The use of artificial intelligence to identify patients' mental health and substance use needs

There is growing interest in exploring how artificial intelligence (AI) can support mental health and substance use (MHSU) assessment. The *Supporting Transformation through Research, Evidence, and Action in Mental health (STREAM) Lab* at the *Waypoint Centre for Mental Health Care* used rapid review methods to conduct a timely, structured search of academic literature on AI-supported MHSU assessment across the care continuum (e.g., intake, screening, diagnosis, triage within stepped care models). Based on 13 reviews, we highlight key findings and considerations that may be relevant to decision-makers supporting MHSU systems planning in Ontario.

Article characteristics:

- Of the 13 included articles, 6 explored models trained on clinical data (e.g., electronic health records, administrative data), while 7 explored models trained on wearable (e.g., smartphone) data.
  - Papers were excluded if they included models trained on any raw neuroimaging, biomarker, or motor marker data not collected by a wearable device or social media data.
- Papers focused on a range of MHSU concerns, including depression, anxiety, neurocognitive disorders, etc.

Key findings:

- AI trained on clinical data inputs and on data from wearables appear to be promising in terms of accuracy, sensitivity, and specificity for prediction, diagnosis, and classification of MHSU concerns in research contexts.
  - Few studies address the real-world application of AI-supported assessment, and some authors cautioned that the technology may not yet be mature enough for implementation in practice settings.

Considerations for decision-makers:

Decision-makers may consider identifying criteria for...

technological readiness

thresholds for acceptable performance of AI tools (e.g., accuracy, sensitivity, specificity)

performance tradeoffs (e.g., minimizing false positives vs. false negatives)

equity concerns (e.g., representativeness of AI training data) and risks of amplifying health inequities

organizational readiness

interest-holder (e.g., patient, family, community, staff) perspectives on AI

safety, privacy, ethics, and governance concerns and regulations

consistency of access to relevant data sources (e.g., health records, referral data)

AI models should also be piloted with substantial oversight, and accompanied by prospectively-developed evaluation and implementation frameworks.

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There are several limitations to the evidence presented:

- Few studies address the real-world application of AI-supported assessment
- Authors of the included papers highlighted concerns around methodological limitations (e.g., risk of bias, inconsistencies in data reporting), generalizability, and interpretability
- We excluded papers that explored any AI models trained on raw neuroimaging, biomarker, motor marker, and social media data (unless the data was collected via wearables)

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About STREAM Lab

Supporting Transformation through Research, Evidence, and Action in Mental Health (STREAM) Lab is dedicated to meeting the evidence needs of mental health and addictions decision-makers in Ontario and beyond. *STREAM* products focus on evidence related to health systems, delivering actionable insights that can inform planning and decision-making. *STREAM* is based at the *Waypoint Centre for Mental Health Care*. The findings in this product should not be taken to represent the views of *Waypoint* or our funders.

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