

# Towards Exchanging Wearable-PGHD with EHRs: Developing A Standardized Information Model for Wearable-Based Patient Generated Health Data

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## About me:

- 2<sup>nd</sup> Year PhD Student at TU Dublin
- Interests in technologies for health
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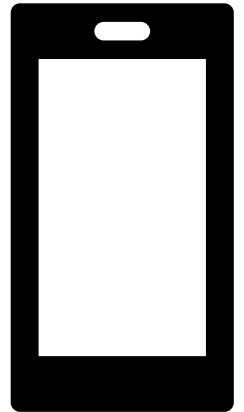


## Interests:

Digital Health, and Human Computer Interaction (HCI).

# Introduction

- Wearables are a prominent source of PGHD identified in literature, that can collect various granular types of data using inbuilt sensors.
- Patient Generated Health Data (PGHD) refers to **health data that a patient (or their authorized representative) records outside the clinic setting** and can be used by them or clinicians for their health management.
- PGHD are collected using many mediums including but not limited to patient diary, **mobile health application (mHealth apps) and wearables.** [1]



## Background (State of Art)

Previous works have examined:

- Integration of Wearables, PHR with Electronic health records (EHR) [2] - [4]
- Models that extend the capabilities of standard data exchanges [7], [8], [9], [10].
- **However**, they are often limited to one or a few wearable, hence not generalizable.
- Also, data quality information (such as accuracy and reliability), is not fully considered for integration.

# Background

**Data Quality:** Data quality issues that have hindered PGHD integration [11], [12].

- Kaewkannate and Kim [13], established that Fitbit Flex & Misfit have difficulty in tasks related to using stairs.

**New Datasets:** Emerging datasets that need to be considered, to account for new and diverse types of data

- Temperature sensing (relating to women's health), ECG (for atrial fibrillation monitoring) and skin temperature etc,

**Provenance:** Woods, et. al [14] suggests importance of developing industry wide PGHD standards that will include data provenance and context.



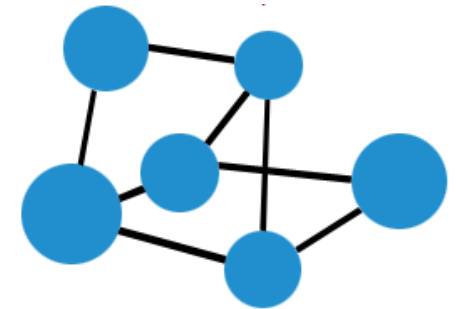
## Aim:

This paper proposes a generic framework to enable a wide range of wearable-PGHD to be interoperable with EHRs, enabling seamless exchange of clinically relevant data from patients (through wearables) to providers (through EHR).



# Methodology

- An Ontology-Driven Information Model (IM) approach – [6]
  - for semantic and syntactic interoperability between wearable-based PGHD and EHR
- Based on Health Level Seven (HL7) FHIR standard
- But that considers more wearables, newer datasets and relevant metadata information



