

# Measuring Nursing Home Resident Satisfaction With Food and Food Service: Initial Testing of the FoodEx-LTC

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**Background.** Malnutrition impacts the quality of life and general health of many older persons living in our nation's 20,000 nursing homes (1). Despite the urgency of this issue, no instrument that measures resident satisfaction with food and food service was found in an extensive literature search. The purpose of this article is to describe the development and initial testing of a resident satisfaction with food and food service questionnaire (FoodEx-LTC) in the context of the Quality Nutrition Outcomes–Long-Term Care Model.

**Methods.** This pilot study was conducted in two phases. During phase one the instrument was developed, peer-reviewed, and pretested. Phase two further tested the instrument using a correlational design, measuring both intermediate and long-term outcomes found on the Quality Nutrition Outcomes–Long-Term Care Model.

**Results.** Hypothesis testing was used to measure construct validity. 4 of 5 FoodEx–LTC domains were significantly correlated with depression, 2 of 5 with serum albumin. The FoodEx-LTC demonstrates acceptable reliability for a new instrument. The coefficient alpha scores ranged from .69–.87 and test–retest correlations ranged from .55–.89, dependent upon domain.

**Conclusions.** FoodEx-LTC appears to be a valid and reliable measure of resident food and food service satisfaction in nursing homes. This line of inquiry is of great importance because perceived quality of food and food service are strongly related to quality of life for residents in nursing homes, and adequate food intake is integral to maintaining weight and preventing protein-calorie malnutrition among elderly residents.

MALNUTRITION impacts the quality of life and general health of many older persons living in our nation's 20,000 nursing homes (1). If current national population projections are correct, the number of nursing home residents with malnutrition will dramatically increase unless effective interventions can be identified. Accurate assessment of causative factors in malnutrition is foundational to effective intervention, yet no instrument that measures resident satisfaction with food or food service was found in an extensive literature search. The purpose of this article is to describe the development and initial testing of a resident satisfaction with food and food service questionnaire (FoodEx-LTC) in the context of the Quality Nutrition Outcomes–Long-Term Care (QNO-LTC) Model (Figure 1).

Most existing patient satisfaction instruments have been developed with little input from residents (2–4), resulting in questionable validity (5). Additionally, instruments developed for hospital populations may not contain dimensions of satisfaction that are relevant to nursing home residents (4,5).

## *Assessment of Resident Satisfaction With Food and Food Service*

The FoodEx-LTC is a simple, 44-item, 5-domain questionnaire that measures resident food and food service satisfaction (Appendix). It is designed to be self-administered or interviewer administered and can be used throughout the long-term care setting. The FoodEx-LTC

was developed from results of an extensive preliminary qualitative study in which 20 in-depth interviews were conducted with nursing home residents regarding positive memories associated with food, and strengths and weaknesses of the food and food service in the facility. The data were further developed into the FoodEx-LTC pilot-tested during this study. Using an interactive process, the FoodEx-LTC was developed with the involvement of researchers, practitioners, and older adults. Developmental analyses have shown that the tool has content validity and internal reliability. In this article, we describe the development and testing of the instrument in two phases. During phase one, scaling methodology was tested to ensure that older adults in nursing homes could understand and respond to survey items with minimal difficulty. Phase two pilot-tested the instrument with 61 nursing home residents from 4 southwestern nursing homes.

## *Organizing Framework*

The study was guided by the QNO-LTC model (Figure 1), which was adapted by Crogan and Pasvogel (7) from the Quality of Health Outcomes Model developed by the American Academy of Nursing Expert Panel on Quality of Health Care (8) and Perrow's theory of complex organizations (9). The QNO-LTC model posits a pathway whereby organizational issues and resident characteristics influence resident food satisfaction, which influences food intake and nutritional status (body mass index [BMI], serum

