

Study Management and Operation

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Measuring and Modeling Health Behavior
with Smartphone Mediated Data
Collection

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Study Versioning

- Changing a study is possible, but can often pose problems for
 - Analysis ease
 - Recall that participants get access to updates only over time (by happenstance of connectivity)
 - Currently is not accompanied by metadata indicating to which version a given participant is exposed at a given time
 - Adding consistent provision of metadata which gives software version, study configuration version in effect at time of data recording is a possible future direction
 - Analysis power
 - Lower sample sizes of exposures
 - Ethical approval

Barriers to retention

- Required network contact drops out
- Change of phone
- App concerns lead to uninstallation of app
- Change in contact information

Study Staff Needs

- Some familiarity with smartphone platforms and computational comfort required for interfacing with some participants
 - During consent process (e.g., connectivity, install challenges, etc.)
 - During troubleshooting requests
 - In sleuthing barriers to non-reporting
 - Interacting with website
- Strong interpersonal skills are often required as well
- Local mixed teams or interdisciplinarily trained individuals advised

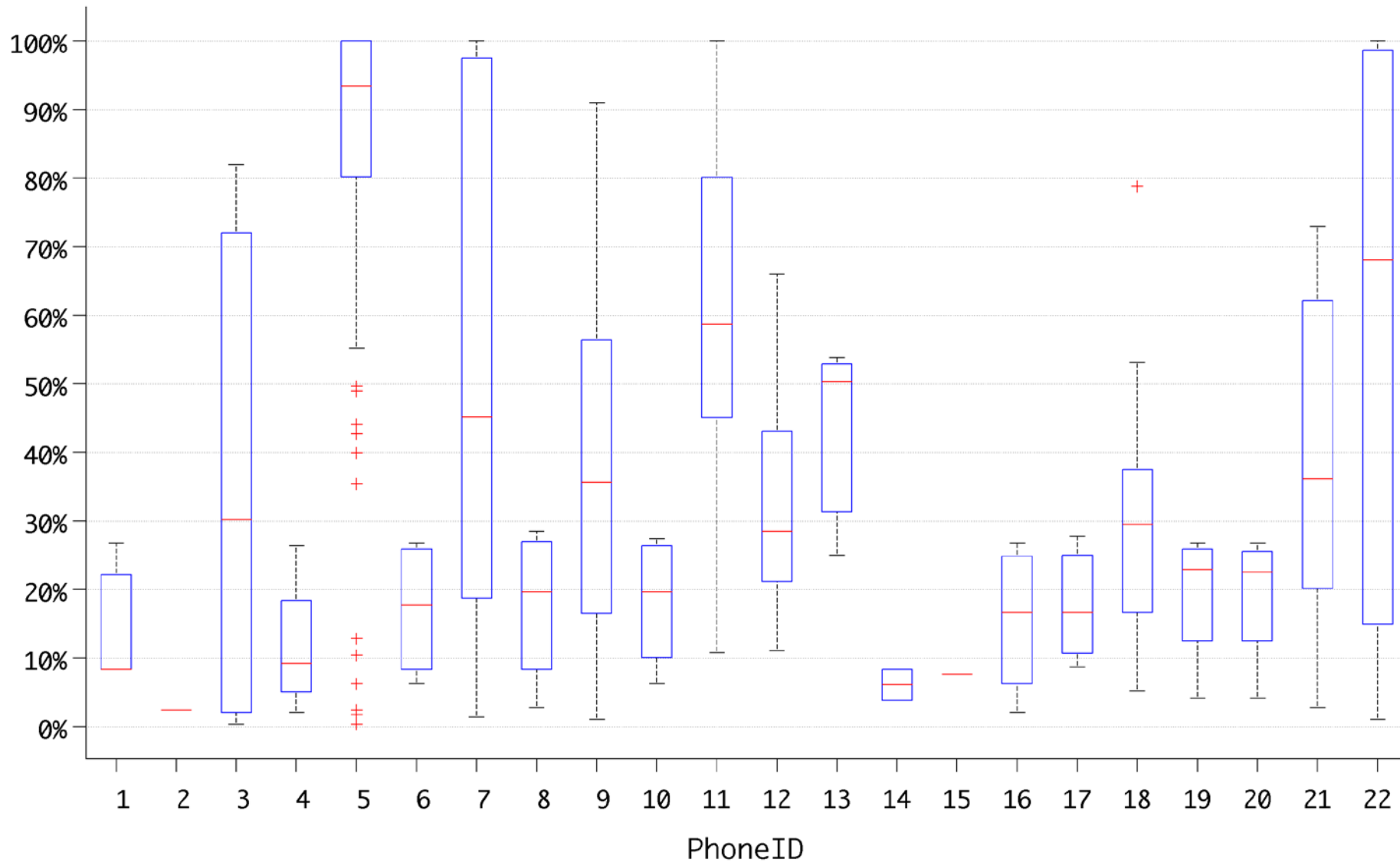
High Level Considerations

- User side issues
 - Privacy
 - Familiarity with phones
- Technical issues
 - Battery exhaustion
 - Coverage challenges
 - Phone failures
- “Burn in” effects

