FROM MONITORING TO PREDICTION: THE USE OF ARTIFICIAL INTELLIGENCE AND WEARABLE DEVICES IN THE PREVENTION OF CHRONIC DISEASES

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INTRODUCTION

Chronic diseases are a leading cause of global mortality. Wearable devices combined with AI enable continuous health monitoring and early detection of physiological changes before symptoms appear, supporting preventive and personalized care.

METHODS

Literature review of open-access studies (2020–present; PubMed, JMIR, Nature). Included systematic reviews, original research on wearable sensors and machine learning in chronic disease monitoring and prediction.

RESULTS

Wearables provide continuous physiological data, with heart rate error of approximately 7–10 bpm and strong agreement with ECG measurements. Key indicators: resting heart rate, heart rate variability, skin temperature.

Predictive accurancy of wearable-based AI models.

Condition	Predictive Accuracy (AUC)
Diabetes	0.845
Sleep Apnea	0.829
Hypertension	0.809
Infection (24h before symptoms)	0.790

Infection prediction: sensitivity 0.69, specificity 0.89. Large-scale datasets (>5 million measurements analyzed) show strong correlation with reference data ($r = 0.89–0.96$).

Standardisation models improve early detection of health deterioration. Moreover, longitudinal data allows for the identification of individual baselines, improving the detection of acute exacerbations. Integrating multiple data streams significantly enhances model sensitivity, highlighting the vital role of continuous monitoring for early health intervention.

CONCLUSIONS

The integration of wearables and AI enables a shift from passive monitoring to active health event prediction. The ability to detect pre-clinical changes highlights the significant potential of these technologies in chronic disease prevention. However, further development, requires methodological standardisation, extensive clinical validation, and robust measures to ensure patient data security and privacy.

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