BUILDING RESIDENT QUALITY OF LIFE AND FAMILY SATISFACTION MEASURES FOR THE MINNESOTA ASSISTED LIVING REPORT CARD

A Report to the Minnesota Department of Human Services

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Executive Summary

Introduction: In 2019, Minnesota passed landmark legislation establishing a new assisted living (AL) license in MN, which included licensure surveys of all assisted living facilities (ALFs). Minnesota became the last state to pass ALF licensing requirements with the Assisted Living Licensure Law. The new regulations went into effect on August 1, 2021. In addition to licensure, the Minnesota legislature also provided funding for AL resident and family surveys and an online Assisted Living Report Card.

Resident quality of life and family satisfaction measures: Over the course of 2019, the University of Minnesota (U of MN) and the MN Department of Human Services (DHS) launched various statewide stakeholder engagement events to determine which domains of quality found in a literature review matter most to Minnesota stakeholders. When comparing all sources of data from all stakeholder groups, the domains rated as most important were quality of life (QOL) and satisfaction. To measure QOL in AL facilities, two surveys were developed: 1) Resident Quality of Life Survey and 2) Family Satisfaction Survey.

Survey development and pilot testing was conducted between September 2020 – July 2021. Implementation of the first round of state-wide resident QOL and family satisfaction surveys concluded in the summer of 2022 and the second round concluded in the summer of 2023.

Assisted Living Report Card work conducted by the University of Minnesota: The University of Minnesota (U of MN) was tasked by DHS to assist in the development of report card measures based on the Resident Quality of Life and Family Satisfaction Survey findings. Over the course of 2022-2023, the U of MN conducted analyses of the first two rounds of statewide survey data to provide recommendations for how to adjust the resident quality of life and family satisfaction surveys and build quality measures based on survey findings. This report provides a summary of these analyses and recommendations for how resident quality of life and family satisfaction ratings should be calculated for the AL Report Card.

Overview of 2022-2023 Resident QOL and Family Satisfaction Survey Data

This report details findings from both resident quality of life surveys and family satisfaction surveys conducted in 2022-2023. The findings are based on a randomly selected sample of residents in Minnesota ALFs and their family members. For the 2022-2023 data collection, 785 facilities were contacted to participate. Data collection occurred at facilities with the capacity to serve 20 or more residents. For resident surveys, 12,091 face-to-face interviews were completed at 467 facilities. A total of 11,935 family surveys came from 481 facilities: 8,360 (70%) by mail, 2,652 (22%) by phone, and 923 (8%) online.

Table 1 shows the socio-demographic characteristics of resident respondents (N = 12,091). Resident age ranged from 18-85+, with a mean age of 82.8 years; most were female (68.6%) and White (81.4%). 83.2% of respondents resided in a Memory Care Unit. Nearly 40% self-rated their overall health as “good”. Likewise, about 40% rated their quality of life as “very good” and almost one-third (28%) rated their care facility as “excellent” (scale: A (excellent) through F (failing)).

Table 1: General Characteristics of Respondents of Resident Quality of Life Survey

General Characteristics	Frequency	Percentage
Age Group		
Mean Age (years)	82.8	
18-54	241	2.2
54-64	505	4.6
65-74	1,332	12.1
75-84	3,147	28.5
85+	5,820	52.7
Gender		
Female	8,291	68.6
Male	3,696	30.6
Other	9	0.1
Missing	95	0.8
Race		
Asian/Asian American	24	0.2
Black	97	0.8
Hispanic	49	0.4
Middle Eastern/North African/Arab American	4	0.0
Multi-Racial	198	1.6
Native American	47	0.4
Native Hawaiian or other Pacific Islander	1	0.0
White	9,843	81.4
Other	1,099	9.1
Missing	729	6.0
Ethnicity		
BIPOC	1,519	12.6
Missing	729	6.0
White	9,843	81.4
Living in a Memory Care Unit		
Yes	1,951	16.1
No	10,057	83.2
Missing	83	0.7
Self-Rated Health		
Excellent	1078	8.9
Very Good	3,722	30.8
Good	4,698	38.9
Fair	1,978	16.4
Poor	406	3.4
Missing	209	1.7
Self-Rated Quality of Life		
Excellent	1,949	16.1
Very Good	4,921	40.7
Good	,3698	30.6
Fair	980	8.1
Poor	226	1.9
Missing	317	2.6
Self-Rated Facility Grade		
Excellent	3,382	28.0
Very Good	5,577	46.1
Good	2,292	19.0
Fair	315	2.6
Poor	113	0.9
Missing	412	3.4

Table 2 describes the general characteristics of the family satisfaction survey sample (N = 11,935). The mean age of respondents was 63 years, with most respondents aged 55 to 64 at

the time of survey administration (39.3%). Most participants were female (64.2%) and White (91.1%). Approximately 42% of family members were retired, however more than one-third (34.2%) of respondents reported providing care to their family member while maintaining full-time employment (≥40 hours/week).

Table 2: General Characteristics of Family Satisfaction Survey Respondents

General Characteristics	Frequency	Percentage
Age Group		
Mean Age (years)	63.0	
18-54	1,923	17.3
55-64	4,351	39.3
65-74	3,632	32.8
75-84	881	7.9
85+	297	2.7
Gender		
Male	3,942	33.0
Female	7,668	64.2
Other	5	0.0
Missing	320	2.7
Race		
Asian/Asian American	64	0.5
Black	85	0.7
Hispanic	43	0.4
Middle Eastern/North African/Arab American	4	0.0
Multi-Racial	102	0.9
Native American	35	0.3
Native Hawaiian or other Pacific Islander	12	0.1
White	10,873	91.1
Other	53	0.4
Missing	664	5.6
Ethnicity		
White	10,873	91.1
BIPOC	398	3.3
Missing	664	5.6
Employment		
Full Time (>= 40 hrs/week)	4,078	34.2
Part Time (<= 39 hrs/week)	1051	8.8
Homemaker	256	2.1
Retired	5,020	42.1
Student	5	0.0
Other	277	2.3
Missing	1248	10.5
Relationship to Resident		
Spouse/Partner	580	4.9
Child/Son-in-law/Daughter-in-law	7,396	62.0
Sibling	1,565	13.1
Other Relative	579	4.9
Friend	215	1.8
Guardian/Conservator/Power of Attorney/Case Manager	494	4.1
Missing	1,106	9.3

Table 3 shows the number of questions, the number of completed survey responses, range, mean, standard deviation, and mean percentage for each quality domain included in the survey. A survey response is considered completed if at least half of the questions are answered. Each question gets a score from 0 (lowest) to 2 (highest). The mean score for each individual is

calculated by summing each question response and dividing it by the total number of answered questions. There are 12,091 surveys included in this table. The “overall”, “engagement” and “food” domains had the lowest mean score, while “environment”, “finances”, and “security” had the highest mean score.

Table 3: Standardized Mean Domain Score of Resident Quality of Life Survey

Domain	# Items	n	Range	Mean	S.D.	Mean %
Staff	9	12,091	0 - 2	1.74	0.32	86.76
Environment	3	12,081	0 - 2	1.88	0.29	93.95
Food	6	11,858	0 - 2	1.53	0.47	76.7
Engagement	6	7,523	0 - 2	1.48	0.47	74.25
Autonomy	5	12,081	0 - 2	1.63	0.37	81.36
Culture	3	11,680	0 - 2	1.79	0.44	89.69
Security	6	12,089	0 - 2	1.82	0.28	91.2
Finances	2	4,150	1 - 2	1.85	0.28	92.65
Overall	4	12,058	0 - 2	1.22	0.34	61.23

Table 4 shows the number of questions, number of completed survey responses, 25th, 50th, and 75th percentile of resident satisfaction mean scores with the interquartile range (IQR) (75th-25th percentile) as a dispersion measure. A larger IQR indicates that the middle 50% of observations are more spread out. There are 12,091 surveys included in this table. Notably, the IQR of “environment” and “finances” is 0 while the IQR of “engagement” is the largest (0.83).