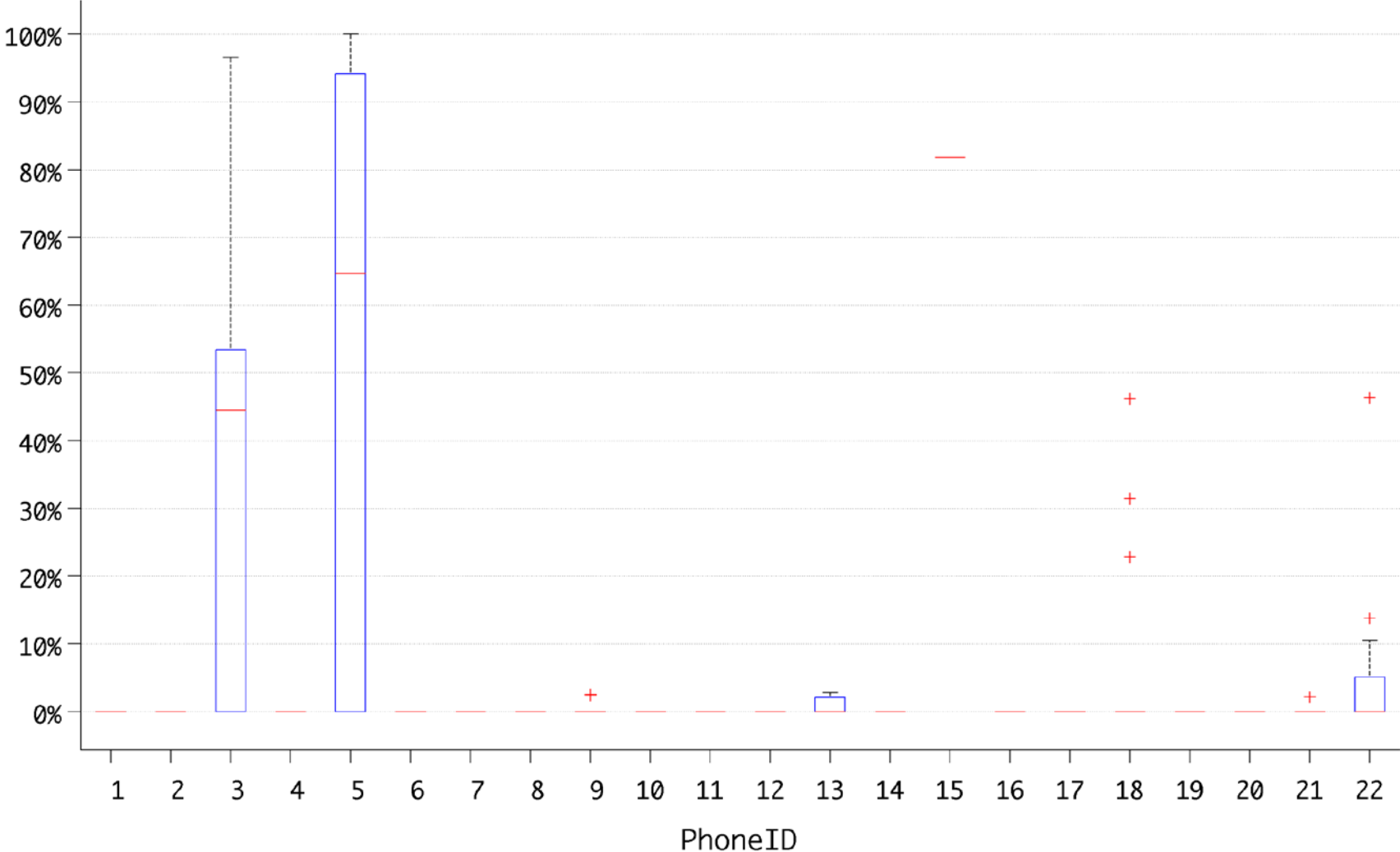
Past Measures

- Fraction of all possible duty cycles in which data was received
- Number of proactive self-reports made
- Fraction of questionnaires answered (vs. cancelled/expired)
 - Warning: Denominators can be hard to determine
- Frequency of snoozing