# Proposed Architecture

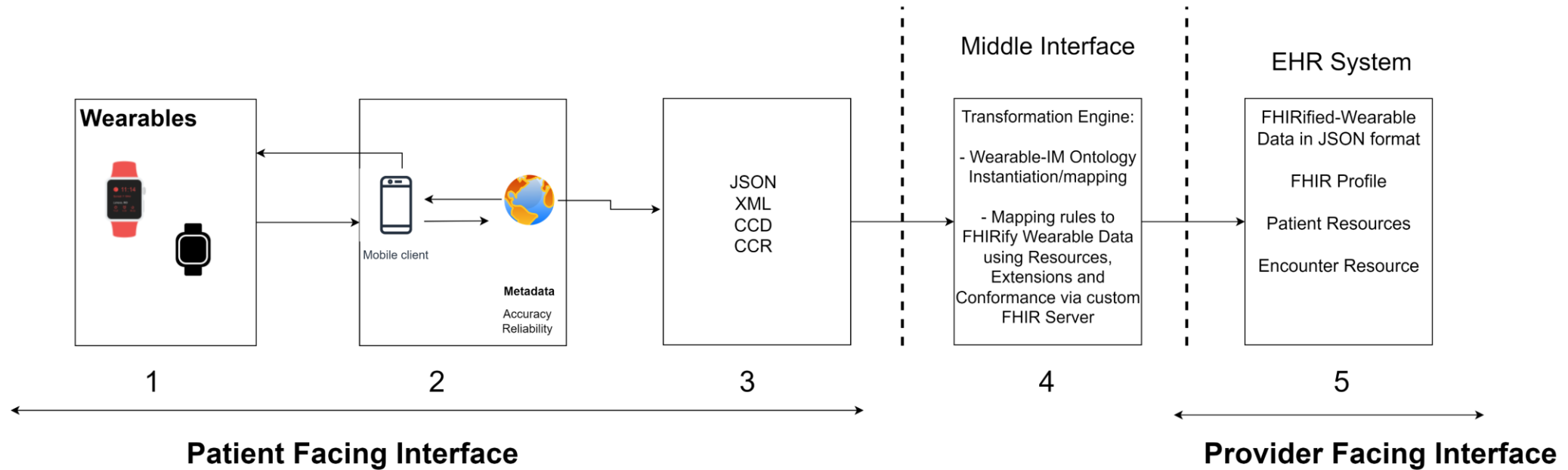
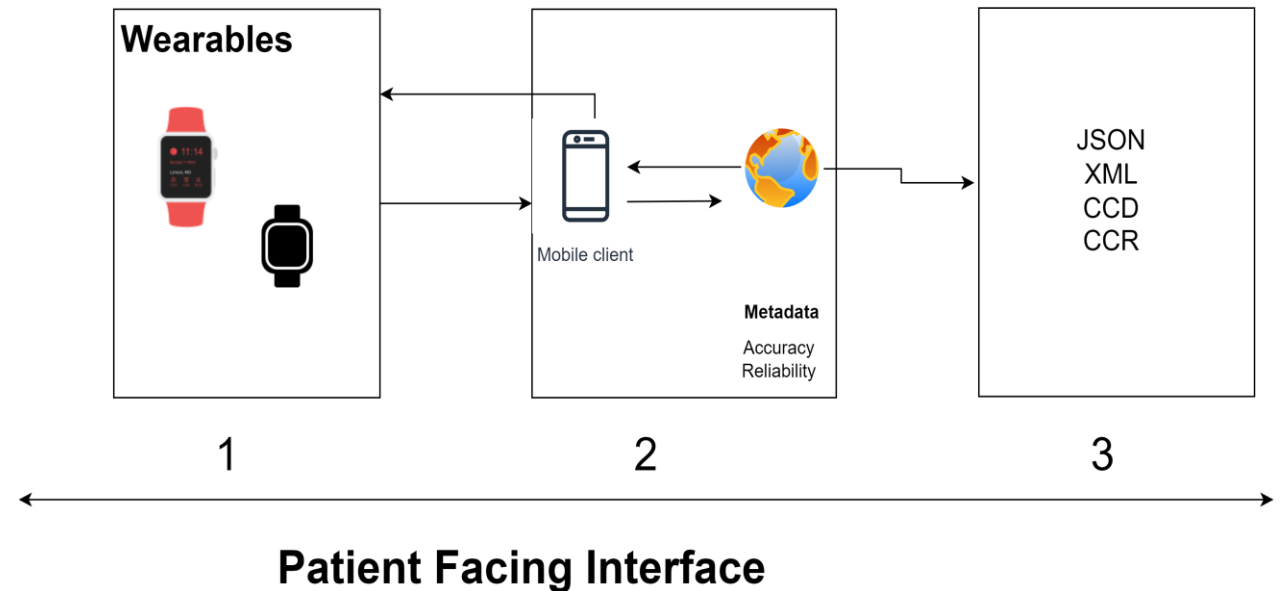


