ABOUT RTI

Global Presence

$957 M
FY2018 Revenue

3,830
Projects
(FY2018)

1,226
Clients
(FY2018)

12
U.S. Offices

12
International
Offices

Scientific Stature

32
Fellows

1,159
Journal
Articles

15
Editorials

30
RTI Press
Publications

43
Book Chapters

9
Books
**Objectives**
- Apply skills acquired in PSM program
- Gain real world experience
- Professional growth
- Produce valuable results

**Responsibilities**
- Literature reviews
- Meetings with Industry Professionals
- Attend workshops
- Data Analysis

**Deliverables**
- 3000 word Research manuscript for RTI press
- Poster for RTI Intern showcase
WEARABLE DEVICE DATA ACCESS: ATTITUDES, BARRIERS AND POSSIBLE SOLUTIONS

AYESHA ASLAM
MPS – BIOMEDICAL & HEALTH INFORMATICS
WHAT ARE WEARABLE DEVICES?
INTERNET OF THINGS
Number of wearable device users in the United States from 2014 to 2019 (in millions)

Source
eMarketer
© Statista 2018

Additional Information:
United States, eMarketer, 2014 to 2015; 18 years and older
Consumer wearables revenues in the United States from 2014 to 2019
(in billion U.S. dollars)

Source:
Compass Intelligence
© Statista 2018

Additional Information:
United States; Compass Intelligence; 2014 to 2015
Global smart wearable devices market is anticipated to reach at a valuation of **USD 52.5 Billion** by the end of 2024.
THE OPPORTUNITY..

- Continuous, updated Medical data from billions of individuals
- Real time, non-invasive, non-intervention medical diagnostic monitoring
- Correlation of measured health parameters with other user demographic data
- Advantages in Medical Research
1- Qualitative Analysis of consumers attitudes that lead to their decline in sharing wearables data.

2- Recommendations to address consumers concerns in order to improve future data sharing based on literature review.
ADD HEALTH CONSUMER WEARABLES ANCILLARY STUDY

1. Determine rates of smartphone and consumer wearable device adoption among cohort (Add Health) participants

2. Obtain data from study participant’s personally-owned consumer wearable devices
WHAT IS ADD HEALTH

National Longitudinal Study of Adolescent to Adult Health

• Initiated in 1994

• National representative sample of adolescents in grades 7-12


https://www.cpc.unc.edu/projects/addhealth
12,300 survey questionnaires
12,300 survey questionnaires

7.94% owned wearable device
12,300 survey questionnaires

7.94% owned wearable device

Asked 998 individuals to provide data
12,300 survey questionnaires

7.94% owned wearable device

Asked 998 individuals to provide data

511 said “Yes”

487 said “No”
12,300 survey questionnaires

7.94% owned wearable device

Asked 998 individuals to provide data

511 said “Yes”

487 said “No”

289 provided refusal comments
RESEARCH QUESTION

“what are the reasons for not sharing your wearable device health data?”
Used “Textalyzer” to identify common occurring 5 lettered words and used them as initial codes for qualitative data coding.

Analyzed every comment and manually coded accordingly in Google spreadsheet.

Added more categories as they emerged “Inductive coding”.

1. Combined all the related categories and narrowed them down to 6 Common Themes.

1. Added all the numbers of responses and calculated the percentage of the total numbers per category.

1. Displayed the results in Bar chart.
Used "Textalyzer" to identify common occurring 5 lettered words and used them as initial codes for qualitative data coding.

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REFUSALS ANALYSIS
### Open-ended question 1

**What are the reasons for not sharing your wearable device health data?**

<table>
<thead>
<tr>
<th>Privacy Issues</th>
<th>Lost/Broken/Don't want to/Not Important</th>
<th>Cumbersome</th>
<th>Accuracy/Incomplete Data</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Total respondents who answered X</th>
<th>159</th>
<th>72</th>
<th>57</th>
<th>34</th>
<th>19</th>
<th>15</th>
</tr>
</thead>
<tbody>
<tr>
<td>% of respondents who answered X</td>
<td>55%</td>
<td>25%</td>
<td>20%</td>
<td>12%</td>
<td>7%</td>
<td>5.00%</td>
</tr>
</tbody>
</table>