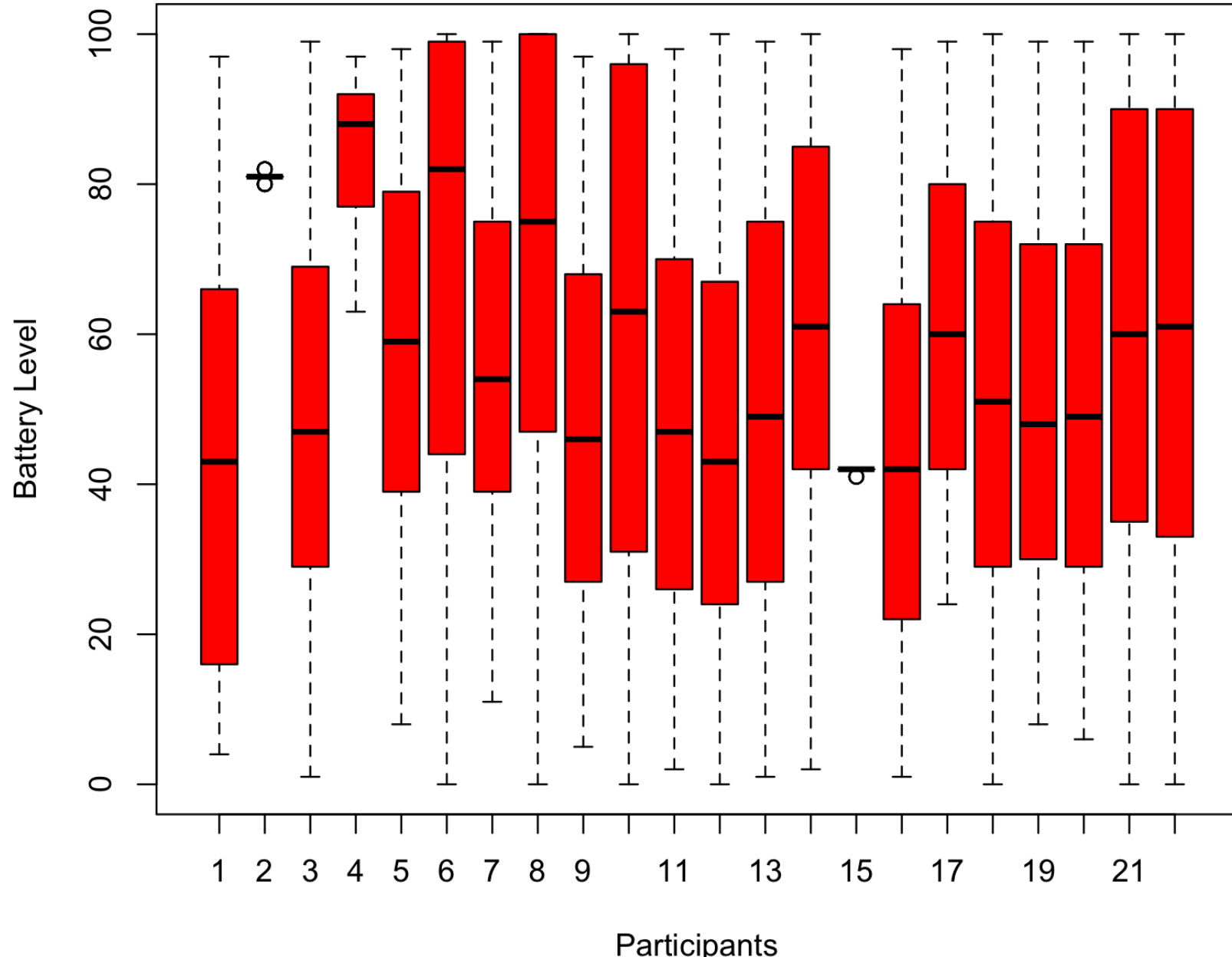
Percent of Possible Data Received Across Participants



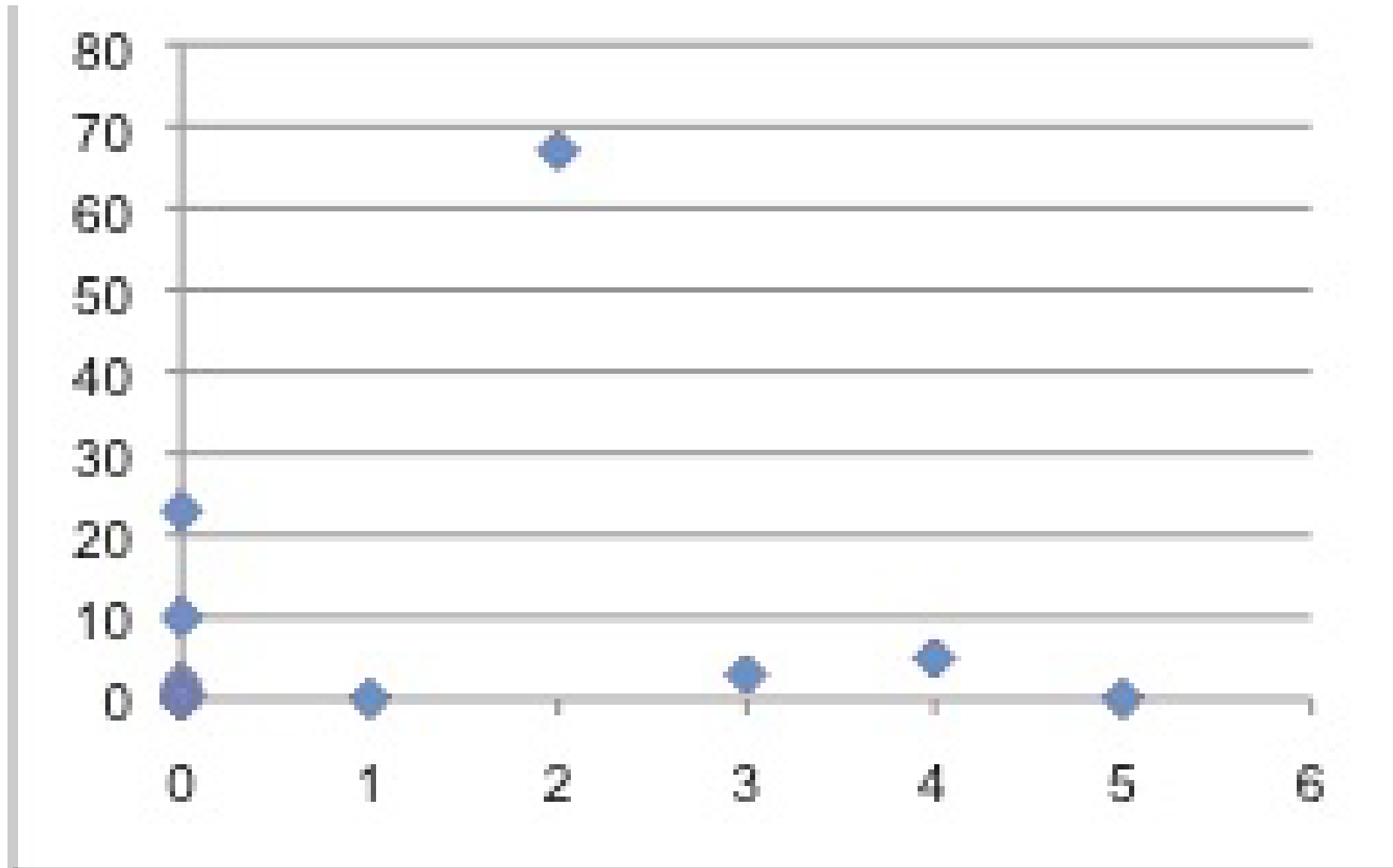
Fraction of Data Concealed by Participants



