Form Approved

OMB No. 0990-0390

Expiration Date 04/30/2018

**The Healthy Behavior Data Challenge**

Phase 1 Submission Template

**Introduction**

The Healthy Behavior Data Challenge responds to the call for new ways to address the challenges and limitations of self-reported health surveillance information and tap into the potential of innovative data sources and alternative methodologies for public health surveillance.

The Healthy Behavior Data Challenge will support the development and implementation of prototypes to use these novel methodologies and data sources (e.g., wearable devices, mobile applications, and/or social media) to enhance traditional healthy behaviors surveillance systems in the areas of nutrition, physical activity, sedentary behaviors, and/or sleep among the US adult population aged 18 years and older.

The collection of health data through traditional surveillance modes including telephone and in-person interviewing is becoming increasingly challenging and costly with declines in participation and changes in personal communications. In addition, the self-reported nature of responses particularly in the areas of nutrition, physical activity, sedentary behaviors, and sleep has been a major limitation in these surveillance systems, since self-reported data are subject to under/over reporting and recall bias. Meanwhile, the advent of new technologies and data sources including wearable devices (Fitbit, Garmin, Adidas, Jawbone, smart watches, activity trackers, etc.), mobile health applications on smartphones or tablets, and data from social media represents an opportunity to enhance the ability to monitor health-related information and potentially adjust for methodological limitations in traditional self-reported data.

The Healthy Behavior Data Challenge will harness this potential and identify feasible alternative options for collecting health-related behaviors in new ways. Conducted in two phases, Phase I (Prototype Development) entails Challenge participants developing a concept proposal for obtaining data collected from wearable devices, mobile applications and/or social media for public health surveillance purposes.

The Healthy Behavior Data Challenge participants will propose data sources and approaches for aggregating data from wearable devices, mobile applications and/or social media in the areas of nutrition, physical activity, sedentary behaviors, and/or sleep. In Phase II (Prototype Implementation), a subset of submissions (up to 3) with promising concepts will be invited to test their proposed approaches for ongoing public health surveillance.

**Website**:

Additional Information:

Information on the Behavioral Risk Factor Surveillance System can be found at [www.cdc.gov/brfss](http://www.cdc.gov/brfss). Details on the HBD Challenge may be found at challenge.gov.

For Further Information Contact: Dr. Machell Town at BRFSSinnovations@cdc.gov.

**Submission Deadline**:

1. Challenge Team Information

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| Team Name |  |  |
| BeHeardBeHealthy Philadelphia | | |
| Team Lead |  | City/Province |
| Heidi Grunwald |  | Philadelphia, PA |
| E-mail |  | Phone Number |
| grunwald@temple.edu |  | 267-262-1691 |
| Subject-matter/domain expertise |  |  |
| Survey Research / Survey Sampling |  |  |

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| --- | --- | --- | --- | --- |
| **Team Member #1** |  | **E-mail** |  | **Subject-matter/domain expertise** |
| **James W. Buehler, MD, Clinical Professor, Dept. of Health Management & Policy, Dornsife School of Public Health, Drexel University** |  | **Jwb87@drexel.edu** |  | **BRFSS implementation and uses (former director of CDC Program Office that managed BRFSS, 2010-2012), public health surveillance (prior responsibility for leading, managing, and using surveillance at CDC and state/local levels and experience as academic investigator in evaluating surveillance utility), public health leadership (former Health Commissioner, Philadelphia Dept. of Public Health), public health and healthcare interface in era of health reform, including understanding of the utilities of EHR systems for patient care, population health management, and patient engagement.** |
| **Team Member #2** |  | **E-mail** |  | **Subject-matter/domain expertise** |
| **Zoran Obradovic** |  | **zoran.obradovic@temple.edu** |  | **Computer and Information Science / Statistical Analysis and Data Mining / Bioinformatics** |
| **Team Member #3** |  | **E-mail** |  | **Subject-matter/domain expertise** |
| **Pearly Dhingra** |  | **sdhingra888@gmail.com** |  | **Public Health Informatics, Software Development** |
| **Team Member #4** |  | **E-mail** |  | **Subject-matter/domain expertise** |
| **Keisha Miles** |  | **kmiles@temple.edu** |  | **Survey Operations** |
| **Team Member #5** |  | **E-mail** |  | **Subject-matter/domain expertise** |
| **David Tucker** |  | **dtucker@temple.edu** |  | **Database, Software Engineer** |
| **Team Member #6** |  | **E-mail** |  | **Subject-matter/domain expertise** |
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| **Are all team members residents of the United States?** |
| **Yes** |