#### Reasons:

1. A little too personal
2. Lost it, wore it at work, I walk a few miles a day (steps, hills, pavement, etc.) And I haven’t replaced it.
3. Access to phone that has other personal information on it.
4. Because I chose not to without reason.
5. Because I do not even remember my login data
6. Because I do not have it anymore
7. Because I don’t feel that it is anyone’s business but mine.
8. Because I haven’t worn it
9. Because I share this only with my doctor’s and no one else
10. Because I used it very minimally and don’t know where that info is stored
11. Because I’m tired of working on this
12. Because it doesn’t include all my activity (i.e. swimming) so I do not feel it’s an accurate reflection of all the fitness activity I do.
13. Because it doesn’t work anymore I use my phone that is what I use to track my steps and activities through the day.
14. Because it is attached to my phone.
15. Because it is not used frequently enough to give a correct sample of physical activity.
## RESULTS

<table>
<thead>
<tr>
<th>Categories</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>What are the reasons for not sharing your wearable device health data?</td>
<td>% of respondents who answered X</td>
</tr>
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</tr>
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<td>7%</td>
</tr>
<tr>
<td>Other</td>
<td>5%</td>
</tr>
</tbody>
</table>
CATEGORIES

1. Privacy
2. Lost/Broken (Abandonment of Device)
3. Don't want to or not important (No Reason)
4. Cumbersome
5. Inaccuracy/ Incomplete data
6. Other
“I do not want to risk my information being breached by others”
MAJOR PRIVACY RELATED ISSUES

• Lack of transparency and accountability in data use
• No specific state or federal device data protection laws
• Risks of identity theft, profiling, stalking, extortion or discrimination
• Data ownership issues
“Not sure how to access it and it broke so haven't been wearing it for months”

- Lack of motivation
- Change in consumers priorities
- Poor device performance
- Design issues
NO REASON

“I don't feel it's necessary”

• Genuine lack of interest
• Lengthy survey questionnaires
• Time of survey

“I am tired of the questions, just going with no to end the survey”
CUMBERSOME

“Seems like a hassle to provide login details or device details”

- Difficult data interpretation
- Data sharing inconvenience
- Uncomfortable device design
- Impractical Design
INACCURACY

“I don't think the information is completely accurate. I use it as a guide, but not as the exact measure”

• Lack of Precision in data recording
OTHER

• Brand new consumers who just started using Fitbit
• Embarrassment due to less active lifestyle
• Having multiple devices so no single source of continual data
• Lack of incentives for data sharing
Improvement in Privacy and Data Security measures

- Policy and Legislation
- Device Design considerations
- Consumer Education and awareness
- Data ownership
- Personalized consenting

Sustained consumer engagement

- Explore Device Disuse reasons
- Incentivized Data Sharing
- Data Accuracy
- Design Comfort
The global smart wearable devices market is anticipated to reach a value of USD 52.6 billion by the end of 2024. Consumers are adopting wearable devices not only to improve their health but also to manage personal health care and chronic health conditions.

These devices are powerful resources for continuously updating medical data from billions of individuals. Access to the health data collected through these devices can revolutionize medical research. Using data from wearable devices, various studies have been conducted in fields such as preventive medicine, cardiovascular health, mental health, and patient reutilization [1].

Wearable Device Data Access: Attitudes, Barriers, and Possible Solutions

Ayesh Aalam, MD, MPH(1); Robert Furberg, PhD, MBA(2)
(1) UNC-Chapel Hill, Chapel Hill, NC, (2) RTI International, Research Triangle Park, NC

We were asked consumers: “What are the reasons for not sharing your wearable device data?”

Almost 300 responses were analyzed through qualitative coding of the data.

Categories | Percentage
---|---
Privacy issues | 48%
Lack of data | 30%
Data security concerns | 12%
Lack of knowledge | 7%
Other | 5%

Wearables Data: The Opportunity

To benefit from the full potential of these data, it is crucial to minimize consumers' concerns about sharing them. Below, we summarize some recommendations to help alleviate consumer concerns and improve data sharing in the future:

1. Privacy
2. Consent
3. Security
4. Data integrity
5. Consentual transparency
6. Ownership

Wearables Data: Barriers to Access

Despite the promise of scientific opportunities, there are many obstacles to accessing these data [1]. Consumers, historically, are hesitant to share their wearable device data for various reasons [2]. This research outlines highlighting and quantifying these reasons and recommending solutions.

References

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RTI International: 3000 E. Cornwallis Drive Research Triangle Park, NC 27709
Presented at: 11th Annual RTI Internship Showcase August 12, 2019 1:00 pm-4:00 pm
Hanesian Building, William M. Moore Collaboration Center
RTI International is sponsored by the National Institutes of Health and the Department of Defense. This work is supported under a Research Triangle Institute Cooperative Agreement to the National Institutes of Health.
RESULTS FROM RTI COHORT

- 23 Respondents
- 12 Yes
- 10 No
- 1 Indecisive
ACKNOWLEDGEMENT

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REFERENCES


Thank you!

Questions?