Table 4: Dispersion of Mean Score of Resident Quality of Life Survey

Domain	# Items	n	25th	50th	75th	IQR
Staff	9	12,091	1.62	1.86	2	0.38
Environment	3	12,081	2	2	2	0
Food	6	11,858	1.33	1.67	2	0.67
Engagement	6	7,523	1	1.67	1.83	0.83
Autonomy	5	12,081	1.4	1.6	2	0.6
Culture	3	11,680	1.67	2	2	0.33
Security	6	12,089	1.67	2	2	0.33
Finances	2	4,150	2	2	2	0
Overall	4	12,058	1	1.25	1.5	0.5

Table 5 shows the number of questions, the number of completed survey responses, range, mean, standard deviation, and mean percentage for the family survey. A survey response is considered completed if at least half of the questions are answered. Each question gets a score from 0 (lowest) to 3 (highest). The mean score for each individual is calculated by summing each question response and dividing it by the total number of answered questions. There are 11,935 surveys included in this table. The “needs” and “finances” domains had the lowest mean score, while “choice”, “housekeeping”, and “environment” had the highest mean score.

Table 5: Standardized Mean Domain Score of Family Satisfaction Survey

Domain	# Items	n	Range	Mean	S.D.	Mean %
Experience	9	11,904	0 - 3	2.29	0.52	76.29
Choice	5	11,863	0 - 3	2.36	0.5	78.51
Needs	7	11,823	0 - 3	2.12	0.6	70.81
Finances	2	9,904	0 - 3	2.13	0.64	70.9
Housekeeping	4	11,866	0 - 3	2.38	0.53	79.23
Environment	3	11,848	0 - 3	2.39	0.52	79.53

Staff	6	11,835	0 - 3	2.28	0.54	75.88
Overall	4	11,871	0 - 3	2.3	0.57	76.78

Table 6 shows the number of questions, number of completed survey responses, 25th, 50th, and 75th percentile of family satisfaction mean scores with the interquartile range (IQR) (75th-25th percentile) as a dispersion measure. A larger IQR indicates that the middle 50% of observations are more spread out. There are 11,935 surveys included in this table. Notably, the IQR of "finances" and "overall" domains are the lowest, while the IQR of "housekeeping" and "environment" are the largest.

Table 6: Dispersion of Mean Score of Family Satisfaction Survey

Domain	# Items	n	25th	50th	75th	IQR
Experience	9	11,904	2	2.33	2.75	0.75
Choice	5	11,863	2	2.25	2.8	0.8
Needs	7	11,823	1.8	2	2.67	0.87
Finances	2	9,904	2	2	2.5	0.5
Housekeeping	4	11,866	2	2.25	3	1
Environment	3	11,848	2	2.33	3	1
Staff	6	11,835	2	2.17	2.83	0.83
Overall	4	11,871	2.06	2.44	2.62	0.56

Factor Analysis

Confirmatory Factor analysis (CFA) was performed on the 2021-2022 and 2022-2023 resident QOL and family satisfaction survey data. CFA is a psychometric approach assessing whether data "supports" an inferred theory and measures structural relationships between survey questions and quality domains. Survey domains and their corresponding questions can be found in Appendix A. More plainly summarized, factor analysis helps determine if all the survey questions asked about staff actually measure the quality of staff in AL. The high-level summary of analysis of the 2021-22 data recommended combining the "*autonomy", "culture"*, and "*environment*" domains for the resident survey into 1 domain since they were highly correlated (i.e. they are similar) – there were no recommended changes to the family survey. However, to ensure reliability of results, we re-ran factor analysis on the 2022-2023 resident and family survey data. Overall recommendations from this analysis confirmed that no changes are needed to the family survey. No changes are recommended for the resident survey as well; however, *"autonomy*" and "*environment*" may need to be combined in the future. The analyses so far have used smaller sample sizes from pilot data collection and the most recent validation sample; we plan to re-run all analyses on a complete dataset in the future.

See Summary of Findings from Factor analysis in Appendix A:

<u>Recommendations for resident QOL:</u>

- We do not recommend dropping any items under "*autonomy*" at this time, given the correlation between individual items changing between the pilot and validation data samples.
- The internal consistency of "*environment"* and *"autonomy"*, although still below the <0.60 threshold, improved with this cycle of data collection. We recommend another wave of data collection before providing final guidance on the collapsing of individual domains.

Recommendations for family surveys

- Our recommendation based on the pilot sample alone was to use the one-factor model ("*experience"* x *"choice"* x *"staff"*) for research but maintain the presentation of the three domains as they currently exist for survey purposes. Given the results from the validation sample, we again recommend no changes to the survey presentation until we have another wave of data.
- Lastly, the domain *"needs*" has a somewhat poor data/model fit, and 2 pairs of individual items are highly correlated (again, similar to pilot data). Given that a new question was added to this domain after pilot data collection, we recommend no changes until we have another wave of data.

Margin of Error

The original margin of error (MOE) and facility sampling table for the AL resident QOL and family satisfaction surveys was based on Minnesota's nursing home resident QOL survey data. We conducted analysis based on the last 2 years of AL data to produce a new sampling table for both resident and family surveys. We calculated different thresholds for the surveys at 5%, 6%, 7%, 8%, 9%, and 10% of the composite score mean. We treated composite scores as continuous variables on a scale from 0-1. After consultation with DHS, it was determined to use a MOE of 6% (Appendix B). This allowed more facilities to be able to meet their MOE and for AL Report Card users to access quality ratings on more facilities.

The 6% MOE table (Appendix B) shows the MOE for each of the individual domains assuming the desired sample size for the composite MOE is met. The MOE calculation of the individual domains takes into account missingness. The formula used to calculate the target sample size is:

n = [N s2] / [N (E2 / za/22) + s2]
Where:
n = target sample size from the "Min Sample Size - Margin of Error" sheet with a 6% margin of error
za/2 = Z-score desired confidence interval (95% CI = 1.96)
s2 = population variance estimated from data (first sheet)
N = population size
E = acceptable absolute margin of error (e.g., .05, .10, etc.)

For all of these calculations, $z_{a/2}$= 1.96 and we solved for E. For n, we also take into account the missingness proportion (so if n=10 and the 20% of surveys for that dimension are missing, we use n=10*0.8=8 as the target sample size).

Dynamic Missingness Approach

The role of missingness is a key consideration on individual items toward creating a domain score. We are using a dynamic missingness approach where we only calculate the score if less than half of the values in that domain are missing. Below we list our recommendation for how to handle missingness on a case-level vs. facility-level basis.

Case-level pertains to individual survey scores for a domain. To have a valid score for a given domain, a respondent must answer half or more of the items in that domain. The domain score for that individual survey is equal to the mean of all completed items.

Facility-level pertains to the license aggregate score for a domain. To arrive at a facility-level score for a certain domain, we use the mean domain score for all valid surveys in that facility. If the number of valid surveys in a domain is <50% of the target minimum survey count set by the MOE calculation previous discussed, we do not report that domain's score for that facility. This calculation is independent for each domain; a facility may have scores for less than the full set of 10 (9 domains + the composite).

Tables can be found in Appendix C.

Tables 7 and 8 show the implications of our approach to missing data for each domain in the resident and family surveys.

Domain	Number Missing	Percent Missing (Including Incomplete Surveys)	Percent Missing (Complete Surveys)	Mean	Standard Deviation	Median	First Quartile	Third Quartile	Min	Max
Staff	3,930	24.701	0.918	86.833	15.996	92.857	81.25	100	0	100
Environment	3,937	24.745	0.976	93.996	14.449	100	100	100	0	100
Food	4,388	27.58	4.706	76.439	23.541	83.333	62.5	100	0	100
Engagement	10,707	67.297	56.968	86.698	14.22	91.667	83.333	100	16.667	100
Autonomy	4,003	25.16	1.522	81.443	18.096	80	70	100	0	100
Culture	5,069	31.86	10.338	90.946	19.277	100	83.333	100	0	100
Security	3,844	24.161	0.207	91.217	14.044	100	83.333	100	0	100
Finances	11,760	73.916	65.677	92.651	13.85	100	100	100	50	100
Overall	3,958	24.877	1.150	61.24	16.714	62.5	50	75	0	100
Composite	3,819	24.004	0.000	83.299	12.162	86.435	78.187	91.927	5.159	100

Table 7: Dynamic Missingness Approach- Resident Survey Summaries

(Total number of resident surveys is 15,901: 12,091 are complete and 3,819 are incomplete)

- Number Missing is the total number of missing scores for that domain out of all of the surveys (both complete and incomplete). The score will be missing if less than half of the questions contributing to that domain are answered.
- Percent Missing (including incomplete surveys) is the percent of missing surveys out of all of the surveys (both complete and incomplete).
- Percent Missing (complete surveys) is the percent of missing surveys after sub setting to only include all the complete surveys.
- The composite score is calculated by averaging all the other scores. As long as there is at least one domain score, the composite score is calculated.