Box Plot of Battery Levels for each participant

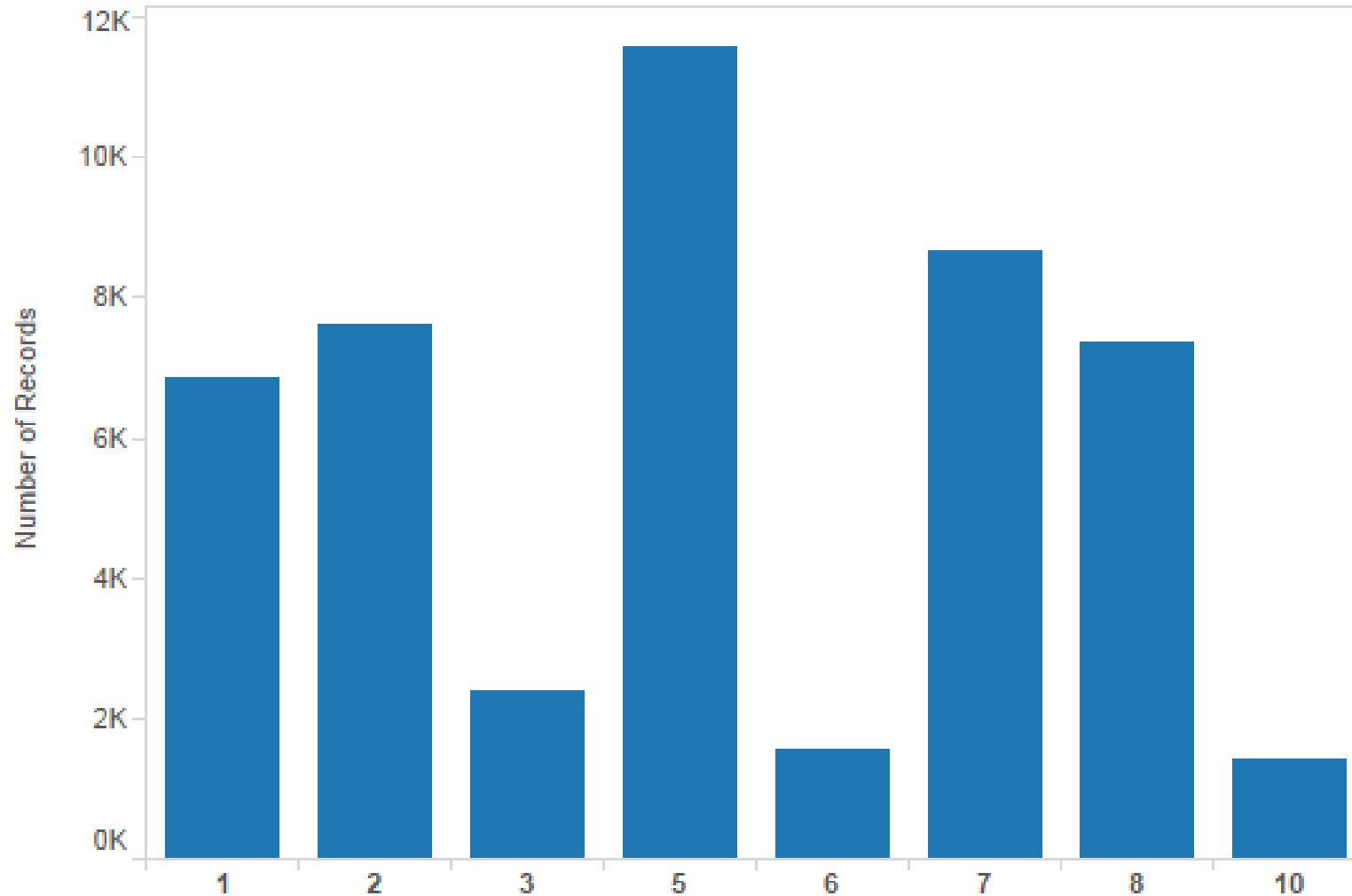


Compliance: Count Reported Meals (h) vs. Count of Glucose Levels (v)