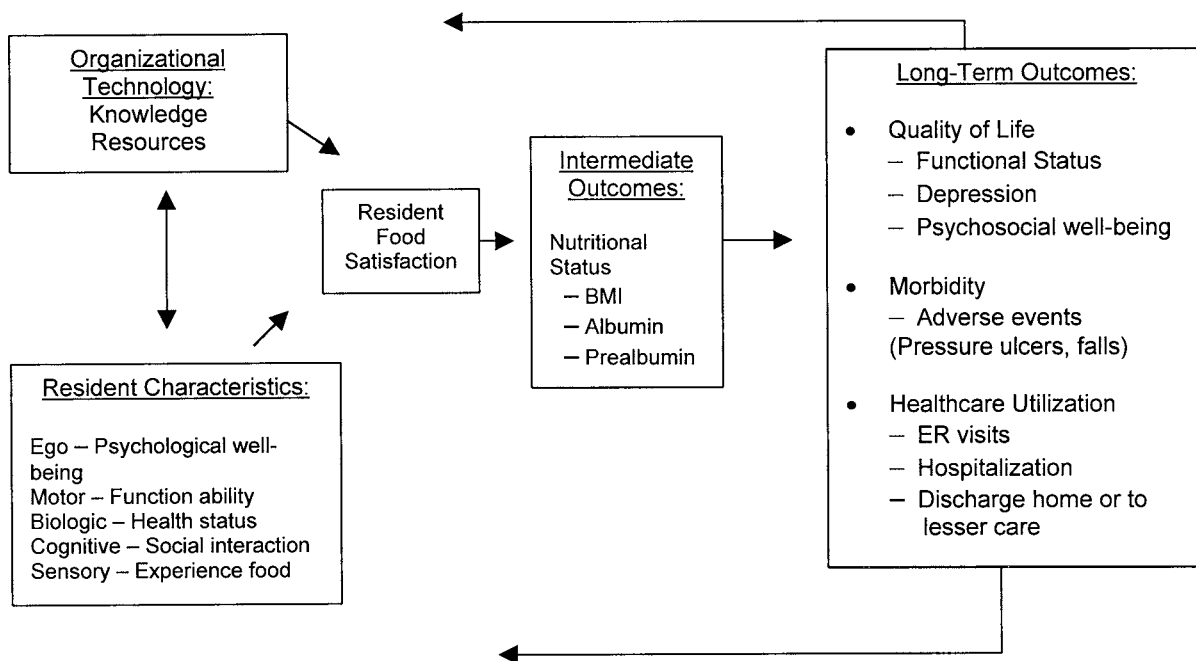


Figure 1. The Quality Nutritional Outcomes Model-Long Term Care (QNO-LTC). BMI = body mass index; ER = emergency room.

albumin, and prealbumin), and subsequent quality of life, morbidity, and health care utilization.

## METHODS

### Phase One: Content Validity

Phase one consisted of a two-stage process (10). The first stage, or development stage, included the identification of full-content domains, item generation, and the assimilation of items into a useable form. A phenomenological study was used to identify domains. Twenty nursing home residents were interviewed to uncover meaning in a series of “tell me a story” interviews about a typical mealtime when food tasted good and they really enjoyed eating, as well as a story about a typical mealtime at the nursing home (11). The resident also provided information on how they felt about the food and food service, along with the best and worst things about it. Finally, they were asked 2 hypothetical questions: “If you had the power to control the food and food service here, and you wanted to make mealtime perfect, what would you do?” “What would it be like if it was perfect?”

Using a phenomenological approach (12), one member of the research team initially coded the content of each interview according to preestablished decision rules set forth in a coding manual designed by the team for this study. The preliminary analysis was then presented to the group for consensus. Exemplars were extracted from the data, and codes were refined and grouped into categories, or domains, of meaning. Analysis of the interviews revealed 14 of these domains of meaning (described in Table 1); each domain contains multiple codes with specific descriptions and exemplars of resident expression about food service. The

domains (Table 1) were further organized and described as organizational issues or as personal resident issues. From these data, items were generated representing all 14 domains. These items were then refined and arranged in a suitable sequence. The domains were further collapsed to a total of 6 after expert review.