1. Organization (if submitting on behalf or as part of an organization)

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| --- | --- | --- | --- | --- |
| **Organization Name** |  | **Website** |  | **Type of Organization** |
| **Temple University’s Institute for Survey Research** |  | [**http://www.beheardphilly.com/**](http://www.beheardphilly.com/)  **http://www.cla.temple.edu/isr/** |  | **Academic Institution** |

1. How did you find out about this challenge?

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| Colleague at Drexel University, Dr. Jim Buehler |

1. Submission Overview

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| **Project Title** |
| **BeHeardBeHealthy: A project designed to engage under-represented populations in a behavioral health and data collection and sharing initiative** |
| **Project Overview** |
| Describe in 500 words or less:   * What aspects of sleep, physical activity, nutrtion, and sedentary behavior do you propose to report on and why are they important for public health surveillance? * Provide a brief description of the source(s) of data that will be used to report on these aspects, how your team proposes to access them, and why they are appropriate for use in public health surveillance? * How do you see your concept improving on current public health surveillance in the areas of sleep, physical activity, nutrition, and sedentary behaviors? |

1. Based on our experience in developing and iomplementing the BeHeardPhilly project ([www.beheardphilly.com](http://www.beheardphilly.com)), which we launched in a predominantly African-American neighborhood of Philadelphia and have since expanded city-wide, we propose to enchance our community- and social-network-based approaches to recruiting and maintaining survey panels and our multi-faceted and flexible approach to fielding surveys as a means to complement existing telephone-based health behavior surveys, such as the BRFRSS and a regional analogous independent survey. We have documented that our approach successfully engages a more demographically diverse population of respondents than telephone survey methods, including our engagement of younger people and those of minorirty race/ethnicity. In addition, our surveys can be fielded and analyzed nimbly, promptly, and frequently relative to BRFSS and its local counterpart, and our surveys can be targeted in ways that provide neighborhoold-level assessments and could, possibly be used to improve small-area estimate methods based on telephone surveys. We have the capacity to monitor a spectrum of behavioral risks and health status measures associated with the leading causes of preventable morbidity and premature mortality, comparable to those monitored by BRFSS, as well as to engage BeHeardPhilly participants in ways that collect more detailed daily information about exercise and nutrition. By engaging participants as part of an online social network, accessible via computer or mobile device, we will pilot participant “donation” of health information in web-based formats, including information derived from “patient portals” that are increasing offered not only through electronic health systems maintained by large institutional providers but also by a growing number of “federally qualified health centers” -- community-based primary care centers in Philadelphia. We will also pilot methods for participants to share data from personal tracking devices and compare self-reported and measured indices of physical activity. The BRFSS, including local efforts to extent BRFSS by oversampling, and independent local surveys are an essential source of information for state and local health departments to monitor risk behavior trends, identify health risk disparities, and inform assessments of behavioral health interventions or policies. But these surveys often fall short of meeting the needs of local health departments and community-based health organizations because of their cost, frequency, timeliness, and lack of geographic granularity. We have conducted surveys for the Mayor’s Office and the Philadelphia Department of Public Health, and we will implement our proposed activities with this perspective on the surveillance data needs of a big-city health department. Indicators to be measured (the indicators listed below are not comprehensive and innovators are recommended to include other relevant indicators)
   1. Physical Activity

