Rational Action Toward Improvement SMOTE on Ranked Outcomes



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INTRODUCTION: Univariate ranked outcome distributions are manifestations of binary classification (hospital readmission, top quadrille KOOS JR scale). The phenotype of the two classification domains is due to the distinct numerical values of the underlined features as per the Synthetic Minority Oversampling Technique (SMOTE).

We present the results of a small, clinical trial to reduce smartphone screentime based on SMOTE-informed, domain feature modification toward a rational outcome improvement

METHODS: Baseline metadata was collected from the cellphones and wearables of 24 volunteers for 8 weeks (Run00). We extracted 5 underlined features, significant (P<0.02), between the low-use decile and its complement: (1) > 12 m distance from the smartphone during sleep;

(2) > 240min device on DoNotDisturb mode;

(3) >30min brisk walking/exercise;(4) >60min human-not virtual-socializing;

 (5) entry into Time-Blocker planner
Subjects were motivationally interviewed and encouraged to adopt behaviors

supporting the **virtuous** features. Two 8 weeks of metadata collection ensued (Run01,02),

RESULTS: For this 24-volunteer cohort, screentime was reduced from the baseline (Fig 1, supplement accessible via QR code).

CONCLUSIONS: Univariate ranked outcome sets are manifestations of binary classification (domain1=desirable, virtuous outcomes, domain2= not so). Identified underlined features, statistically significant between the binary domains, can be systematically leveraged toward rational improvement. We anticipate incorporating such features into ICHOM Standardized Outcome Sets, explicitly directing action toward VBHC True North.



Figure 1 Smartphone screentime/24hrs use reduction. Each Run includes ~1350 Person-Days of metadata collection from the same cohort of 24 volunteers





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