

# How well can your smartphone measure what you drink and smoke? Systematic review of the measurement properties of smartphone approaches to assess alcohol and tobacco use

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**Introduction and Aims:** Accurate, and low burdensome measurement of alcohol and tobacco use is central to successful behaviour change and chronic disease risk-reduction interventions, therefore identifying new and valid ways to measure these behaviours could have major public health implications. We aimed to identify existing smartphone-based approaches to measure alcohol and tobacco use and critically appraise the quality of their measurement properties.

**Method:** A systematic search electronic databases was conducted. Studies measuring alcohol use and/or tobacco use via a smartphone, and reporting at least one measurement property (e.g. validity, reliability and/or responsiveness) were included.

**Results:** Sixteen studies describing the measurement properties of smartphone-based approaches to measure alcohol and 8 to measure tobacco use were identified. Across behaviours, 11 different measurement techniques were used, including self-report approaches (e.g. recording alcohol use in a mobile-app in real-time), approaches where participants actively provided an objective measure of their behaviour (e.g. expired CO monitors attached to smartphones), and approaches where data was collected without the active involvement of users (e.g. using smartphone sensors to detect gait and infer alcohol intoxication). Results varied by behaviour and measurement approach and the methodological quality of studies varied widely.

**Discussions and Conclusions:** This world first review found there was some evidence to support the reliability and validity of using smartphones to assess alcohol and tobacco use. However, more high-quality studies validating smartphone-based approaches against criterion measures, and research investigating objective measurement approaches are needed.

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