* Amount of MVPA[[1]](#footnote-0) time per day
* Amount of MVPA time per day obtained in bouts of 10 minutes or more
* Amount of MVPA time accrued while at work, at home and/or in transit
* Identification of times during the day where MVPA is high
* Daily number of steps
* Miles/km (Distance) on foot or other modes of active transportation
* Frequency of MVPA
* Calories burned
* Type of activity (aerobic, strength, etc.)
* Level of activity (low, moderate, high)
* Time spent in different domains of MVPA (home/occupational, travel and recreational)
* Location of MVPA (recreation facility, at home, at work, on sidewalk/bike lane)
* Perception of safety while active
* Enjoyment level of the MVPA
* Number/flights of stairs climbed
* Average and peak heart rate
* Hours per week adults spent in sports, fitness or recreational physical activities
* Other indicators
  1. Sedentary Behavior[[2]](#footnote-1)
* Amount of time per day spent sedentary, excluding sleep time
* Amount of time per week spent on a computer/screen including watching TV, videos, playing computer games, emailing or using the internet
* Amount of sedentary time accrued while at work, at home and/or in transit
* Sitting time at work/ number and frequency of breaks at work from sedentary time
* # of hours spent in a car or motor-vehicle
* Other indicators
  1. Sleep
* Hours of sleep per night (sleep duration)
* Amount of time awake after sleep onset
* Sleep efficiency
* Amount of time to fall asleep (i.e., sleep latency)
* Consistency of bedtime
* Consistency of wake time
* Amount of time in REM vs. non-REM sleep (duration of sleep stage)
* Type of activity directly before sleep (e.g., screen time, reading, TV)
* Sleep satisfaction in morning
* Daytime sleepiness
* Other indicators
  1. Nutrition
* Total calories consumed per day
* Total calories from fat
* How often fruit (not including juices) was consumed (day, week, or month)
* How many times per day/week/month a green leafy or lettuce salad, with or without other vegetables, was eaten
* How often vegetables (not including lettuce salads and potatoes) was eaten (day, week, or month)
* Number of sugar-sweetened beverages consumed in a week (or per day)
* Number of caffeinated drinks consumed in a week (or per day)

1. Summary of proposed data source(s) (complete applicable sections)

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|  | **Data Source** | | **Data Accessibility** (e.g., API, specialized software, existing data set) | **Data Cost** (i.e., fee for access, open access) | **Data Recency and Update Frequency** (i.e., how recent is the data and how often is it collected) | **Applicable Functional Area(s) and Indicator** (i.e., physical activity, nutrition, sleep, and/or sedentary behavior) | **Existing Users of the Data Source** (i.e., identify examples of organizations or other groups that have or are using the data source) |
| **Organization (e.g., company)** | Method of Collection (e.g., wearable, self-reported) |
| *1* | Temple University, Institute for Survey Research | Patient Portals, Wearables and Self-Report through surveys | We will use the Quantexutal.co platform that has APIs that connect to fitbit and other fitness track clouds as well as patient portals for most hospitals in Philadelphia as well as the Federally Qualified Health Centers. The platform also deploye surveys, email reminders. | Cost of platform is $1/participant per month so $3000. No other data costs are incurred. | We will collect data on the daily, weekly and monthly level | Daily number of steps, distance on foot or other modes (bike, swim), calories burned, level of activity, location of MVPA, perception of safety while active, level of enjoyment, water consumption, hours of sleep per night, amount of awake time, consistency of bedtime, and sleep satisfaction. | Data will be collected by participants and shared with the researchers. Sources of data to be shared might include patient portal (clinical data), fitness tracker data and survey data. |
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| *3* |  |  |  |  |  |  |  |
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| *10* |  |  |  |  |  |  |  |

1. Describe how the data that you will use provides information and insight that is complementary to or more novel and innovative than that currently utilized for public health surveillance by CDC? (Novelty/innovation can apply at the level of the individual data source(s) selected, the specific indicators to be measured, tools/solutions that are used to capture the data, or result from newly created linked data sets). (750-word limit)

Temple’s Institute for Survey Research (ISR) created BeHeardPhilly to 1) Create a cost-effective and convenient resource for investigators conducting social science, public health or public opinion research in the City of Philadelphia; 2) Create civic engagement tool where Philadelphia residents can have their voices heard through opting in to participate in surveys pertaining to life in the city of Philadelphia and 3) Conduct survey experiments and better understand the nature of opt-in vs. probability-based panel respondent behavior at the local level. Our current panel of 8500+ members consists of opt-in members as well as members who were recruited based on probability-based studies in the field. The panel contains approximately 1000 probability-based members and we have launched over 80 surveys to date for clients. We continue to grow the panel and have residents from every zip code. We will begin to overlay census tracts and block groups so that we can create prevalence estimates for the city as well as for neighborhoods. We allow participants to opt their preferred mode of response (phone, web, SMS) and their preferred number of times per year they agree to be surveyed. We have built custom, panel management software that allows us to field surveys to eligible participants at any given time of the year. In addition, as panel members are enrolled we collect sex, age, race, ethnicity, education and parental status to aid in survey eligibility and weighting. We can also use custom filters on any of the surveys we launch to identify certain sub-populations (e.g. smokers).

