The future is wearables: How technology will transform data collection

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Disclosure

Speaker name:
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I have the following potential conflicts of interest to report:

☒ Stockholder of genae associates and Hilbert Paradox
Wearable technology was worth USD 22.7 billion in 2015 rising to USD 173.3 billion by 2020.

Source: Research And Markets, Feb 2015
Wearables in Clinical Research

**Opportunities**

- Innovate clinical trial process;
- Create patient engagement;
- Streamline communication between clinician and patient;
- Potentially reduce cost of clinical trial;
- Proactively find, pre-screen and recruit patients;
- Optimize research processes: improve quality, gain efficiency;
- Accelerate discovery by developing or linking global registries.
Wearables in Clinical Research

Challenges 1/2

• Protecting sensitive personal information and enabling its value and appropriate use;
• Data does not automatically lead to knowledge;
• Security (hardware and software);
• Variability in device accuracy;
• Validity of the data;
• Validation by clinical trials;
• Privacy;
• Consent;
Wearables in Clinical Research

Challenges 2/2

• Leverage real time data analysis;
• Data volume and variety of sources increase risk of re-identification;
• Authentication and verification;
• Integrate wearables with data exchanges and cloud-based analytics, and then connect to e-clinical systems.
TURNING SCIENCE FICTION INTO SCIENCE REALITY

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PRIZE PROGRESS

1/2012 REGISTRATION OPENED
1/2012 ANNOUNCED
8/30/2013 REGISTRATION DEADLINE
5/15/2014 SUBMISSION DEADLINE
WEEK OF 8/4/2014 QUALIFYING ROUND
8/2014 - 3/2015 FINALIST TEAMS DESIGN AND BUILD
11/2015 - 8/2016 RE-ENTRY QUALIFICATION PERIOD
9/2016 CONSUMER TESTING STARTS
Q1 2017 AWARDS CEREMONY
Capturing & Correlating Sensor Data

*Today's model*

Sensor → Proprietary storage and processing infrastructure ←

Physician

End-user

Visualization, analysis, reporting
Is this Big Data?
Developers of digital tools, apps and biosensor technologies spend up to 30% of the R&D budget on proprietary storage and processing infrastructures.

*Data engineering may leverage storage, scalability and data management.*

**Unmet Need 1: Data Engineering**

Many technologies promise disruptive or transformational qualities but often lack clinical and economical evidence – and data interpretation.

*Knowledge engineering may enable an increase in medical data equity.*
Hilbert Paradox

a unique way of worldwide capturing and correlating digital health data
HPX Value Proposition

*Data Engineering*

Hilbert Paradox (HPX) is a global, cloud based architecture with storage, retrieval and data processing efficiencies.

*Knowledge Engineering*

HPX assists stakeholders in accelerating market access, in *demonstrating value* and in realizing a vision for the digital health future.
Global Presence & Scalability

*Powered by Microsoft Azure*

HPX is available in 140 countries in 20 regions around the world
Case example

*ECG monitoring*

- **subject**
- **smartphone**
- **HPX**
- **physician**
- **visualization in near real time, analysis and reporting**

*Case example: ECG monitoring*

- Subject uses a smartphone for ECG monitoring.
- Data is encrypted for up/download and pre-processing.
- HPX facilitates visualization in near real time, analysis, and reporting.
- Physician receives the data for analysis.
Internet of Things (IoT)
HPX Cloud Model

Knowledge Engineering
- HPX Inform
- HPX Learn
- HPX Explain
- HPX Explore

Data Engineering
- HPX Align
- HPX Connect

- Decision making
- Correlations & patterns
- Metadata & ontologies
- Exploratory analysis
- Normalized data
- Raw data

Raw data

medical data equity
Case: Automated RT ECG Analysis

Automated real-time ECG algorithms are made available on a pay-per-use or licensing model.
Case: INTEGR8 II trial

IoT + bi-directional communication with EDC

Integration of smart watch, medical grade ECG sensor and RT-ECG interpretation in EDC workflow for more efficient and effective patient interaction.
Conclusions

*Wearables in Clinical Research Strategy*

- Map a clear **business benefit outcome** as part of your technology development strategy for using wearables to augment clinical trials.

- Ensure wearables meet requirements for **regulatory compliance** and **information security**, and can operate in **clinical conditions**.
The future is wearables: How technology *may* transform data collection

- thank you -

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