**Planned missingness design**

In order to obtain the optimal information on a range of measures, while also minimising respondent burden, we will use a planned missingness design with a 15 form multiform approach.

Each participant is randomly assigned to complete one form. This approach means that the presence of missing data for specific survey items is missing completely at random (MCAR), and thus multiple imputation can be used to provide estimates of the missing values and recover statistical power without introducing bias in the data.

Table 1 gives an overview of the seven question sets, and the 15 forms of the survey that will use different forms of the question sets.

Table 2: Overview of a multiform design with combinations of seven questions sets across 15 forms.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Form | Set X | Set A | Set B | Set C | Set D | Set E | Set F |
| 1 | X | X | X |  |  |  |  |
| 2 | X | X |  | X |  |  |  |
| 3 | X | X |  |  | X |  |  |
| 4 | X | X |  |  |  | X |  |
| 5 | X | X |  |  |  |  | X |
| 6 | X |  | X | X |  |  |  |
| 7 | X |  | X |  | X |  |  |
| 8 | X |  | X |  |  | X |  |
| 9 | X |  | X |  |  |  | X |
| 10 | X |  |  | X | X |  |  |
| 11 | X |  |  | X |  | X |  |
| 12 | X |  |  | X |  |  | X |
| 13 | X |  |  |  | X | X |  |
| 14 | X |  |  |  | X |  | X |
| 15 | X |  |  |  |  | X | X |
| Number of items\* | 110 | 19 | 19 | 19 | 18 | 18 | 18 |

**\***Approximate due to routing

**Question sets**

Each of the five sets contain different items from the main survey. The X set includes common questions for all participants, while the remaining sets include subsets of items.

The questions in the X set include: demographic factors, network data, and one or two items from each of the topics, constructs, and scales in the survey. The decision on which items to include in Set X from each of the scales was based on the principal components analysis of the items for the scales in the Net4Health pilot study. The items which had the highest relative importance for the first principal component were placed in set X. Where there were multiple components (e.g. subscales), multiple items were placed in set X. Remaining items from each of the scales or topics were distributed across the remaining sets. All items from the mental health, worries, and substance use questions were placed in set X.

At time point 2, participants will be randomly assigned to complete a different form than they completed at time 1. This reduces the potential for repeated testing effects with the items and increases validity of the construct measurement.

**Reduction in survey length**

Administering the full survey would involve each participant responding to around 221 items, plus additional items for the social network questionnaire.

Using the 15 form design, each participant responds to around 148 items, around 67% of the full survey.