For this pilot project we plan to partner with Public Good Ventures to power the BeHeardBeHealthy project. Their HIPAA secure, Quantextual.co platform provides a robust set of Application Programming Interfaces (APIs) that enable direct connection to patient portals, fitbit and other fitness trackers in the Android and iOS environments. In addition, we can deploy surveys, send emails and reminders, geo-fence activities and aggregate all of the BeHeardBeHealthy data in one secure cloud environment. We will recruit participants from our BeHeardPhilly panel. Once consented, participants will be asked a series of questions about whether they own a smartphone, have access to broadband and own and/or use a fitness tracker of some type. Once consented, participants will be randomly assigned to one of three groups (fitbit deployment, smartphone app only and self-report via survey only). Each individual in the study will have access to their own health related dashboard. We will design a study to collect the most data from fitness device and mobile app users such as daily number of steps, distance on foot or other modes (bike, swim), calories burned, level of activity, location of MVPA, perception of safety while active, level of enjoyment, water consumption, hours of sleep per night, amount of awake time, consistency of bedtime, and sleep satisfaction. We will collect BRFSS style data from the self-report group. We will consider connecting participants with a program called Philly Powered (http://phillypowered.org/), which is a PDPH-sponsored web page that helps people find healthy, low-cost or free, community resources for exercise/being active.

This pilot is novel in that it will use Quantexual.co, a new, HIPAA secure, cloud-based health data aggregator platform that will allow us to launch the first municipal effort to track real-time physical activity and sleep data with an under represented population already willing to be surveyed. Also novel will be the feasibility components, the challenges of undertaking a study like this in a city with a persistent digital divide, and the comparison of groups using passive data collection units (fitbits) vs. smartphone apps vs. self-report survey recall data.

1. Describe the process you will use to link the data from the different sources you’ve identified. Include a description of feasibility and any considerations that will be made to ensure the privacy, security and confidentiality of the data and data subjects throughout this process. (750-word limit)

BeHeardPhilly members’ data reside in a secure Azure cloud instance. To date, we have collected no HIPAA related data, all data has been self-report data. Each panel member is identified with a unique, randomly generated identifier. Once panel members are recruited for the BeHeardBeHealthy project they will be identified in the Quantexual.co with that same unique identifier.

All data collected by the Fitbit device, mobile app, website will be stored and managed according to Fitbit’s data security practices and privacy policy which are compliant with the U.S. Federal Communications Commission (FCC) and Industry Canada (IC). The flow of data from the Fitbit device to the Fitbit cloud server is not part of the research study and is not overseen by this study. Once a participant has been recruited, they will be given a BeHeardBeHealthy account and login/password to complete the study consent. As a study participant, the user gives BeHeardBeHealthy permission to access his/her Fitbit data from the Fitbit cloud/server. Geographic location data is automatically collected by the Fitbit but will NOT be accessible to BeHeardBeHealthy unless authorized by the participant. All study data (passive Fitbit data and active survey data) are stored in the BeHeardBeHealthy server/cloud which is managed by Public Private Venture through ClearDATA on the Amazon Web Services cloud storage. This cloud instance is a HIPAA and PII compliant. The study data are stored separately from the participants account data (name, unique identifier, contact information, log-in, and password).

1. Describe how the linked data set(s) or individual data source(s) will be used to develop values for your proposed set of metrics in sleep, sedentary behaviors, nutrition, and/or physical activity. (500-word limit)

All of the participant data is exportable from the Quantexual.co platform in csv files. Once de-identified, the statistical and data mining team will aid in creation city-wide and where possible, neighborhood level estimates for these physical activity and sleep metrics; daily number of steps, distance on foot or other modes (bike, swim), calories burned, level of activity, location of MVPA, perception of safety while active, level of enjoyment, water consumption, hours of sleep per night, amount of awake time, consistency of bedtime, and sleep satisfaction. The team will compute point estimates and margins of error for the fitibit device group, the smartphone app group and the self-report comparison group using a set of comparable questions/metrics such as “type of activity” “duration of activity”, “time spent doing MVPA”, “distance covered”, “hours of sleep”, “trouble falling asleep”. Data will be aggregated to the day, week and month to be comparable with Phialdelphia BRFSS estimates.

