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| **Phase I (Prototype Development)** | **Answers** |
| [1. Submit/upload a completed HBD Challenge Submission Template describing the proposed project, project personnel and data sources.](https://www.challenge.gov/wp-content/uploads/2017/04/CDC-Data-Challenge-Phase-1-submission-template-US-FINAL.docx) | Completed |
| 2. Provide a PowerPoint or other visual presentation of the proposed project including purpose, methods and anticipated outcomes of the proposed approach, which could be used to present the proposal to a judging panel. | Refer to PowerPoint presentation |
| 3. Provide a description of data that are anticipated to be captured by the proposed approach, and, if applicable, descriptions of online app(s), web-based tools or communication devices used to recruit or track subjects’ healthy behavior information. | Survey Questionnaires that related to nutrition, physical activity, and sedentary behavior from BRFSS survey questionnaire.  In addition to passive data collected from participants with wearables devices or those who enabled their smart phones physical activity tracker. |
| 4. Propose (a) viable data source(s) from currently available or a feasible future source (such as a proposed app or online tool). HBD Challenge participants may propose the use of public and/or private data sources, as long as respondent confidentiality and privacy are maintained. | We propose to use quantextual.co <https://www.quantextual.co/> to conduct this project. The application guarantees maximum privacy and confidentiality to member participants. |
| 5. Demonstrate how CDC would be able to access the data. | Refer to Question 13-1 from details in HDB template. |
| 6. Outline in a detailed manner what information will be obtained. | Refer to Question 13-4 from details in HDB template. |
| 7. Demonstrate how data will be extracted and collected: present the format in which it will be stored. | Refer to Question 13-4 from details in HDB template. |
| 8. Show how the new data source(s) could be linked with other data sources, in a statistically robust manner that could result in useful public health insights, citing statistical approaches and evidence to support the proposal. | Refer to Question 7 from details in HDB template. |
| 9. Focus on one or more behavioral factors including physical activity, sleep, sedentary behaviors, and/or nutrition. | Refer to Question 9 from details in HDB template. |
| 10. Provide information about the population reached and generalizability of the approach. | Refer to Question 11 from details in HDB template. |
| 11. Describe how data could be stratified by demographic characteristics (e.g. age, sex, education, geographic jurisdiction). | Question 10 from details in HDB template. |
| 12. Show how information gathered addresses some or all of the following common metrics in one or more of the healthy behavior topics below: |  |
| **A. Sleep:** |  |
| 1. Hours of sleep per night (sleep duration) | Collected through wearable devices. The data collected on sleep will used as outcome measure for sleep |
| 2. Amount of time awake (sleep quality) | Collected through wearable devices. The data collected on sleep will used as outcome measure for sleep |
| 3. Number of times awake (sleep quality) | Collected through wearable devices. The data collected on sleep will used as outcome measure for sleep |
| 4. Number of adults reporting having trouble getting to and staying asleep | These data will be collected to survey sent in daily basis to each participant |
| 5. Time to fall asleep | From wearable devices |
| 6. Amount of time in REM vs. non-REM sleep (duration of sleep stage) | From wearable devices |
| 7. Heart rate | From wearable devices |
| 8. Respiration | Not applicable with the right wearable devices |
| 9. Sleep behaviors such as snoring, sleep talking, sleep movement | Not applicable with the right wearable devices |
| **B. Sedentary Behaviors:** |  |
| 1. Average number of hours per day spent sedentary, excluding sleep time | Inferred using wearable device |
| 2. Average number of hours per day spent on a computer/screen including watching TV, videos, playing computer games, emailing or using the internet | Collected through survey questionnaire |
| 3. Sedentary data with additional information on location (work, school, community, etc.) broken down by weekday and weekend day | Collected through survey questionnaire |
| **C. Nutrition:** |  |
| 1. Total calories consumed per day | Collected through wearable devices |
| 2. Consumption of fruit (not including juices) by day, week, or month | Collected through survey questionnaire (self-reported measure). This is measure can be collected as frequently as needed with a day. |
| 3. Consumption of green leafy or lettuce salads, with or without other vegetables, by day, week, or month | Collected through survey questionnaire (self-reported measure). This is measure can be collected as frequently as needed with a day. |
| 4. Consumption of vegetables (not including lettuce salads and potatoes) by day, week, or month | Collected through survey questionnaire (self-reported measure). This is measure can be collected as frequently as needed with a day. |
| 5. Number of sugar-sweetened beverages consumed by day, week, or month | Collected through survey questionnaire (self-reported measure). This is measure can be collected as frequently as needed with a day. |
| 6. Number of caffeinated drinks consumed by day, week, or month | Collected through survey questionnaire (self-reported measure). This is measure can be collected as frequently as needed with a day. |
| **D. Physical Activity** |  |
| 1. Minutes of moderate-to-vigorous physical activity (MVPA) per day (ideally by location – work, school, in community) | Collected through wearable devices |
| 2. Daily number of steps | Collected through wearable devices |
| 3. Miles/km (Distance) on foot | Collected through wearable devices |
| 4. Number of days of physical activity/week or month (and established number of days in one month) | Collected through wearable devices |
| 5. Minutes of moderate-to-vigorous physical activity (MVPA) per day (ideally by location – work, school, in community) broken down by weekday and weekend day. | Can be inferred by combining data from wearable devices and GPS location collected from participants smart phone |
| 6. Calories burned | Collected through wearable devices |
| 7. Type of activity (aerobic, strength, etc.) | Collected through wearable devices |
| 8. Active minutes | Collected through wearable devices |
| 9. Duration of exercise | Collected through wearable devices |
| 10. Flights of stairs climbed | Collected through wearable devices |
| 11. Average and peak heart rate | Collected through wearable devices |
| 12. Occupational physical activity and active chores amount: (location of physical activity) | Can be inferred from survey data and wearable device data |
| 13. Number of hours of reported physical activities while at work, in or around household | Can be inferred from survey data and wearable device data |
| 14. Leisure time physical activity amount: | Can be inferred from survey data and wearable device data |
| 15. # of hours per week adult participants spent in sports, fitness or recreational physical activities, organized or non-organized, that lasted a minimum of 10 continuous minutes | Can be inferred from survey data and wearable device data |
| 16. Number of adults reporting and time spent walking or cycling to work or school | Can be inferred from survey data and wearable device data |