Table 8: Dynamic Missingness Approach- Family Survey Summaries

Domain	Number of Surveys	Number of Missing Surveys	Percent Missing	Mean	Standard Deviation	Median	First Quartile	Third Quartile	Min	Max
Experience	11,935	114	0.955	76.296	17.148	77.7	66.6	91.575	0	99.9
Choice	11,935	511	4.282	78.849	16.583	74.925	66.6	99.9	0	99.9
Needs	11,935	787	6.594	70.726	20.012	66.6	59.94	88.8	0	99.9
Finances	11,935	2031	17.017	70.833	21.152	66.6	66.6	83.25	0	99.9
Housekeeping	11,935	80	0.67	79.172	17.5	74.925	66.6	99.9	0	99.9
Environment	11,935	132	1.106	79.504	17.337	77.7	66.6	99.9	0	99.9
Staff	11,935	327	2.74	76.099	17.907	72.15	66.6	94.35	0	99.9
Overall	11,935	80	0.67	76.732	18.776	81.169	68.681	87.412	0	99.9
Composite	11,935	25	0.209	74.974	15.623	73.854	64.955	88.39	5.565	99.9

(For the family surveys, there is not a variable to indicate whether or not a survey is “complete”. This table only contains one percent missing column)

Risk Adjustment

It has become common to use case mix adjustment (i.e. risk adjustment) for provider comparison for satisfaction surveys. Such comparisons allow for more fair comparisons between AL providers who may serve residents with different needs and have different resources. Case mix adjustment can be achieved with adequate statistical power and sample size for comparisons. Key questions that should guide such work typically include considerations of the outcome (resident QOL and family satisfaction), time frame for risk adjustment (annual), and populations to which it would apply (need to determine if ALFs with certain size will be excluded), and adjustors that are selected.

We examined risk adjustment for specific facility characteristics. The facility characteristics currently available are size, geography, license type, and ownership type. We recommend adjusting resident and family surveys for geography, specifically Twin Cities Metro vs. Other.

We made this recommendation after comparing mean resident QOL scores by different facility characteristics and saw significant differences by geography. While our initial analyses used more granular measures of geography, we didn't see meaningful differences outside of the Twin Cities Metro area and hence combined the scores for rural and suburban facilities. This approach is similar to what is currently used in the MN Nursing Home Report Card.

Appendix D shows risk adjustment tables for geography and size for resident and family surveys. Although there are some statistically significant differences by size, the effect size is very small, therefore we do not recommend risk adjustment based on size. It should be noted that to date, all resident QOL and family satisfaction surveys have been conducted in facilities with the capacity to serve 20 or more residents; we do not have data for facilities with the capacity to serve less than 20 residents. Once there is enough data from small facilities to conduct meaningful analysis, we will reevaluate whether or not risk adjustment based on size is warranted.

Star Scoring

We initially recommended the AL Report Card use the same scoring system as the Nursing Home Report Card, a 5-star rating system (formula below). This established system is familiar to both providers and consumers.

- 5 Stars: Mean plus 1½ standard deviations
- 4 Stars: Mean plus ½ to 1½ standard deviations
- 3 Stars: Mean plus or minus ½ standard deviations
- 2 Stars: Mean minus ½ to 1½ standard deviations
- 1 Star: Mean minus 1½ standard deviations

Table 9 shows the distribution of stars using 2022-23 ALF data in the 5-star rating formula for resident and surveys. This produced a very left-skewed distribution for resident surveys where only 8 facilities were assigned a 5-star rating.

Table 9: 5-star rating system for resident and family surveys (option 1a)

Star Rating	1	2	3	4	5
Resident Survey	40	70	168	157	8
Family Survey	32	100	177	118	28

Due to this over dispersion, we explored other ways to calculate a 5-star rating. A comparison of the various star scoring systems can be found in Appendix E. Ultimately, with input from DHS, we recommend option 1c where the top 7% OR 1 ½ standard deviations (SD) above the mean receive 5 stars. This is the same scoring system as the nursing home report card, but with one change that the top 7% of facilities receive 5 stars even if the facility score is not 1.5 SDs above the mean of all facilities (formula below).

- 5 stars: Mean plus 1 ½ standard deviations OR top 7% of facilities
- 4 stars: Mean plus ½ to 1 ½ standard deviations
- 3 stars: mean plus or minus ½ standard deviations
- 2 stars: Mean minus ½ to 1 ½ standard deviations
- 1 star: Mean minus 1 ½ standard deviations

Table 10 shows the star distribution using this new formula for resident and family surveys. This system added more 5-star facilities for resident surveys with very little change to the concentration of 1-3 star ratings for family surveys.

Table 10: Number of facilities under 5-star rating system for resident and family surveys (using option 1c- recommended option)

Star Rating	1	2	3	4	5
Resident Survey	42	70	173	137	32
Family Survey	33	101	184	115	33

We recommend this same approach for the family surveys, although the distribution of facilities changes very little under option 1a or 1c. The family survey distribution using 1c adds five facilities to the 5-star rating. This is the same approach as used by the Centers for Medicare and Medicaid Star Ratings, which has been validated by a number of studies.

Summary of Recommendations

Below, we report the main summary of recommendations for each of our analyses.

- Factor analysis
  - Recommendations for resident survey

        - We propose no survey changes and suggest analyzing another wave of survey data before providing final guidance on changes to the quality domains.
    - Recommendations for family survey
        - No changes are recommended. Again, we feel analyzing another round of survey data is warranted.

- Margin of error
    - A MOE of 6% is favored by the U of MN and DHS (Appendix B). This allowed more facilities to be able to meet their margin of error and for AL Report Card users to access quality ratings on more facilities.

- How survey results are calculated
    - Results from resident QOL and family satisfaction surveys will show the score for each domain and an overall composite score. Domain scores come from responses to survey questions listed in the Resident Quality of Life Survey (9 domains) and the Family Satisfaction survey (8 domains). Domains capture questions around staff, food, engagement and other important factors associated with quality in the facility. Scores for domains are listed as an average of all reportable scores for each individual domain. To calculate a composite score for resident quality of life surveys, totals from each domain (9 in total) are combined and reported as the average for the entire facility. The same process is used to calculate the composite score for family surveys where totals from each of the 8 domains are averaged and reported

- Missingness
    - A dynamic missingness approach where scores are only calculated if less than half of the values in that domain are missing is recommended.
        - Case-level pertains to individual survey scores for a domain. To have a valid score for a given domain, a respondent must answer half or more of the items in that domain. The domain score for that individual survey is equal to the mean of all completed items.
        - Facility-level pertains to the license aggregate score for a domain. To arrive at a facility-level score for a certain domain, we use the mean domain score for all valid surveys in that facility. If the number of valid surveys in a domain is <50% of the target minimum survey count set by the margin of error calculation previous discussed, we do not report that domain's score for that facility. This calculation is independent for each domain; a facility may have scores for less than the full set of 10 (9 domains + the composite).
        - For resident QOL surveys, the finances domain will not be included in the composite score. This domain has a 50% missingness threshold where very few facilities will be able to have this domain reported. The finances domain will still be displayed on the report card as its own score for facilities to have reportable data in this domain. The finances domain will be included in the family satisfaction composite score.

- Risk adjustment
    - As of the date of this report, risk adjustment for geography (Twin Cities Metro vs. Other) is recommended. The U of MN suggests evaluating risk adjustment for size once there is sufficient data from small facilities (<20 residents), to conduct meaningful analysis.

