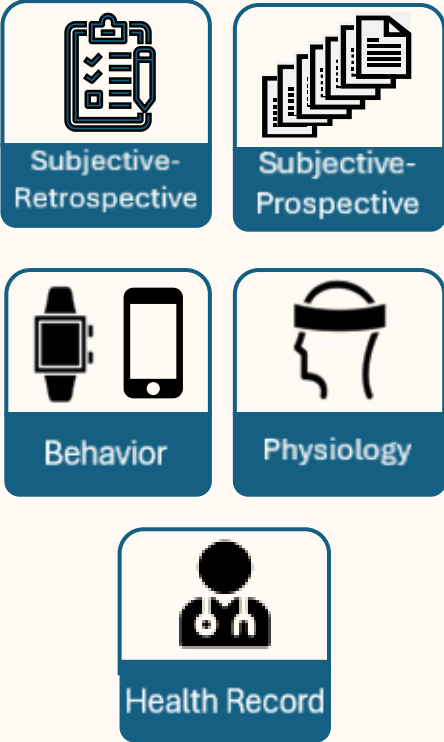
- ✓ **N=1200 youth ages 10-13 years old (n=400 per site)**
- ✓ Engaged in primary care
- ✓ No major psychiatric or medical dx

# Sleep Signature Development (Aim 1)

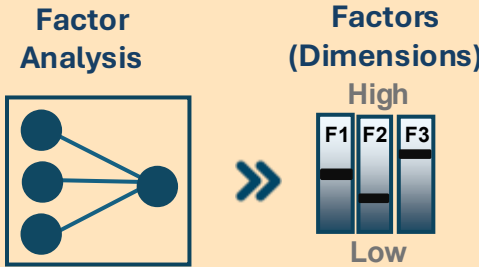


Deep Learning via Transformers, Multimodal Fusion

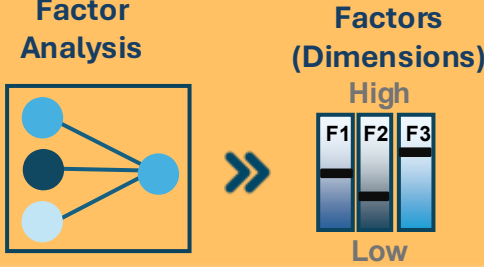
## Sleep Modalities



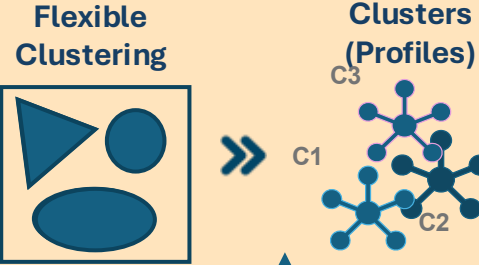
## Unimodal Signature Levels



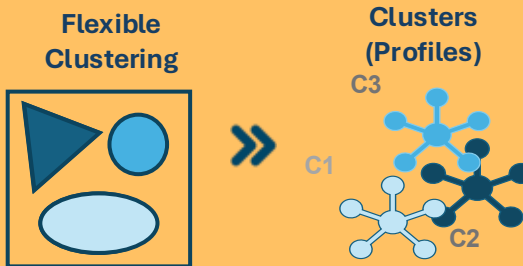
## Multimodal Signature Levels



## Unimodal Signature Patterns

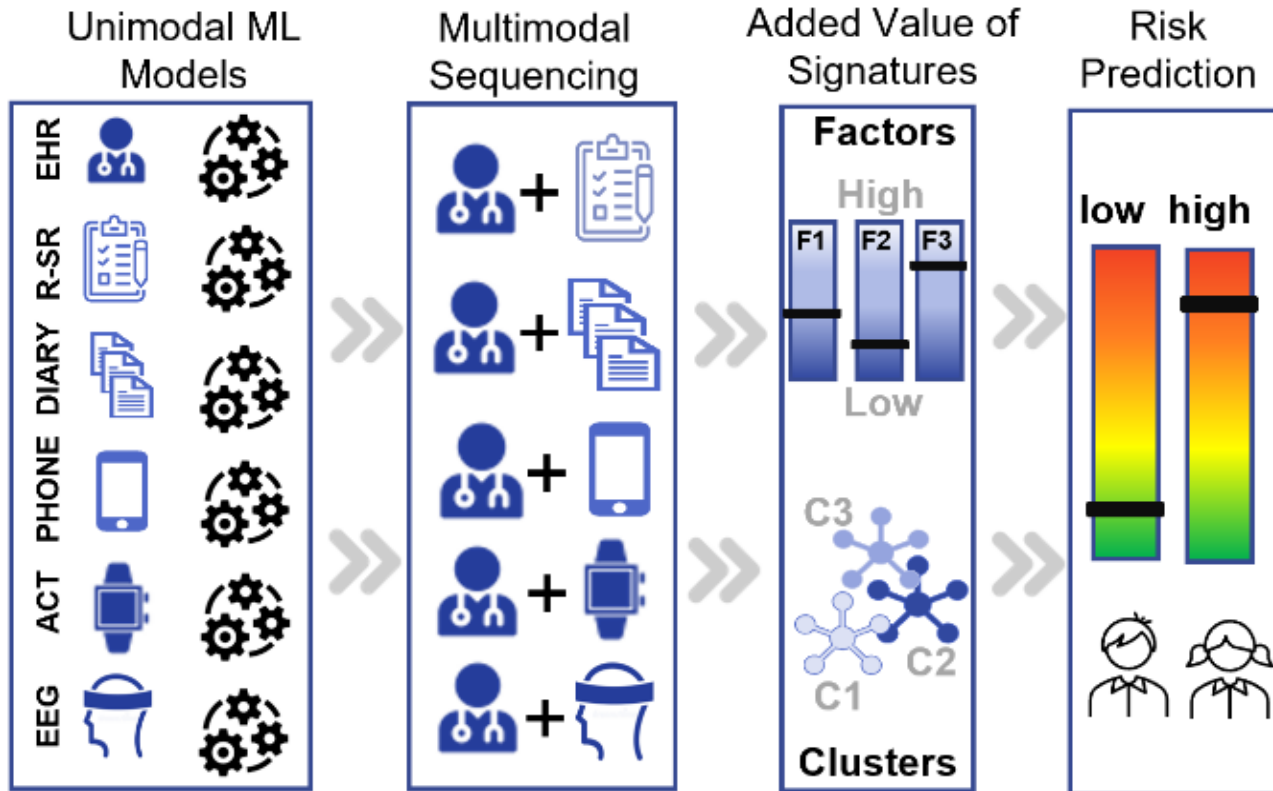


## Multimodal Signature Patterns



Deep Embedded Clustering

# Mental Health Prediction (Aim 2)



By incorporating multiple sleep modalities and signatures into **sequential risk stratification algorithms**, we can expand the capabilities of our algorithms to include risk stratification *as well as* insight into optimal sleep treatment.

# PPSN Analytics Resources



## Establishing dimensionality of sleep (Aim 1)

- Cooper RE, ..., Wallace ML. *JAMA Pediatrics*, 2026
- Wallace ML, et al. *SLEEP*, 2021

## Developing sleep and multi-modal signatures (Aim 1)

- Hoepel SJW, ... Wallace ML. *Sleep Health*, 2025
- Soehner AM, Wallace ML, et al. *Biol Psychiatry Cogn Neurosci Neuroimaging*, 2023
- Wallace ML, et al. *Data Sci Sci*, 2023
- Wallace ML, et al., *JASA*, 2018

## Risk prediction and feature Importance (Aim 2)

- Wallace ML, et al.. *BMC Med Res Methodol*. 2023
- Wallace ML, et al., *J Sleep Res*. 2021

## PPSN Protocol and Conceptual Framework

- Soehner AM, ..., Wallace ML. Under review, *Biol Psychiatry Cogn Neurosci Neuroimaging*
- Baker AE, ..., Soehner AM. Under Review, *BMC Pediatrics*