1. Describe the representativeness of your data set for public health surveillance (e.g., to what population groups or sub-groups can you meaningfully extrapolate the results of your data set?). How amenable will this data set be to disaggregation by age, gender, education, geography, or other demographic characteristics? (750-word limit)

BeHeardBeHealthy will collect data that will be representative of Philadelphians with respect to age, race, gender, ethnicity, and education. We will aim to have each group be representative of the five demographic traits so that statistical comparisons can be made across the groups. These data could serve as an essential source of health behavior surveillance information for the state and local health departments as well as regional hospitals aiming to use data to meet their community benefit requirements. BRFSS and local health assessments often fall short of meeting the needs of local health departments and community-based health organizations because of their cost, frequency, timeliness, and lack of geographic granularity. Using a panel methodology with probability-based members as well as opt-in members can help us learn about the ways in which these groups differ as well as whether or not these data are reliable enough to supplement BRFSS-type prevalence estimates.

1. How useful will your data set be for public health surveillance, how significant/relevant and generalizable are the results that you expect to obtain? (500-word limit)

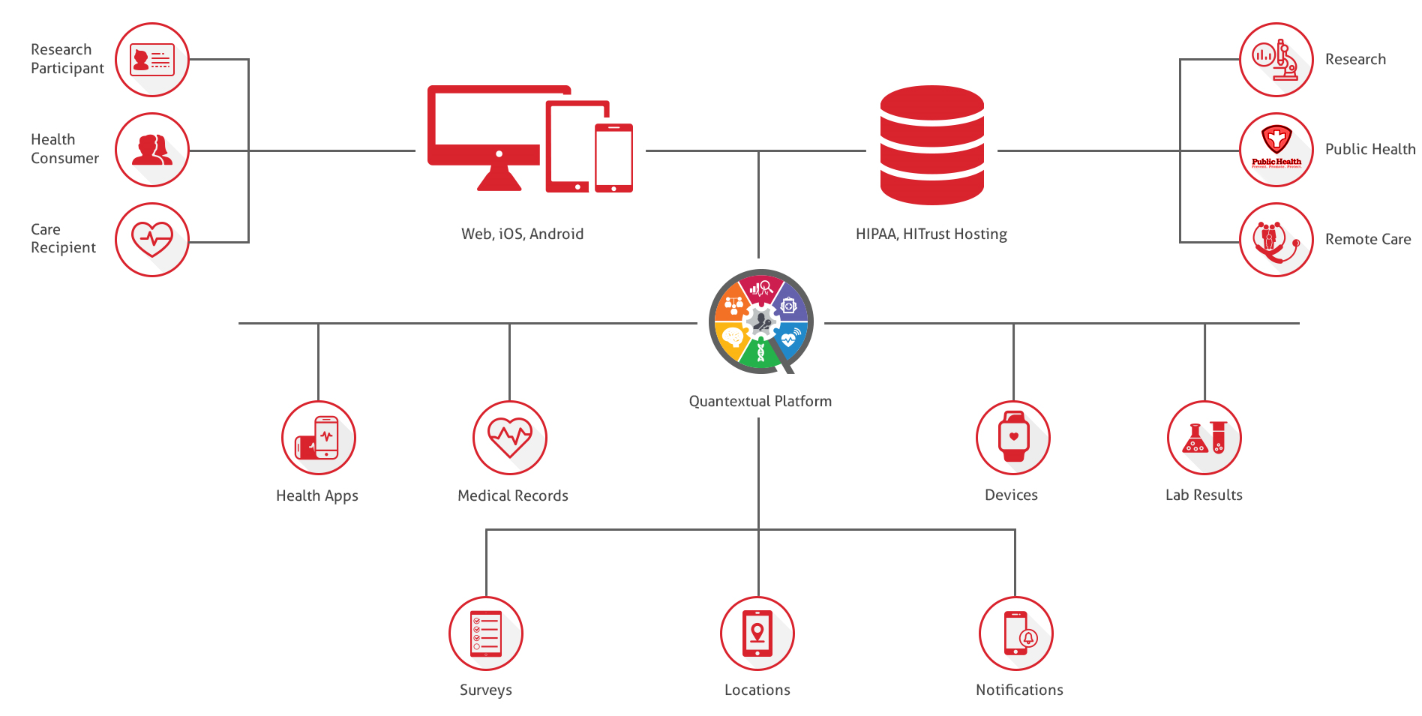
This is a feasibility project. We anticipate challenges with trust, deploying fit devices to under-resourced participants, access to broadband and daily compliance. We hypothesize that the BeHeardBeHealthy branding, our existing relationship with participants and the social-network component of this project will encourage participation and compliance. We also hypothesize that providing participants with their own e-health dashboard will encourage increased awareness and engagement with their physical activity and sleep behaviors. We also hypothesize that acknowledging the challenge of access to broadband and helping participants find nearby locations to access broadband will help compliance. If we can overcome some of these challenges, we expect this pilot to produce insightful, and potentially essential public health surveillance data for the Philadelphia Department of Public Health as well as data for community-based programs and hospitals. This study would be the first that we know of to explore willingness to share these types of data in a majority African American city. We anticipate these data to be generalizable to the city of Philadelphia.