- Star scoring
    - The top 7% of facilities receive 5 stars even if the facility score is not 1.5 SDs above the mean of all facilities (formula below).
        - 5 stars: Mean plus 1 ½ standard deviations OR top 7% of facilities
        - 4 stars: Mean plus ½ to 1 ½ standard deviations
        - 3 stars: mean plus or minus ½ standard deviations
        - 2 stars: Mean minus ½ to 1 ½ standard deviations
        - 1 star: Mean minus 1 ½ standard deviations

Appendix

Appendix A: Factor Analysis

Table 11. Questions Associated with Resident QOL Domains

Domains	Questions
Staff	**I'd like to begin by asking some questions about the people who work here. Please answer each question using always or most of the time, some of the time, or rarely or never.** 1. How often do the people who work here try to get to know you? 2. How often do the people who work here treat you with respect? 3. How often do you feel comfortable asking for help when you need it? 4. How often do the people who work here come quickly when you need help? 5. How often do the people who work here follow through when you have a complaint or problem? 6. How often do you get enough help with your everyday activities if you need it? *For example, do you get enough help caring for and cleaning your room, getting dressed if you need help, etc.?* 7. How often are you confident the people who work here can address your healthcare needs? 8. How often are you satisfied with how your medications are managed? 9. How often are you confident the people who work here know what to do if you have a medical emergency? 10. Do you have friends here? (Yes, No, DK/NA/NR)
Environment	**Next, I'd like to ask about where you live. Please answer each question using always or most of the time, some of the time, or rarely or never.** 11. How often are the common areas well maintained? *For example, are the dining areas clean, visiting areas in good condition, etc.?* 12. How often is it quiet enough for you to sleep here? 13. How often are there places for residents to socialize with other residents? *(Probe: spend time together)*
Food	**The next few questions are about mealtime and food here. Please answer each question using always or most of the time, some of the time, or rarely or never.**

	14. How often does [insert facility name] offer access to healthy foods, like fruits and vegetables, if you want them? 15. How often do you like the food served here? 16. How often do you have enough choice in the meals offered here? 17. How often do you look forward to mealtimes here? 18. How often is there enough variety in the meals offered here? 19. How often can you eat your meals when you want to?
Engagement	**I would like to ask about the activities here. We know there may be limited activities right now because of the COVID-19 pandemic. Please answer the following questions as best you can.** 20. Do you participate in activities here? (Yes: CONTINUE TO #21, No: SKIP TO #27, DK/NA/NR: SKIP TO #27) 21. How often do you like the activities here? 22. How often are there things to do here on the weekends that you enjoy? 23. How often do you have enough activities to keep your mind active? *For example, are there reading materials, puzzles, games, etc.?* 24. How often is there enough variety in the activities here? 25. How often do you enjoy the way you spend your time? 26. How often do you feel included in things that are happening here? *(Probe: do you know about things that are happening, receive a calendar of events, etc.?)*
Autonomy	**Now I would like to ask you about some of the choices you make here. Please answer each question using always or most of the time, some of the time, or rarely or never.** 27. How often can you decide how to spend your time each day? 28. How often do you spend as much time outdoors as you would like? 29. How often are you allowed to personalize your room? 30. How often are the services you receive here provided the way you want? *For example, help you get with bathing or dressing, help with cleaning your room, etc.* 31. How often are you as involved in decisions about the services you receive here as you want to be?
Culture	**These questions are about your religion, spirituality, and culture. Please answer each question using always or most of the time, some of the time, or rarely or never.**

	32. How often are there opportunities for you to practice your religious or spiritual beliefs here? 33. How often are the people who work here respectful of your religious or spiritual practices? 34. How often are the people who work here respectful of your culture? *For example, do the people who work here respect your traditions, language, and way of dressing?*
Security	**Next, I'd like to know how you feel about safety and privacy. Please answer each question using always or most of the time, some of the time, or rarely or never.** 35. How often are your personal belongings safe here? 36. How often do you feel safe here? 37. How often do the people who work here ever get angry at you?* 38. How often do you feel comfortable voicing a complaint or concern? 39. How often do you feel you have enough privacy here? 40. How often do the people who work here ask to come in before entering your room?
Finances	41. Are you involved with your finances here? *For example, are you knowledgeable about the cost of living here or do you handle payments of your bills?* (Yes: CONTINUE TO #42, No: SKIP TO #44, DK/NA/NR: SKIP to #44) 42. How often do you understand what is included in monthly fees here? 43. How often do you believe you are getting value for your money here?
Overall	**Next, I'd like to ask how you feel about living here overall.** 44. Overall, what grade would you give [Name of Facility], [pause] where A is the best it could be and F is the worst it could be? *(Probe: Think of grades in school where A is the highest grade and F is the lowest grade.)* 45. Overall, would you rate your quality of life as: (READ LIST) Excellent, Very Good, Good, Fair, Poor, DK/NA/NR 46. Overall, has the COVID-19 pandemic impacted your quality of life: (READ LIST) A lot, Some, Little or not at all, DK/NA/NR 47. Since the coronavirus outbreak began, have you had more contact with family and friends, less contact with family and friends, or about the same? *(Probe: calling, visiting, spending time with)* More, About the same, Less, DK/NA/NR

Table 12. Questions Associated with Family Satisfaction Survey Domains

Domains	Questions (Response Options are: Strongly Agree, Agree, Disagree, Strongly Disagree, Not Applicable/Don't know)
Experience	1. I feel welcome when I visit. 2. People who work here try to get to know me. 3. The leaders of this facility are available to speak with me, if needed. 4. I am comfortable voicing a complaint or concern. 5. People who work here respond promptly to my concerns. 6. I am pleased with how the people who work here treat my resident. 7. This facility offers enough meaningful activities my resident enjoys. 8. My resident looks forward to participating in activities. 9. My resident seems happy at this facility.
Choice	10. I have enough opportunities to provide input into decisions about my resident's care. 11. My resident's spiritual beliefs are respected. 12. People who work here respect my resident's culture. 13. People who work here care about my resident. 14. My resident has a choice in the care they receive.
Needs	15. I receive timely updates about changes in my resident's status. 16. I am satisfied with the amount of information I receive about my resident. 17. My resident is given the opportunity to be as independent as they can be. 18. I am confident that my resident's service plan is being delivered as promised. 19. There is enough staff during weekdays. 20. There is enough staff on weekends.
Finances	21. Are you involved with your resident's finances? (Yes: Continue to question 22, No: Skip to question 24) 22. I understand what is covered in my resident's monthly fees. 23. Monthly fees are appropriate for the quality of services provided.
Housekeeping	24. My resident's living unit/personal space is well maintained. (e.g., the living unit is kept in good condition)

	25. The common areas in and around the facility are well maintained. (e.g., kept in good condition) 26. The facility is clean. 27. The facility is free of offensive odors.
Environment	28. There is enough variety in the meals. 29. My resident looks forward to mealtimes. 30. My resident likes the food served here. 31. This facility has accommodations to ensure my resident's physical safety. (e.g., like hand railings, no area rugs) 32. I feel confident my resident is safe. 33. My resident's belongings are safe.
Staff	34. People who work here seem happy to work here. 35. There is a sense of community among the people who live and work at this facility. 36. I have peace of mind about the care my resident is getting. 37. People who work here treat my resident with respect. 38. People who work here take the time to get to know my resident. 39. People who work here are knowledgeable about my resident's service plan.
Overall	40. On a scale where A=excellent, B=very good, C=average, D=below average, and F=failing, how would you grade the quality of this facility as a place to live? 41. On a scale where 5=extremely confident and 1=not at all confident, how confident are you that your resident is well cared for whether you are present or not? 42. On a scale where 5=extremely high and 1=extremely low, how enthusiastically would you recommend this facility to another family? 43. Overall, how has the COVID pandemic impacted your social connection to family or friends at this facility? (To a great extent, To some extent, Little or not at all)

Table 13. Resident survey internal consistency (McDonald's omega).

Domain	# items	Omega - Validation Data	Omega - Pilot Data
FOOD	6	0.77	0.76
STAFF	9	0.78	0.77

ENVIRONMENT	3	0.41	0.37
ENGAGEMENT	6	0.74	0.73
AUTONOMY	5	0.59	0.53
CULTURE	3	0.69	0.60
SECURITY	6	0.67	0.61

Table 14. Confirmatory factor analysis for resident survey.

Domain	# obs. used	# obs. total	All Path Coefficients >0.40	CFI	RMSEA	SRMR
FOOD	9275	15910	yes	0.998	0.028	0.025
STAFF	7825	15910	Q9 -> 0.300	0.995	0.027	0.035
ENVIRONMENT	11109	15910	yes	0.993	0.024	0.027
ENGAGEMENT	6374	15910	yes	0.997	0.029	0.030
AUTONOMY	9499	15910	yes	0.986	0.042	0.048
CULTURE	9121	15910	yes	0.999	0.031	0.018
SECURITY	10236	15910	yes	0.992	0.030	0.039

If interested in more information on two and three factor findings, please contract dhs.aasd.hcbs@state.mn.us

Table 15. Family survey internal consistency (McDonald's omega).

Domain	# items	Omega - Validation Data	Omega - Pilot Data
NEEDS**	7	0.92	0.90
HOUSEKEEPING	4	0.91	0.91
FOOD	3	0.91	0.91
ENVIRONMENT	3	0.88	0.88
STAFF	6	0.93	0.93
EXPERIENCE	9	0.91	0.90
CHOICE	5	0.90	0.90

****Needs now has one additional item (related to medications), moved from the resident survey.

Table 16. Confirmatory factor analysis for family survey.