Figure 1. Proposed Wearable-based PGHD-EHR integration



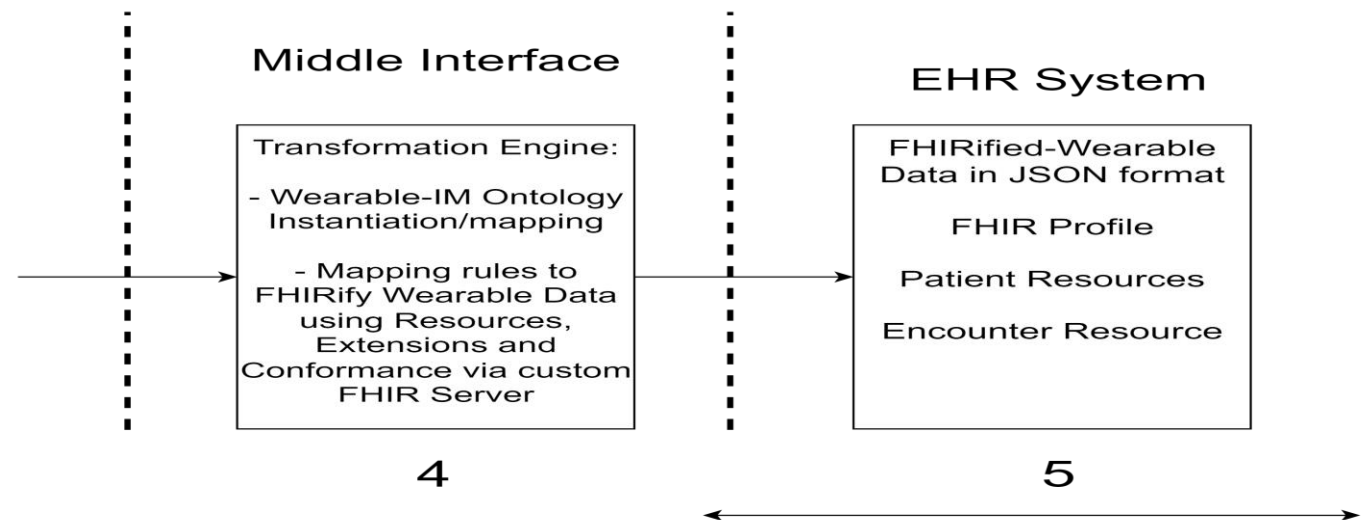
# Stage 1 – 3 : Exploring Data Sharing Capabilities of Wearables

- PGHD from Wearables are shared via Mobile App and/or Web Application
- Data received can be in different formats



## Stage 4 – 5 : Mapping and FHIRification of Wearable-PGHD

- **Map** wearable PGHD data to standard and custom ontologies.
- **Transform** received data to fit into existing FHIR Resources and Extension.



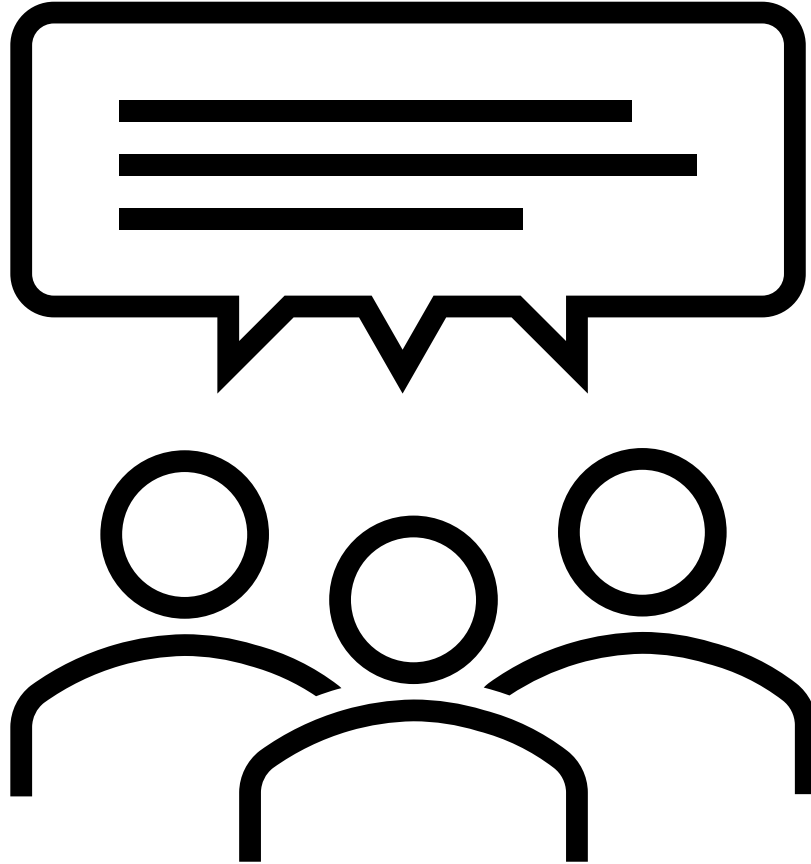
## Acknowledgement

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Centre for  
Research  
Training

The logo for the Science Foundation Ireland (sfi), featuring a stylized figure and the text 'Science Foundation Ireland For what's next'.

# THANK YOU



# QUESTIONS ?

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