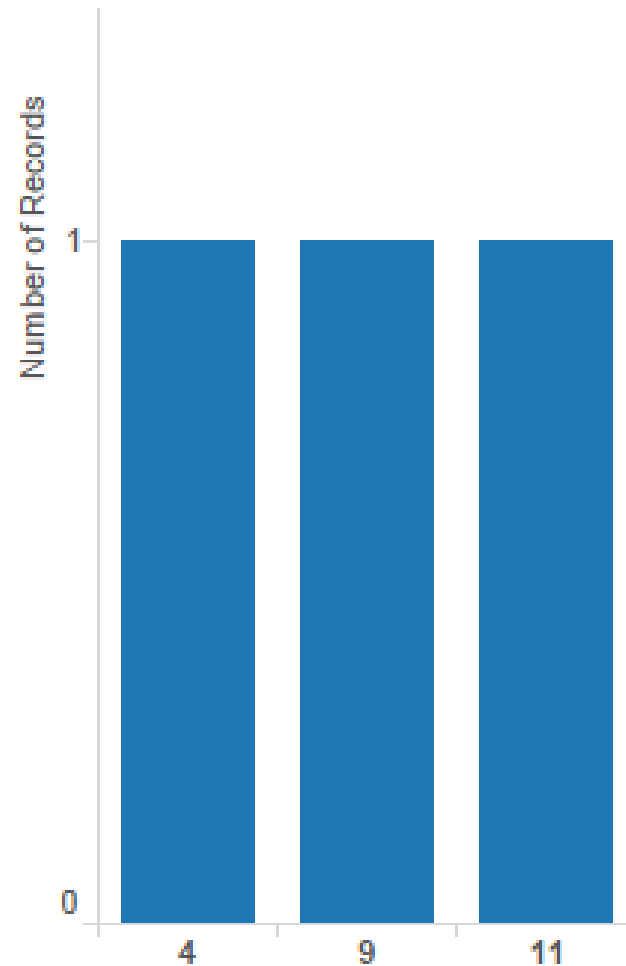
Relative Volumes of Data Collected from Different Participants

(Y Axis is for Relative Values only)



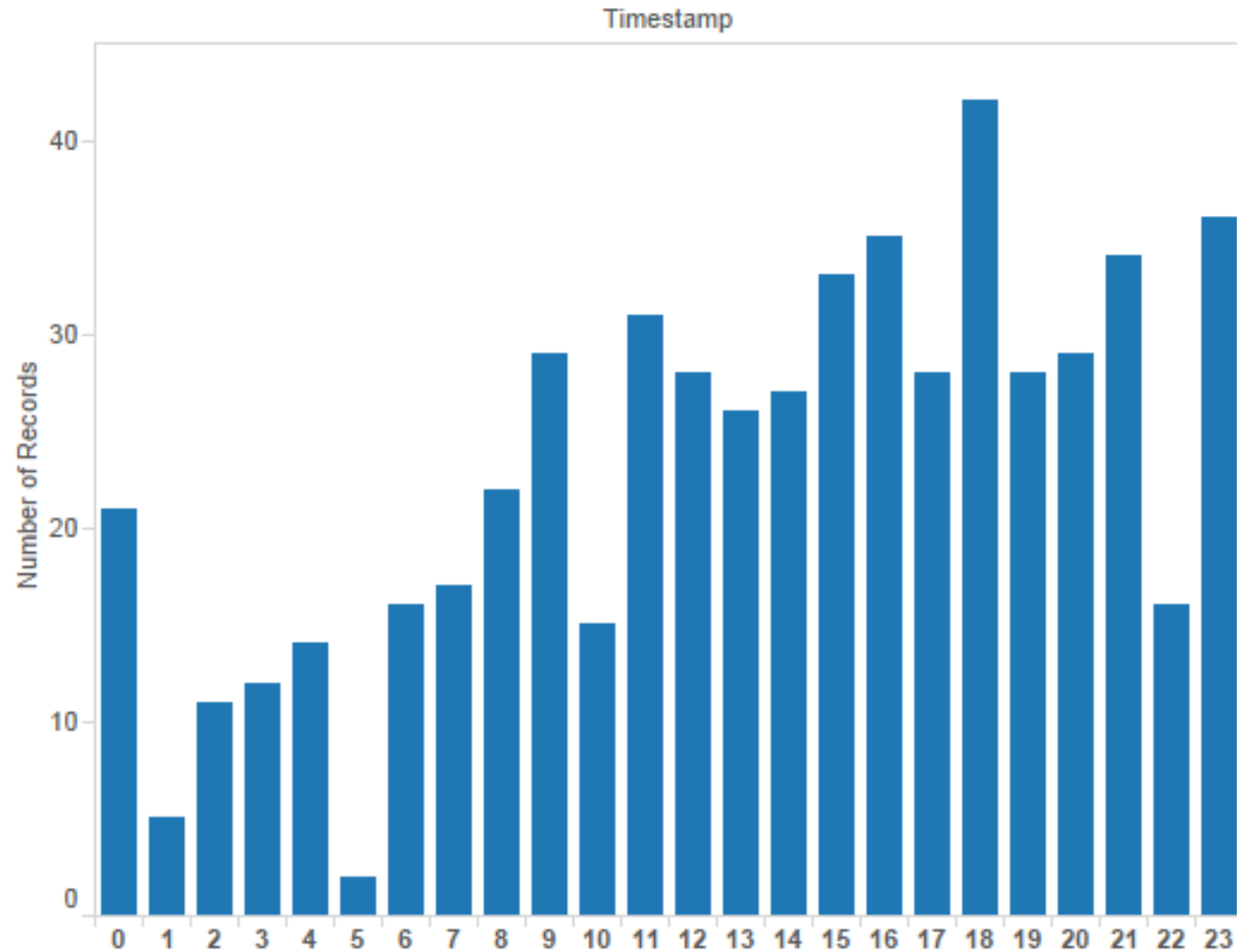
500-Second Intervals Where iEpi was “Snoozed” by Participant