Domain	# obs. used	# obs. total	All Path Coefficients >0.40	CFI	RMSEA	SRMR
NEEDS	6696	11935	yes	0.994	0.195	0.083
HOUSEKEEPING	11415	11935	yes	1	0.04	0.009
FOOD	9348	11935	yes	1	0	0
ENVIRONMENT	11359	11935	yes	1	0	0
STAFF	8646	11935	yes	0.999	0.083	0.021
EXPERIENCE	8397	11935	yes	0.989	0.116	0.070
CHOICE	8355	11935	yes	0.998	0.124	0.035

Table 17. Interfactor correlations between family survey domains

	experience	choice	needs	housekeeping	food	environment	staff
experience	1.000						
choice	0.931	1.000					
needs	0.898	0.887	1.000				
housekeeping	0.801	0.797	0.790	1.000			
food	0.672	0.625	0.654	0.630	1.000		
environment	0.859	0.869	0.864	0.860	0.677	1.000	
staff	0.916	0.903	0.892	0.828	0.677	0.918	1.000

Table 18. One-factor model of the domains with poor internal consistency and high interfactor correlations.

	# items	# obs. used	# obs. total	All Path Coefficients >0.40	CFI	RMSEA	SRMR	Omega
EXP x CHOICE x STAFF	20	5773	11935	yes	0.995	0.098	0.053	0.9627

Appendix B: Margin of Error

Table 19. Margin of Error of Dimension Score When Using 6% Margin of Error for Composite

Facility Eligible Population Size (N)	Staff	Environment	Food	Engagement	Autonomy	Culture	Security	Finance	Overall
1	0.035	0.03	0.134	0.37	0.054	0.141	0.01	0.405	0.058
2	0.025	0.021	0.095	0.262	0.038	0.1	0.01	0.287	0.041
3	0.02	0.017	0.077	0.214	0.031	0.081	0.01	0.234	0.033
4	0.106	0.089	0.191	0.233	0.13	0.145	0.09	0.249	0.158
5	0.083	0.069	0.151	0.198	0.101	0.117	0.07	0.213	0.123
6	0.068	0.057	0.125	0.176	0.083	0.099	0.06	0.189	0.101
7	0.088	0.073	0.156	0.182	0.107	0.118	0.07	0.194	0.13
8	0.075	0.063	0.135	0.165	0.092	0.103	0.06	0.176	0.112
9	0.086	0.072	0.152	0.169	0.105	0.114	0.07	0.179	0.128
10	0.076	0.063	0.135	0.155	0.092	0.101	0.06	0.165	0.113
11	0.083	0.07	0.147	0.158	0.101	0.109	0.07	0.167	0.124
12	0.075	0.062	0.132	0.146	0.091	0.098	0.06	0.155	0.111
13	0.08	0.067	0.141	0.149	0.097	0.104	0.07	0.157	0.119
14	0.073	0.061	0.128	0.139	0.089	0.095	0.06	0.147	0.108
15	0.077	0.064	0.135	0.141	0.094	0.099	0.06	0.149	0.114
16	0.08	0.067	0.14	0.142	0.098	0.103	0.07	0.15	0.119
17	0.074	0.062	0.13	0.134	0.09	0.095	0.06	0.141	0.11
18	0.077	0.064	0.134	0.135	0.093	0.098	0.06	0.142	0.114
19	0.079	0.066	0.138	0.136	0.096	0.101	0.07	0.143	0.118
20	0.074	0.062	0.129	0.129	0.09	0.094	0.06	0.136	0.11
21	0.076	0.063	0.132	0.13	0.092	0.096	0.06	0.137	0.113
22	0.078	0.065	0.135	0.131	0.094	0.098	0.06	0.137	0.115
23	0.079	0.066	0.138	0.132	0.096	0.1	0.07	0.138	0.118
24	0.074	0.062	0.129	0.125	0.09	0.094	0.06	0.131	0.11
25	0.076	0.063	0.131	0.126	0.092	0.096	0.06	0.132	0.113
26	0.077	0.064	0.134	0.127	0.094	0.097	0.06	0.132	0.115
27	0.078	0.065	0.136	0.127	0.095	0.098	0.07	0.133	0.116
28	0.074	0.062	0.128	0.122	0.09	0.093	0.06	0.127	0.11
29	0.075	0.063	0.13	0.122	0.091	0.094	0.06	0.128	0.111
30	0.076	0.063	0.131	0.123	0.092	0.095	0.06	0.128	0.113

31	0.077	0.064	0.133	0.123	0.093	0.096	0.06	0.128	0.114
32	0.078	0.065	0.134	0.123	0.094	0.097	0.07	0.129	0.115
33	0.079	0.066	0.136	0.124	0.095	0.098	0.07	0.129	0.117
34	0.075	0.062	0.129	0.119	0.09	0.093	0.06	0.124	0.111
35	0.075	0.063	0.13	0.119	0.091	0.094	0.06	0.124	0.112
36	0.076	0.063	0.131	0.12	0.092	0.095	0.06	0.124	0.113
37	0.077	0.064	0.132	0.12	0.093	0.095	0.06	0.125	0.114
38	0.077	0.064	0.133	0.12	0.094	0.096	0.06	0.125	0.115
39	0.078	0.065	0.134	0.12	0.094	0.097	0.07	0.125	0.115
40	0.074	0.062	0.128	0.116	0.09	0.092	0.06	0.121	0.11
41	0.075	0.062	0.129	0.116	0.091	0.093	0.06	0.121	0.111
42	0.075	0.063	0.13	0.116	0.091	0.093	0.06	0.121	0.112
43	0.076	0.063	0.13	0.117	0.092	0.094	0.06	0.121	0.112
44	0.076	0.064	0.131	0.117	0.092	0.094	0.06	0.121	0.113
45	0.077	0.064	0.132	0.117	0.093	0.095	0.06	0.122	0.114
46	0.077	0.064	0.133	0.117	0.093	0.095	0.06	0.122	0.114
47	0.077	0.065	0.133	0.118	0.094	0.096	0.06	0.122	0.115
48	0.078	0.065	0.134	0.118	0.094	0.096	0.07	0.122	0.115
49	0.075	0.062	0.128	0.114	0.09	0.092	0.06	0.118	0.111
50	0.075	0.063	0.129	0.114	0.091	0.093	0.06	0.118	0.111
51	0.075	0.063	0.129	0.114	0.091	0.093	0.06	0.118	0.112
52	0.076	0.063	0.13	0.114	0.092	0.093	0.06	0.118	0.112
53	0.076	0.063	0.13	0.114	0.092	0.094	0.06	0.118	0.113
54	0.076	0.064	0.131	0.114	0.092	0.094	0.06	0.118	0.113
55	0.077	0.064	0.131	0.115	0.093	0.094	0.06	0.119	0.114
56	0.077	0.064	0.132	0.115	0.093	0.095	0.06	0.119	0.114
57	0.077	0.064	0.132	0.115	0.093	0.095	0.06	0.119	0.114
58	0.077	0.065	0.133	0.115	0.094	0.095	0.06	0.119	0.115
59	0.078	0.065	0.133	0.115	0.094	0.095	0.06	0.119	0.115
60	0.078	0.065	0.134	0.115	0.094	0.096	0.07	0.119	0.115
61	0.075	0.062	0.129	0.112	0.091	0.092	0.06	0.115	0.111
62	0.075	0.063	0.129	0.112	0.091	0.092	0.06	0.115	0.111
63	0.075	0.063	0.129	0.112	0.091	0.093	0.06	0.116	0.112
64	0.076	0.063	0.13	0.112	0.091	0.093	0.06	0.116	0.112
65	0.076	0.063	0.13	0.112	0.092	0.093	0.06	0.116	0.112
66	0.076	0.063	0.13	0.112	0.092	0.093	0.06	0.116	0.113
67	0.076	0.064	0.131	0.112	0.092	0.094	0.06	0.116	0.113
68	0.076	0.064	0.131	0.112	0.092	0.094	0.06	0.116	0.113
69	0.076	0.064	0.131	0.112	0.093	0.094	0.06	0.116	0.113

