Proposed Sample Size Categories for Food Shelf Survey
Danielle Dupuis, Ph.D.
Research Methodology Consulting Center, UMN

Background Information

The primary purpose of these analyses is to develop a sampling plan accounting for the varying number of households that visit each food shelf in Minnesota. In previous years the targeted sample size for each food shelf was 25 participants. Some food shelves, however, have fewer than 50 "household visits" per month, while others have over 8,000 "household visits" per month. Additional considerations include the total sample size and the minimum sample size per food shelf.

Background Analyses

The first step was to identify the <u>size of the population</u> – that is, the number of food insecure households throughout Minnesota. According to the 2020 U.S. Census there are 2,208,000 households in Minnesota. According to the Feeding America, in 2019, 7.7% of Minnesota households were food insecure, resulting in approximately 170,016 households in MN that are food insecure.

The second step was to identify the <u>total number of households to sample</u>. Given a population size of 170,016 and a 95% confidence interval, 2,368 households would need to be sampled to achieve a 2% margin of error. To achieve a 1% margin of error, 9,091 households would need to be sampled. In 2019, the data collection team was able to sample approximately 5,000 households from 200 food shelves. As such, the decision was made to target a total sample size of 5,000 households again, which would result in a margin of error slightly larger than 1.5%.

The third step was to identify the <u>number of households per food shelf</u> that should be sampled. With a total sample size of 5,000 households to target and approximately 200 food shelves participating in the survey again, 25 households from each food shelf would need to take the survey. However, as noted previously, food shelves vary greatly in the number of households they serve each month. Table 1 contains percentiles of the number of visits each food shelf received during the summer of 2021 and for the most recently available data in 2022.

Table 1. Percentiles of number of visits by household

Month	1st	25th	50th	75th	99th
June 21	1	31	65	181	2,718
July 21	1	35	73	181	7,284
August 21	1	33	75	201	8,317
January 22	1	43	93	275	8,435
February 22	1	49	122	384	8.545
March 22	1	43	98	287	5,776

The data presented in Table 1 is skewed with most food shelves (75%) having fewer than 300 visits per month. In fact, 50% have fewer than 100 visits per month. In contrast, only 25% of food shelves receive more than 300 visits per month, with fewer than 20 having over 5,000 visits per month.

Proposed Sample Categories

Given the skewed nature of the data and the need to simplify the data collection process, the decision was made to categorize the food shelves into groups based on their size and to set a target sample size for each group. The four groups of food shelves are presented in Table 2.

Table 2. Sample size targets by food shelf group

Food Shelf Size*	Total number of food shelves	Sample size to target	Minimum sample size needed to hit margin of error targets	Resulting sample size if 50% of food shelves participate
1-50	95	10	8	420
51-100	95	20	17	830
101-300	95	25	22	1,250
301+	95	55	53	2,500

*Based on number of households who visited in March 2022.