(Message: Only 1 such interval for each of 3 participants –negligible, except to indicate that rarely participants do request privacy)

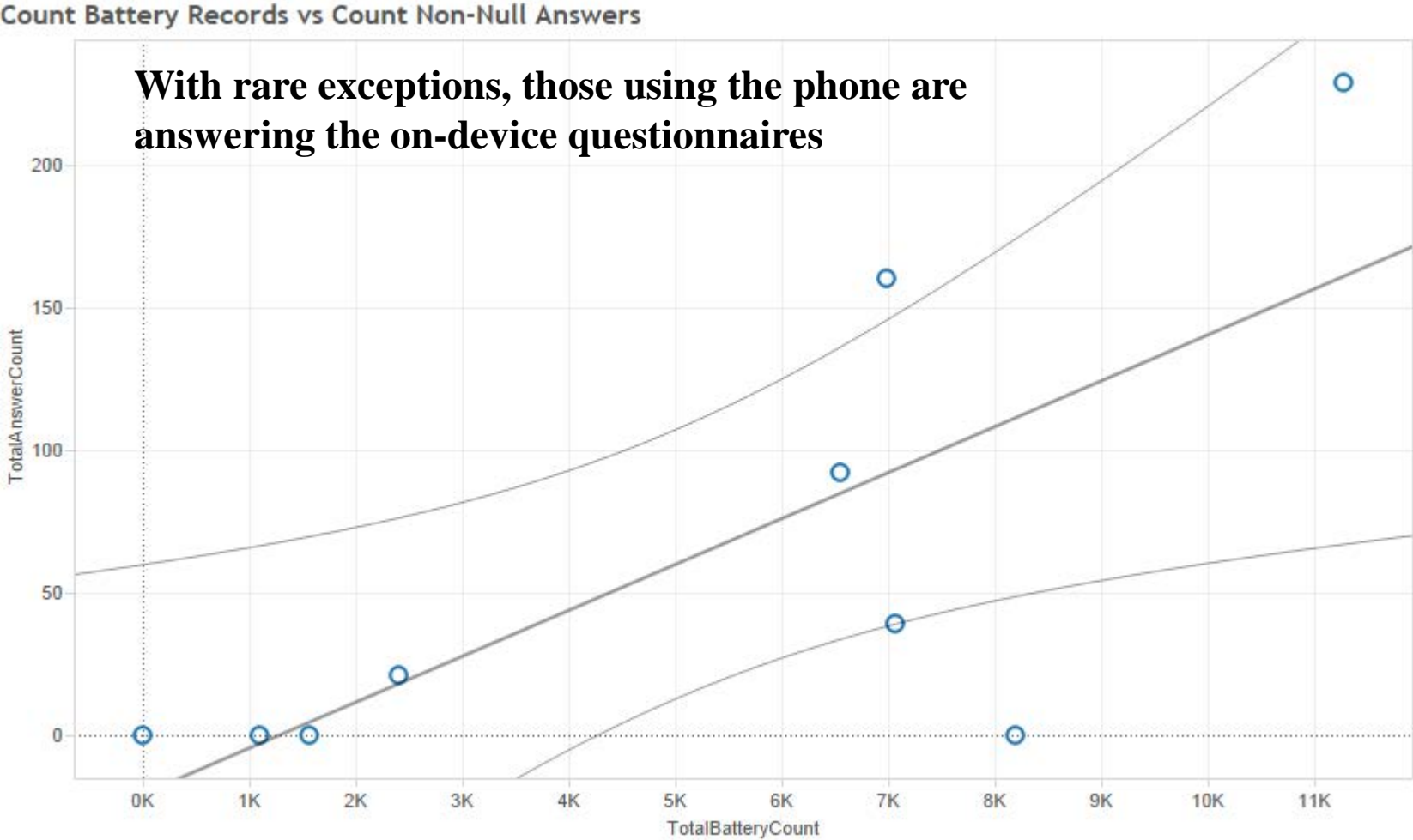


Survey Questions Answered by Hour of Day

NonNull Question Response by Time of Day



Relative Sensor Data (X) vs. Count of Self-Reported Answers on Questionnaires (Y)



TotalBatteryCount vs. TotalAnswerCount.