70	0.077	0.064	0.131	0.112	0.093	0.094	0.06	0.116	0.114
71	0.077	0.064	0.132	0.113	0.093	0.094	0.06	0.116	0.114
72	0.077	0.064	0.132	0.113	0.093	0.094	0.06	0.116	0.114
73	0.077	0.064	0.132	0.113	0.093	0.095	0.06	0.116	0.114
74	0.077	0.065	0.133	0.113	0.094	0.095	0.06	0.116	0.115
75	0.077	0.065	0.133	0.113	0.094	0.095	0.06	0.116	0.115
76	0.075	0.062	0.128	0.109	0.091	0.092	0.06	0.113	0.111
77	0.075	0.063	0.128	0.11	0.091	0.092	0.06	0.113	0.111
78	0.075	0.063	0.129	0.11	0.091	0.092	0.06	0.113	0.111
79	0.075	0.063	0.129	0.11	0.091	0.092	0.06	0.113	0.112
80	0.075	0.063	0.129	0.11	0.091	0.092	0.06	0.113	0.112
81	0.075	0.063	0.129	0.11	0.091	0.093	0.06	0.113	0.112
82	0.076	0.063	0.13	0.11	0.092	0.093	0.06	0.113	0.112
83	0.076	0.063	0.13	0.11	0.092	0.093	0.06	0.113	0.112
84	0.076	0.063	0.13	0.11	0.092	0.093	0.06	0.113	0.113
85	0.076	0.063	0.13	0.11	0.092	0.093	0.06	0.114	0.113
86	0.076	0.064	0.13	0.11	0.092	0.093	0.06	0.114	0.113
87	0.076	0.064	0.131	0.11	0.092	0.093	0.06	0.114	0.113
88	0.076	0.064	0.131	0.11	0.092	0.093	0.06	0.114	0.113
89	0.076	0.064	0.131	0.11	0.093	0.094	0.06	0.114	0.113
90	0.077	0.064	0.131	0.11	0.093	0.094	0.06	0.114	0.114
91	0.077	0.064	0.131	0.11	0.093	0.094	0.06	0.114	0.114
92	0.077	0.064	0.131	0.111	0.093	0.094	0.06	0.114	0.114
93	0.077	0.064	0.132	0.111	0.093	0.094	0.06	0.114	0.114
94	0.077	0.064	0.132	0.111	0.093	0.094	0.06	0.114	0.114
95	0.077	0.064	0.132	0.111	0.093	0.094	0.06	0.114	0.114
96	0.077	0.064	0.132	0.111	0.093	0.094	0.06	0.114	0.114
97	0.077	0.064	0.132	0.111	0.094	0.094	0.06	0.114	0.115
98	0.077	0.065	0.132	0.111	0.094	0.095	0.06	0.114	0.115
99	0.077	0.065	0.133	0.111	0.094	0.095	0.06	0.114	0.115
100	0.075	0.063	0.128	0.108	0.091	0.092	0.06	0.111	0.111
110	0.076	0.063	0.13	0.108	0.092	0.093	0.06	0.111	0.112
120	0.076	0.064	0.131	0.109	0.092	0.093	0.06	0.112	0.113
130	0.077	0.064	0.132	0.109	0.093	0.094	0.06	0.112	0.114
140	0.075	0.063	0.129	0.106	0.091	0.092	0.06	0.109	0.111
150	0.076	0.063	0.129	0.106	0.091	0.092	0.06	0.109	0.112
160	0.076	0.063	0.13	0.107	0.092	0.092	0.06	0.109	0.113
170	0.076	0.064	0.13	0.107	0.092	0.093	0.06	0.11	0.113
180	0.077	0.064	0.131	0.107	0.093	0.093	0.06	0.11	0.114

190	0.077	0.064	0.131	0.107	0.093	0.093	0.06	0.11	0.114
200	0.077	0.064	0.132	0.107	0.093	0.094	0.06	0.11	0.114
210	0.075	0.063	0.128	0.105	0.091	0.091	0.06	0.107	0.111
220	0.075	0.063	0.129	0.105	0.091	0.092	0.06	0.107	0.112
230	0.075	0.063	0.129	0.105	0.091	0.092	0.06	0.107	0.112
240	0.076	0.063	0.129	0.105	0.092	0.092	0.06	0.107	0.112
250	0.076	0.063	0.129	0.105	0.092	0.092	0.06	0.108	0.112
260	0.076	0.063	0.13	0.105	0.092	0.092	0.06	0.108	0.113
270	0.076	0.063	0.13	0.105	0.092	0.092	0.06	0.108	0.113
280	0.076	0.064	0.13	0.105	0.092	0.092	0.06	0.108	0.113
290	0.076	0.064	0.13	0.105	0.092	0.093	0.06	0.108	0.113
300	0.076	0.064	0.13	0.105	0.092	0.093	0.06	0.108	0.113
310	0.076	0.064	0.131	0.105	0.093	0.093	0.06	0.108	0.113
320	0.077	0.064	0.131	0.105	0.093	0.093	0.06	0.108	0.114
330	0.077	0.064	0.131	0.105	0.093	0.093	0.06	0.108	0.114
340	0.077	0.064	0.131	0.106	0.093	0.093	0.06	0.108	0.114
350	0.077	0.064	0.131	0.106	0.093	0.093	0.06	0.108	0.114
360	0.077	0.064	0.131	0.106	0.093	0.093	0.06	0.108	0.114
370	0.077	0.064	0.131	0.106	0.093	0.093	0.06	0.108	0.114
380	0.077	0.064	0.131	0.106	0.093	0.093	0.06	0.108	0.114
390	0.077	0.064	0.131	0.106	0.093	0.093	0.06	0.108	0.114
400	0.075	0.063	0.128	0.103	0.091	0.091	0.06	0.106	0.112
410	0.075	0.063	0.128	0.103	0.091	0.091	0.06	0.106	0.112
420	0.075	0.063	0.128	0.103	0.091	0.091	0.06	0.106	0.112
430	0.075	0.063	0.129	0.103	0.091	0.091	0.06	0.106	0.112
440	0.075	0.063	0.129	0.103	0.091	0.091	0.06	0.106	0.112
450	0.075	0.063	0.129	0.103	0.091	0.091	0.06	0.106	0.112
460	0.075	0.063	0.129	0.103	0.091	0.092	0.06	0.106	0.112
470	0.076	0.063	0.129	0.103	0.091	0.092	0.06	0.106	0.112
480	0.076	0.063	0.129	0.103	0.091	0.092	0.06	0.106	0.112
490	0.076	0.063	0.129	0.103	0.091	0.092	0.06	0.106	0.112
500	0.076	0.063	0.129	0.103	0.092	0.092	0.06	0.106	0.112

Table 20. Minimum Sample Size Calculation for Composite Score with Various Margins of Error

Facility Eligible Population Size (N)	Margin of Error: 6% of the Composite Score Mean
1	1
2	2
3	3
4	3
5	4
6	5
7	5
8	6
9	6
10	7
11	7
12	8
13	8
14	9
15	9
16	9
17	10
18	10
19	10
20	11
21	11
22	11
23	11
24	12
25	12
26	12
27	12
28	13
29	13
30	13
31	13
32	13
33	13

34	14
35	14
36	14
37	14
38	14
39	14
40	15
41	15
42	15
43	15
44	15
45	15
46	15
47	15
48	15
49	16
50	16
51	16
52	16
53	16
54	16
55	16
56	16
57	16
58	16
59	16
60	16
61	17
62	17
63	17
64	17
65	17
66	17
67	17
68	17
69	17
70	17
71	17
72	17

73	17
74	17
75	17
76	18
77	18
78	18
79	18
80	18
81	18
82	18
83	18
84	18
85	18
86	18
87	18
88	18
89	18
90	18
91	18
92	18
93	18
94	18
95	18
96	18
97	18
98	18
99	18
100	19
110	19
120	19
130	19
140	20
150	20
160	20
170	20
180	20
190	20
200	20
210	21

220	21
230	21
240	21
250	21
260	21
270	21
280	21
290	21
300	21
310	21
320	21
330	21
340	21
350	21
360	21
370	21
380	21
390	21
400	22
410	22
420	22
430	22
440	22
450	22
460	22
470	22
480	22
490	22
500	22

Appendix C: Dynamic Missingness Approach- Resident Surveys

Table 21. Summary of Total Number of Missing Domains – All Surveys

Number of Missing Domains	Number of Surveys	Proportion of Surveys
0	1714	0.1077
1	4512	0.2836
2	4514	0.2837
3	1005	0.0632
4	232	0.0146
5	73	0.0046
6	19	0.0012
7	17	0.0011
8	4	0.0003
9	3820	0.2401

Table 22. Summary of Total Number of Missing Domains – Completed Surveys

Number of Missing Domains	Number of Surveys	Proportion of Surveys
0	1714	0.1418
1	4512	0.3732
2	4514	0.3733
3	1005	0.0831
4	232	0.0192