1. Will the proposed project’s data and data sets contain information of relevance to other areas of public health surveillance (e.g., chronic or infectious disease)? If yes, please specify and describe any additional work that would be required in order to expand applicability. (500-word limit)

For this particular pilot project we plan to collect data that is directly relevant to chronic disease prevention – physical activity, water consumption and sleep. If enrollment, participation and compliance are sufficient to compute stable estimates over time, the BeHeardBeHealthy project could be used to deploy a full Philadelphia-based BRFSS. In addition, the fitness tracking devices, along with smartphone apps like Apple Health, Google Fit or a number of other freely available fitness apps could be used to supplement Physical Activity, Nutrition, Calories, and Sleep data.

In addition, we are going to ask participants if they would be willing to connect their patient-portal data which would include clinical data such as biomarkers for diabetes, kidney function, and other infectious disease related markers. These clinical data, coupled with self-report survey data and passive physical activity data could provide a much more complete picture for the Philadelphia Department of Public Health as well as community-based health-serving organizations.

It would not take a lot of work to expand this project. It is highly dependent on increasing trust with the Philadelphia community, awareness and engagement with their health data, willingness to share, and compliance in reporting. We plan to outline a streamlined process for participants with a manned technical support space so that participants are successful at getting up and running. Unknown factors include “rate of fitness tracker device loss”, “rate of compliance”, “rate of willingness to share”. Because Temple University is a known entity in the region and graduates 1 out of every 8 graduates in the region there is a level of brand recognition and trust. BeHeardPhilly is owned and operated by Temple University as would BeHeardBeHealthy. The graphic below shows how robust the Quantextual.co platform is. I received a demo a year ago and then received another demo two weeks ago. The platform has evolved significantly and provides researchers an ideal place to aggregate health and public health and wellness related data and to deploy research studies involving surveys.



1. Please describe a 3.5-month plan to develop a working prototype during the second phase of this challenge. This should include:
2. Details on how you will gain access to and link data from the source(s) you’ve identified.
3. Approaches/strategies that will be taken to ensure privacy/confidentiality of data before and after linkage.
4. Your approach to comparing results from your prototype to that generated from existing public health surveillance programs
5. A description of the format your prototype will take (e.g., visualization, online data tool, etc.)
6. Costs you expect to incur during this prototyping phase

Because we already have 8500+ Philadelphians who are members of BeHeardPhilly it would not take us long to develop a working prototype. We have already engaged Public Good Ventures (PGV) and they have agreed, for a cost of $1/participant per month, to host BeHeardBeHealthy. Dr. Jim Buehler would advise in all aspects of the study. In month 1 we would work with PGV to launch the secure, BeHeardBeHealthy instance of the Quantextual.co platform with our branding. In month 2 we would begin to recruit, consent and assign participants into randomized groups in the project, this would include setting up our technical assistance program. Once consented, those people in the fitbit device group would be asked if they already owned and used fitness tracking devices. If they did, we would ask them to continue using their own device. Quantextualiz.co has multiple fitness tracker APIs. We would deploy fitbit flex 2 devices to all others in that group. The second group would be asked to download a smartphone fitness app such as Apple Health or Google Fit. Others would simply be asked to download or access the Quanatextual.co app to self-report. Once participants were enrolled and set up with their respective fitness tracking schemes, they would be asked about willingness to share patient-portal and fitness tracking data with the research team. Even if the participants did not want to share data with the research team we would include them as this is a feasibility study and those estimates are important to learn.