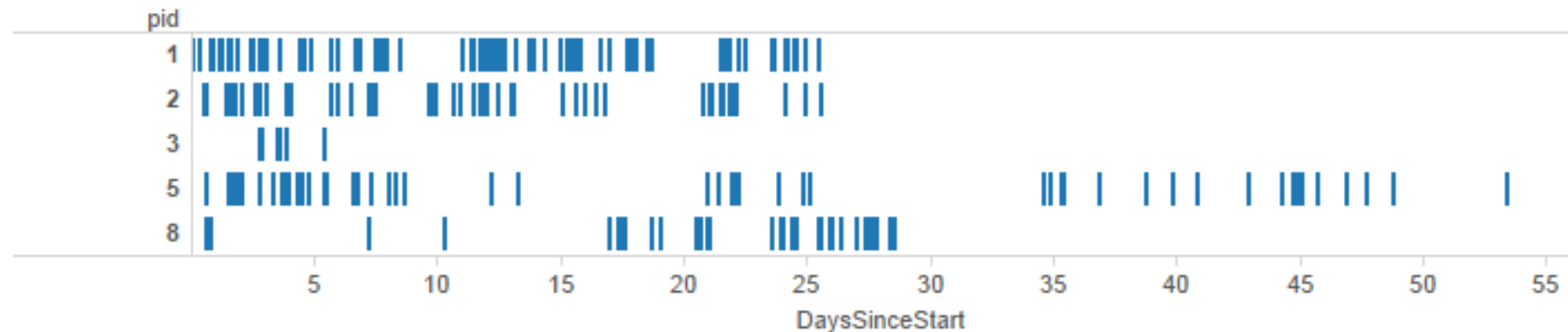
Dynamics of Questionnaire Completion

[Responses to Questions over time (X axis)

Provided by Participants (Y Axis)]

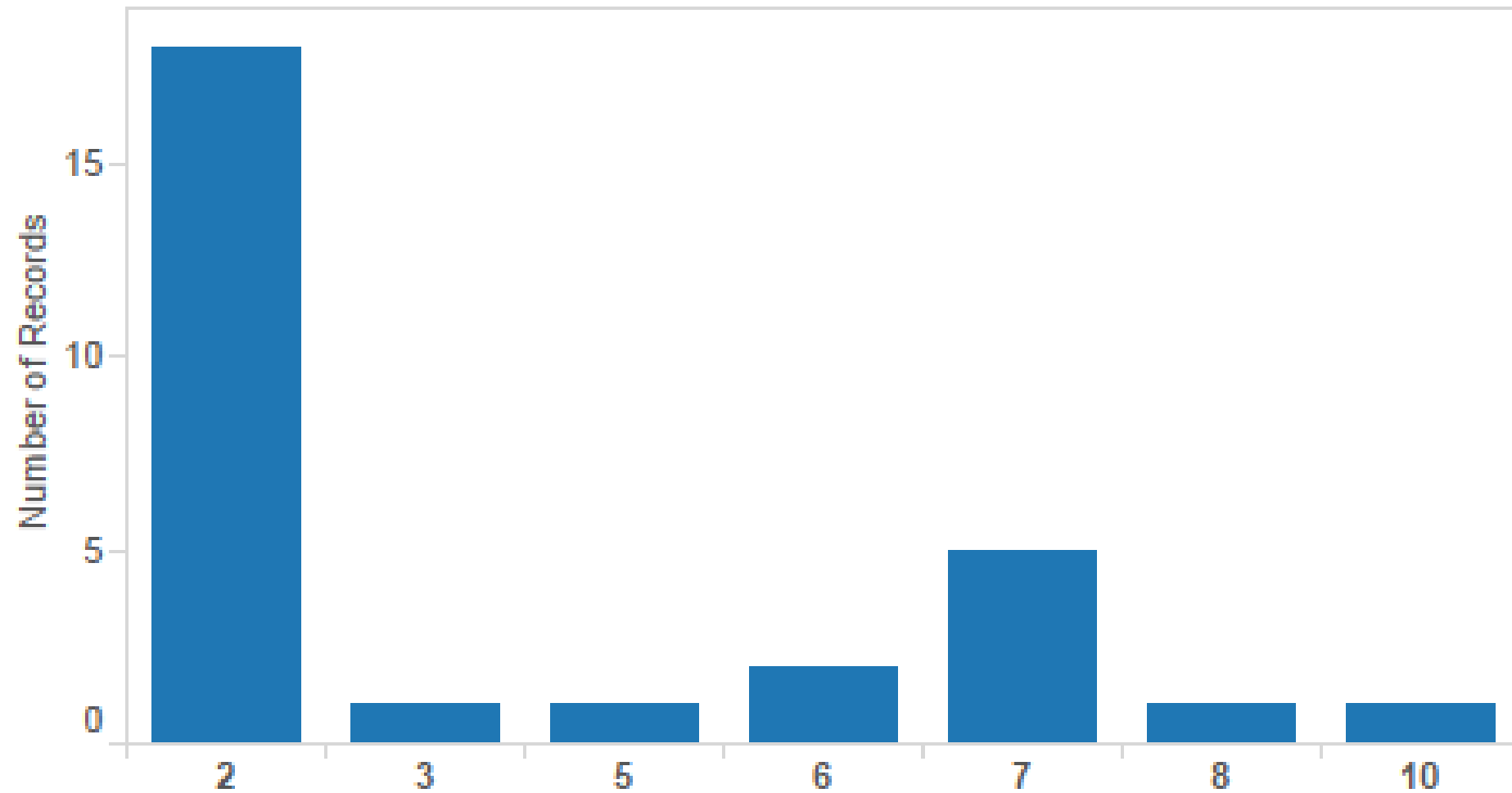
- High Level Message: Participants appear to persist in answering questionnaires over entire deployment – not just at beginning