5	73	0.006
6	19	0.0016
7	17	0.0014
8	4	0.0003
9	1	0.0001

Appendix D: Risk Adjustment

Resident Facility-Level Summaries

Table 23. Risk Adjustment for Size - Resident

	level	Medium (8-50)	Large (51-100)	Very Large (101+)	p
N		5247	6131	4240	
Number of Valid Surveys (%)	0	1221 (23.3)	1464 (23.9)	1056 (24.9)	0.176
	1	4026 (76.7)	4667 (76.1)	3184 (75.1)	
Staff Score (mean (SD))		86.520 (16.723)	87.496 (15.276)	86.312 (16.130)	0.002
Environment Score (mean (SD))		92.731 (15.936)	94.556 (13.775)	94.751 (13.227)	<0.001
Food Score (mean (SD))		73.851 (25.153)	77.872 (22.427)	77.530 (22.803)	<0.001
Engagement Score (mean (SD))		85.184 (15.364)	86.937 (13.750)	88.104 (13.380)	<0.001
Autonomy Score (mean (SD))		80.548 (18.916)	81.826 (17.811)	82.068 (17.423)	<0.001
Culture Score (mean (SD))		88.689 (21.630)	91.905 (18.102)	92.610 (17.032)	<0.001
Security Score (mean (SD))		89.532 (15.300)	91.791 (13.478)	92.512 (12.988)	<0.001
Finances Score (mean (SD))		92.464 (14.738)	93.024 (13.396)	92.217 (13.742)	0.275
Overall Score (mean (SD))		59.801 (17.059)	61.991 (16.502)	61.863 (16.470)	<0.001
Composite Score (mean (SD))		81.730 (13.166)	84.011 (11.682)	84.236 (11.315)	<0.001

Table 24. Risk Adjustment for Geography - Resident

	level	Micro/Outlying Metro	Other Metro	Rural	Twin Cities Metro	p
n		3532	3182	1982	6922	
Number of Valid Surveys (%)	0	763 (21.6)	704 (22.1)	392 (19.8)	1882 (27.2)	<0.001
	1	2769 (78.4)	2478 (77.9)	1590 (80.2)	5040 (72.8)	
Staff Score (mean (SD))		88.277 (15.086)	88.314 (14.633)	88.834 (14.879)	84.711 (17.220)	<0.001
Environment Score (mean (SD))		94.234 (13.963)	94.359 (14.399)	94.686 (13.576)	93.454 (14.944)	0.005
Food Score (mean (SD))		76.587 (23.287)	77.828 (23.257)	76.384 (23.775)	75.539 (23.802)	0.002
Engagement Score (mean (SD))		86.277 (14.483)	87.322 (13.471)	84.979 (15.181)	87.145 (14.138)	0.002
Autonomy Score (mean (SD))		82.260 (17.524)	82.324 (17.357)	82.895 (18.118)	80.144 (18.676)	<0.001
Culture Score (mean (SD))		91.710 (18.439)	91.926 (17.439)	90.942 (19.769)	90.146 (20.195)	0.001
Security Score (mean (SD))		91.576 (13.724)	92.135 (12.994)	91.659 (12.998)	90.433 (14.981)	<0.001
Finances Score (mean (SD))		93.219 (13.476)	92.572 (14.309)	93.348 (13.432)	92.021 (14.081)	0.089
Overall Score (mean (SD))		60.654 (16.448)	61.923 (16.728)	61.121 (16.986)	61.206 (16.756)	0.057
Composite Score (mean (SD))		83.709 (11.666)	84.244 (11.469)	83.799 (12.110)	82.449 (12.716)	<0.001

Table 25. Risk Adjustment for Geography (Twin Cities Metro Vs. Other) - Resident

	level	Twin Cities Metro	Other	p
n		6922	8696	
Number of Valid Surveys (%)	0	1882 (27.2)	1859 (21.4)	<0.001
	1	5040 (72.8)	6837 (78.6)	
Staff Score (mean (SD))		84.711 (17.220)	88.419 (14.875)	<0.001
Environment Score (mean (SD))		93.454 (14.944)	94.384 (14.034)	0.001
Food Score (mean (SD))		75.539 (23.802)	76.989 (23.396)	0.001
Engagement Score (mean (SD))		87.145 (14.138)	86.355 (14.317)	0.050
Autonomy Score (mean (SD))		80.144 (18.676)	82.431 (17.604)	<0.001
Culture Score (mean (SD))		90.146 (20.195)	91.609 (18.409)	<0.001
Security Score (mean (SD))		90.433 (14.981)	91.798 (13.296)	<0.001
Finances Score (mean (SD))		92.021 (14.081)	93.019 (13.767)	0.023
Overall Score (mean (SD))		61.206 (16.756)	61.222 (16.683)	0.958
Composite Score (mean (SD))		82.449 (12.716)	83.924 (11.701)	<0.001

Family Facility-Level Summaries

Table 26. Risk Adjustment for Size - Family

	Medium (8-50)	Large (51-100)	Very Large (101+)	p
n	3459	4711	3590	
Experience Score (mean (SD))	77.109 (16.876)	76.123 (17.329)	75.681 (17.141)	0.002
Choice Score (mean (SD))	79.651 (16.319)	78.673 (16.606)	78.248 (16.781)	0.002

Needs Score (mean (SD))	72.543 (19.478)	70.216 (20.111)	69.421 (20.277)	<0.001
Finances Score (mean (SD))	72.721 (20.546)	70.490 (21.173)	69.314 (21.561)	<0.001
Housekeeping Score (mean (SD))	79.220 (17.334)	79.219 (17.505)	78.842 (17.662)	0.562
Food Score (mean (SD))	66.407 (24.213)	66.365 (23.854)	65.265 (23.910)	0.094
Environment Score (mean (SD))	79.723 (17.294)	79.347 (17.353)	79.386 (17.297)	0.593
Staff Score (mean (SD))	77.362 (17.593)	75.949 (17.894)	75.006 (18.075)	<0.001
Overall Score (mean (SD))	77.599 (18.439)	76.760 (18.549)	75.482 (19.308)	<0.001
Composite Score (mean (SD))	75.732 (15.595)	74.847 (15.589)	74.252 (15.637)	<0.001

Table 27. Risk Adjustment for Geography - Family

	Micro/Outlying Metro	Other Metro	Rural	Twin Cities Metro	p
n	2602	2301	1474	5383	
Experience Score (mean (SD))	76.771 (16.660)	76.126 (16.849)	79.195 (15.928)	75.303 (17.726)	<0.001
Choice Score (mean (SD))	79.502 (16.088)	78.917 (16.374)	81.395 (15.749)	77.755 (17.040)	<0.001
Needs Score (mean (SD))	72.078 (19.330)	70.492 (20.169)	74.518 (18.622)	69.026 (20.447)	<0.001
Finances Score (mean (SD))	72.132 (20.426)	70.635 (21.019)	72.821 (20.527)	69.689 (21.633)	<0.001
Housekeeping Score (mean (SD))	79.554 (17.094)	78.881 (17.374)	81.854 (17.054)	78.227 (17.792)	<0.001
Food Score (mean (SD))	66.920 (23.804)	66.148 (23.644)	66.953 (24.683)	65.336 (24.000)	0.026

Environment Score (mean (SD))	80.021 (16.890)	79.053 (17.180)	82.138 (17.117)	78.645 (17.558)	<0.001
Staff Score (mean (SD))	77.561 (17.029)	76.298 (17.373)	79.194 (16.792)	74.404 (18.605)	<0.001
Overall Score (mean (SD))	77.769 (17.603)	77.004 (18.634)	79.303 (16.899)	75.156 (19.713)	<0.001
Composite Score (mean (SD))	75.806 (15.048)	74.875 (15.507)	77.595 (14.881)	73.789 (16.010)	<0.001

Table 28. Risk Adjustment for Geography (Twin Cities Metro vs. Other) - Family

	Twin Cities Metro	Other	p
n	5383	6377	
Experience Score (mean (SD))	75.303 (17.726)	77.100 (16.602)	<0.001
Choice Score (mean (SD))	77.755 (17.040)	79.734 (16.139)	<0.001
Needs Score (mean (SD))	69.026 (20.447)	72.083 (19.529)	<0.001
Finances Score (mean (SD))	69.689 (21.633)	71.744 (20.680)	<0.001
Housekeeping Score (mean (SD))	78.227 (17.792)	79.844 (17.221)	<0.001
Food Score (mean (SD))	65.336 (24.000)	66.651 (23.954)	0.005
Environment Score (mean (SD))	78.645 (17.558)	80.163 (17.084)	<0.001
Staff Score (mean (SD))	74.404 (18.605)	77.486 (17.132)	<0.001
Overall Score (mean (SD))	75.156 (19.713)	77.848 (17.843)	<0.001
Composite Score (mean (SD))	73.789 (16.010)	75.884 (15.209)	<0.001