Incentives of $10 would be used for the full length of the study. Demographic data with unique identifiers would be uploaded to the Quantextual.co platform. All surveys, reminders, email communication and API connectors would be managed within the Quantextual.co platform so all data would reside in one database with unique participant identifiers. In months 3 we would begin to extract de-identified data for the data miners/statisticians such that they could begin to create a template for the special/temporal data. The team would work with the statistical team to create a specific set of metrics for each group. In months 4 we would conduct a formative assessment and tweak study designs, operations as needed. By month 5 we would download all the data collected for the 3 months that participants were enrolled in the study and create statistical estimates for each physical activity and sleep measure.

All active and passive data would reside in the Quantextual.co cloud (patient portal, fitness tracker, survey). This is a secure cloud with secure API connections to the fitbit cloud and patient portals. The goal would be to enroll 600 participants total across the city of Philadelphia. We would invite all of our probability-based panel members into the study and quota sample from the active opt-in BeHeardPhilly members until we had a representative group with respect to age, gender, race, ethnicity, education within each group.

The cost of 200 or less fitness trackers, assuming some participants will have their own would be $9,000 (assuming we purchase the $45 Fitbit Flex2). The $10 incentive for 600 people would cost $6000. Cost for the Quantextual.co platform is $3000. Staff labor for the five months and the statistician/data miner would cost 22,000. All costs could be scaled down with a scale back in design.

The prototype project would end with a panel of BeHeardBeHealthy members, data that compares fitness and sleep data across two to three months, some prevalence estimates for physical activity and sleep for the three groups (fit device trackers, smartphone app only, self-report) and differences between them. We would compare the self-report estimates to BRFSS data for Philadelphia as well as compare the aggregated fitness tracker and smartphone monthly estimates with BRFSS data for Philadelphia.

The Quantexual.co platform provides a robust dashboard for participants. It allows them to see all of their health and wellness information in one place as well as access information the Medline library of health information. A recent study by the Free Library of Philadelphia found that the majority of people who access the internet in the library access health information. The dashboard includes graphs and other visual tools for participants. If participants enable their location, they are able to compare their activity with others in their neighborhood.

1. Significance and Relevance Summary

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| BeHeardBeHealthy is a project designed to engage under-represented populations in a behavioral health and data collection and sharing initiative. The prototype developed would be a platform that allows individual participants to collect all of their health and wellness data in one place, and to engage in sharing of those data with researchers. These data could be used to aid local health departments, community-based care organizations and hospitals with the data they need to deploy resources, develop health interventions, create health communication and awareness campaigns and make health policy decisions.  Specifically, we plan to engage participants of an existing municipal survey panel with 8500+ members called BeHeardPhilly as part of an online social network called BeHeardBeHealthy. BeHeardBeHealthy would be deployed on the Quantexual.co platform that resides in a secure cloud, is uniquely branded and that is accessible via computer or mobile device. The platform would be used to pilot participant “donation” of health information, including information derived from “patient portals”, fitness device trackers, smartphone apps and surveys.  The participants would have access to their own health and wellness dashboard as well as to the built-in Medline library for health information. |

Public reporting burden of this collection of information is estimated to average 60 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. An agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a currently valid OMB control number. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden to CDC/ATSDR Reports Clearance Officer; 1600 Clifton Road NE, MS D-74, Atlanta, Georgia 30333; ATTN: PRA (0990-0390).

1. Moderate-to-vigorous physical activity (MVPA) is any activity with an energy expenditure >3 metabolic equivalents [↑](#footnote-ref-0)
2. Sedentary behavior is any waking activity characterized by an energy expenditure ≤ 1.5 metabolic equivalents and a sitting or reclining posture [↑](#footnote-ref-1)