2025 START Program
CFP Brief

THEME: **02. Digital Health**

SUB-THEME: **2.1. Monitoring/Interventions of Chronic Health Conditions, using Digital Biomarkers measured by Wearables**

Context/ Overview

This call for proposal (CFP) seeks research proposals focusing on the use of wearable sensing devices for early detection and intervention of chronic health conditions. With the widespread use of smartphones and the increasing popularity of wearable devices like smartwatches, earbuds, and smart rings, there is a significant opportunity for timely and passive intervention to prevent the progression of chronic diseases.

These devices, being closely integrated into users' lives, offer a unique opportunity to passively monitor chronic health conditions and prompt users to take preventative actions. The increasing prevalence and cost of chronic diseases are major challenges for the US healthcare system. In 2020, health spending rose by 9.7% to $4.1 trillion, representing 19.7% of the GDP. Chronic illnesses are particularly prevalent among older adults, with 60% of those aged 65 and older having two or more chronic conditions. Despite the growing need, there has been limited success in preventing and treating these diseases.

Problem Statement

One of the main challenges is identifying and extracting digital biomarkers for various chronic conditions such as diabetes, hypertension, cardiovascular diseases, and neurodegenerative diseases, and devising methods to prevent their progression.

Additionally, tracking disease progression outside clinical settings presents difficulties due to data quality issues and variability in device usage in daily life. Challenges also include accommodating differences in device placement and usage, establishing baseline biomarker patterns for different users, and validating the system's reliability against clinical standards.

Objectives & Scope

The objective of the proposed research is to develop an unobtrusive, continuous system for tracking and intervening in chronic health conditions. This system should be personalized for each user while also preserving their privacy to encourage user engagement.

Specific Topics & focus areas *

This call invites research proposals in this field, with potential topics including but not limited to:

1. Utilizing wearable sensing technology like smartwatches, earbuds, and smart rings to passively collect physiological and behavioral biomarkers associated with chronic diseases.

2. Integrating digital biomarkers, symptoms, contextual information, and patient-reported data with predictive algorithms to enable early detection of deteriorating conditions and assess disease severity.

3. Developing innovative methods for timely adaptive intervention through wearable devices and evaluating their effectiveness in alleviating acute health conditions using passive and user-friendly techniques.

※ The topics are not limited to the above examples and the participants are encouraged to propose other original ideas.

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