Appendix E: Star Rating Scoring Systems

Scoring System 1a

This is the same scoring system as the Nursing Home Study

Star Scoring System:

5 Stars: Mean plus 1½ standard deviations.

Resident: > 91.41

Family: > 85.02

4 Stars: Mean plus ½ to 1½ standard deviations.

Resident: 85.70-91.41

Family: 78.21-85.02

3 Stars: Mean plus or minus ½ standard deviations.

Resident: 79.98-85.69

Family: 71.40-78.20

2 Stars: Mean minus ½ to 1½ standard deviations.

Resident: 74.26-79.97

Family: 64.60-71.39

1 Star: Mean minus 1½ standard deviations.

Resident: < 74.26

Family: < 64.60

Distribution of Facilities with this Star Scoring System

Star Rating	1	2	3	4	5
Resident Survey	42	70	173	161	8
Family Survey	33	101	184	120	28

Scoring System 1b

This is the same scoring system as the Nursing Home Study

Star Scoring System:

5 Stars: Mean plus 1½ standard deviations OR top 5% of facilities

Resident: > 89.69

Family: > 85.02

4 Stars: Mean plus ½ to 1½ standard deviations

Resident: 85.69-89.69

Family: 78.21-85.02

3 Stars: Mean plus or minus ½ standard deviations

Resident: 79.98-85.69

Family: 71.40-78.20

2 Stars: Mean minus ½ to 1½ standard deviations

Resident: 74.26-79.97

Family: 64.60-71.39

1 Star: Mean minus 1½ standard deviations

Resident: < 74.26

Family: < 64.60

Key Points:

- This is the same scoring system as the nursing home facilities, but we added that the top 5% of facilities will be 5 stars even if the facility score is not 1.5 standard deviations above the mean of all facilities.
- The family survey distribution does not change at all because the top 5% of facilities are all already 5 stars because the facility score is at least 1.5 standard deviations above the mean of all facilities.

Distribution of Facilities with this Star Scoring System

Star Rating	1	2	3	4	5
Resident Survey	42	70	173	146	23
Family Survey	33	101	184	120	28

Scoring System 1c

This is the same scoring system as the Nursing Home Study

Star Scoring System:

5 Stars: Mean plus 1½ standard deviations OR top 7% of facilities

Resident: > 89.31

Family: > 83.99

4 Stars: Mean plus ½ to 1½ standard deviations

Resident: 85.69-89.31

Family: 78.21-83.99

3 Stars: Mean plus or minus ½ standard deviations

Resident: 79.98-85.69

Family: 71.40-78.20

2 Stars: Mean minus ½ to 1½ standard deviations

Resident: 74.26-79.97

Family: 64.60-71.39

1 Star: Mean minus 1½ standard deviations

Resident: < 74.26

Family: < 64.60

Key Points:

- This is the same scoring system as the nursing home facilities, but we added that the top 7% of facilities will be 5 stars even if the facility score is not 1.5 standard deviations above the mean of all facilities.
- We chose 7% because if the scores were normally distributed 6.68% of the scores would be 1.5 standard deviations above the mean, so we wanted to replicate this.

Distribution of Facilities with this Star Scoring System

Star Rating	1	2	3	4	5
Resident Survey	42	70	173	137	32
Family Survey	33	101	184	115	33

Scoring System 2

Modifying the Nursing Home Study scoring system

Star Scoring System:

5 Stars: Mean plus 1.2 standard deviations

Resident: > 89.70

Family: > 82.98

4 Stars: Mean plus 0.4 to 1.2 standard deviations

Resident: 85.12-89.70

Family: 77.53-82.98

3 Stars: Mean plus or minus 0.4 standard deviations

Resident: 80.55-85.11

Family: 72.09-77.52

2 Stars: Mean minus 0.4 to 1.2 standard deviations

Resident: 75.98-80.54

Family: 66.64-72.08

1 Star: Mean minus 1.2 standard deviations

Resident: < 75.98

Family: < 66.64

Key Points:

- Starting with the 3 star facilities, we modified the nursing home facilities rankings so three stars is 0.1 standard deviations smaller on either side (+/- 0.4 standard deviations instead of +/- 0.5 standard deviations).
- For consistency, since 3 stars includes a range of 0.8 standard deviations, we kept this size for 2 stars and 4 stars, which is how we got the range of 0.4 to 1.2 standard deviations.

Distribution of Stars Resident Survey

Star Rating	1	2	3	4	5
Resident Survey	59	67	142	163	23
Family Survey	62	85	149	125	45

Scoring System 3

Modifying the Nursing Home Study scoring system

Star Scoring System:

5 Stars: Mean plus 1.05 standard deviations

Resident: > 88.84

Family: > 81.96

4 Stars: Mean plus 0.35 to 1.05 standard deviations

Resident: 84.84-88.84

Family: 77.19-81.96

3 Stars: Mean plus or minus 0.35 standard deviations

Resident: 80.84-84.83

Family: 72.43-77.18

2 Stars: Mean minus 0.35 to 1.05 standard deviations

Resident: 76.84-80.83

Family: 67.66-72.42

1 Star: Mean minus 1.05 standard deviations

Resident: < 76.84

Family: < 67.66

Key Points:

- Starting with the 3 star facilities, we modified the previous scoring system so three stars is 0.05 standard deviations smaller on either side (+/- 0.35 standard deviations instead of +/- 0.4 standard deviations).
- For consistency, since 3 stars includes a range of 0.7 standard deviations, we kept this size for 2 stars and 4 stars, which is how we got the range of 0.35 to 1.05 standard deviations.

Distribution of Stars Resident Survey

Star Rating	1	2	3	4	5
Resident Survey	67	66	123	152	46
Family Survey	68	85	138	115	60

Scoring System 4 (Percentile Based Star Scoring)

Using this method, in a normal distribution, 6.68% of scores are more than 1.5 standard deviations above the mean, 24.17% of scores within 0.5 to 1.5 standard deviations above the mean, 38.29% of the scores are between 0.5 standard deviations below the mean and 0.5 standard deviations above the mean, 24.17% of scores within 0.5 to 1.5 standard deviations below the mean, and 6.68% of scores are less than 1.5 standard deviations below the mean.

Star Scoring System:

5 stars: top 6.68% of scores

Resident: > 89.42

Family: > 84.22

4 stars: 69.15% to 93.31% scores

Resident: 86.42-89.42

Family: 78.37-84.22

3 stars: 30.89% to 69.14% scores

Resident: 81.10-86.41

Family: 71.83-78.36

2 stars: 6.69% to 30.88% scores

Resident: 73.21-81.09

Family: 64.47-71.82

1 star: bottom 6.68% scores

Resident: < 73.21

Family: < 64.47

Key Points:

- This scoring system distributes the stars following a normal distribution so there are the same number of 1 star and 5 star facilities, and 2 star and 4 star facilities.

Distribution of Stars Resident Survey

Star Rating	1	2	3	4	5
Resident Survey	31	109	174	109	31
Family Survey	32	112	178	112	32

Table 29. Comparison of Scoring Systems – Resident Surveys

Star Rating	1	2	3	4	5
Scoring System 1a	42	70	173	161	8
Scoring System 1b	0	0	0	-15	+15
Scoring System 1c	0	0	0	-24	+24
Scoring System 2	+17	-3	-31	+2	+15
Scoring System 3	+25	-4	-50	-9	+38

Scoring System 4	-11	+39	+1	-52	+23

Table 30. Comparison of Scoring Systems – Family Surveys

Star Rating	1	2	3	4	5
Scoring System 1a	33	101	184	120	28
Scoring System 1b	0	0	0	0	0
Scoring System 1c	0	0	0	-5	+5
Scoring System 2	+29	-16	-35	+5	+17
Scoring System 3	+35	-16	-46	-5	+32
Scoring System 4	-1	+11	-6	-8	+4

The “Scoring System 1a” row shows the distribution of stars using the scoring system 1a (same as nursing home facilities). The four bottom rows show the change in the scoring systems compared to 1a using the other scoring designs.