Questionnaires following Start Date

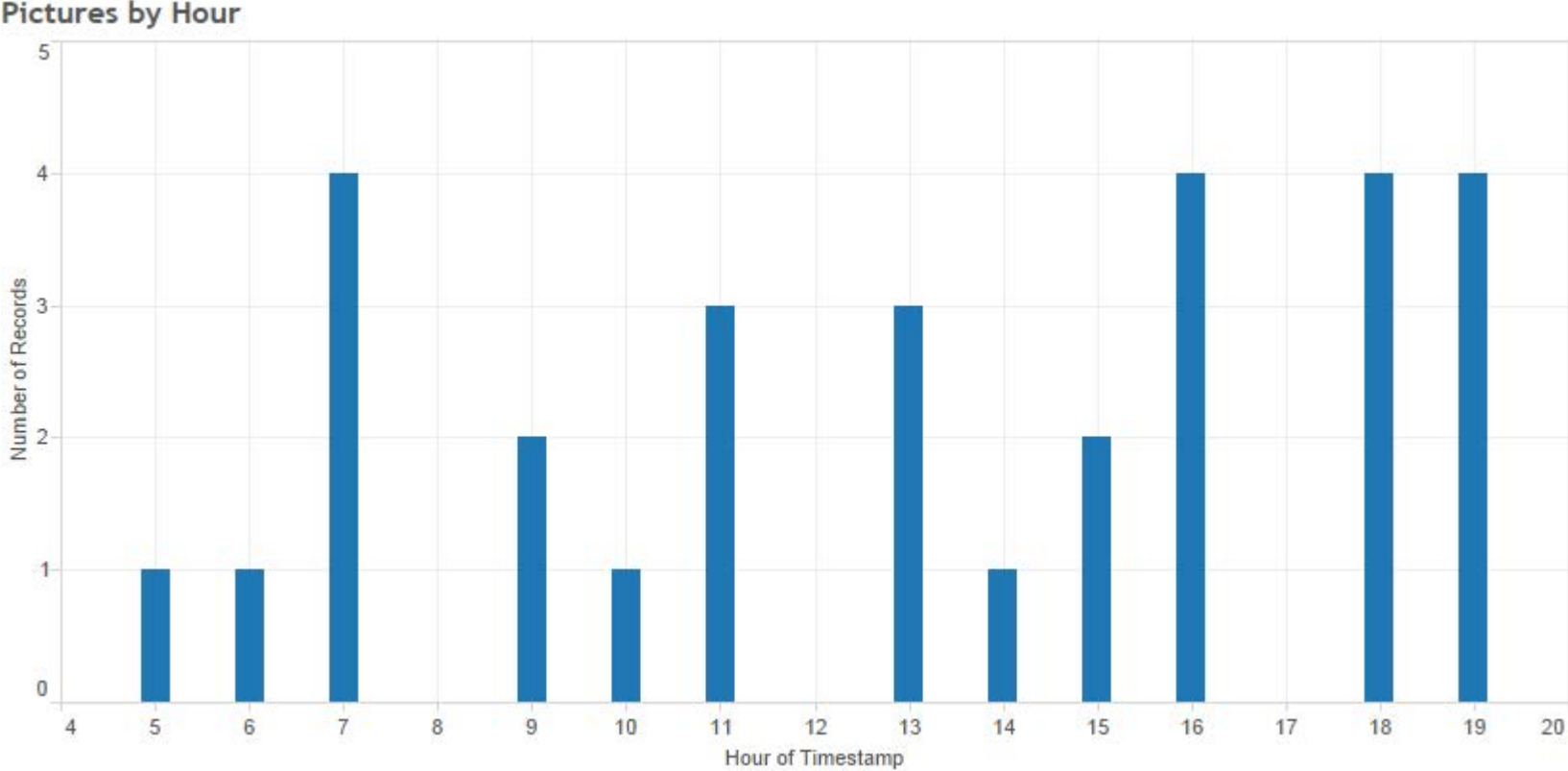


DaysSinceStart for each pid. The data is filtered on Answer, which excludes Null.

Count of Pictures (Y) Submitted by Participants (id on X axis)



Photos Taken by Hour of Day



Photos Taken by Participants (Y) by Days Since Enrollment (X)

Pictures Following Start Date