In stage two, the judgment-quantification stage, an index of content validity was calculated (10). Expert reviewers were chosen and the minimum number of experts required to agree on each item and the total instrument was established. A structured procedure for the reviewer was developed using items from the instrument. Reviewers were told that the purpose of the review was to elicit their opinions on 1) whether or not each item was clearly written, and 2) whether or not each item was relevant to the content domain in which it had been organized. This portion of the review required responses on a 4-point Likert scale. Experts were then asked to indicate by “yes” or “no” whether or not a nursing home resident could answer each item, if any item was redundant, and if the format was easy to read. An open-ended section at the end of each review form asked the expert to identify any areas that, in his or her opinion, had been omitted from the instrument. Based on content validity information, the instrument was revised and then pretested for format and clarity with a convenience sample of 10 nursing home residents.

### Phase Two: Instrument Testing

*Sampling.*—Participants were recruited from 4 southwest nursing homes. To be included in the study, residents had to be aged 65 years or older, have lived at 1 of 4 nursing homes for at least 1 month, be able to make themselves understood,

Table 1. Organizational and Personal Resident Issues Affecting Resident Food Intake

Organizational Issues	Description
Supporting nutritional health	Provide adequate amounts of nutritious food
Cook/serve food to one's liking	Provide a variety of foods that taste good
Requirement of good cooking	Hire experienced staff that know how to cook
Provide quality food service	Serve food residents like and want to eat
Provide poor food service	Problems with inadequate staff training and equipment
Waste food	Serving food that doesn't look good or that residents dislike
<i>Personal Issues</i>	
Enjoy the experience of eating	Social experience of eating
Lack of enjoyment in eating	Problems with food quality and food service
Exercise choice in eating	Choosing what you want to eat
Lack of choice	Eating food that looks bad; feeling powerless; lack of trust
Eating to maintain health	Eating to heal/prevent illness
Achieve self-actualization	Making it be whatever you want it to be
Choose to accept	Feeling powerless so letting the current situation be
Refuse to eat	Refusing to eat food that looks bad

and have adequate cognitive skills for daily decision-making. Sample characteristics are described in Table 2.

*FoodEx-LTC.*—The original form of the questionnaire included 74 items that the resident could answer as True, Somewhat True, Somewhat False, or False. However, 3 items within the domain “Exercising Choice” required a different response selection to answer questions of “How important to you is ...”. Choices for this portion were scored on a 4-point Likert Scale ranging from “Important” to “Not Important.” For the scales “Enjoying Food and Food Service,” “Exercising Choice,” and “Providing Good Food Service—Positive View,” higher scores indicated greater satisfaction. For the scales “Cooking Good Food” and “Providing Good Food Service—Negative View,” higher scores indicated less satisfaction within those domains.

### Procedure

A master's prepared nurse met with each resident, obtained informed consent, and administered the FoodEx-LTC and the Geriatric Depression Scale (GDS). The nurse read each item to the resident and scored it based on the resident's response. Information to complete the Katz Index of Independence in Activities of Daily Living (Katz ADL), height, weight, and demographic data were obtained from each resident's medical record. A local laboratory company provided phlebotomy services and laboratory analysis for the one-time measurement of resident serum albumin and prealbumin.

Sixty-one people participated in the final field-testing of the instrument. The reliability of the FoodEx-LTC was

Table 2. Demographic Characteristics

Characteristic	N (%)
<i>Age (y)</i>	
Young old (aged 65–74)	18 (29.5%)
Old (aged 75–84)	27 (44.2%)
Old old (aged 85+)	16 (26.2%)
<i>Gender</i>	
Male	15 (24.6%)
Female	46 (75.4%)
<i>Marital Status</i>	
Never married	7 (11.5%)
Married	16 (26.2%)
Widowed	28 (45.9%)
Divorced	10 (16.4%)

*Note:* For age, the mean was 78.8, standard deviation was 9.33, and range was 65–103.

measured using tests of internal consistency (Cronbach's Alpha) and temporal stability (test–retest). A subset of 15 participants (25%) completed the test–retest component at 2 weeks. Test–retest differences between time 1 and time 2 were estimated using Pearson's zero-order correlations.

Construct validity is the extent to which measures meet theoretical expectations (28). The following hypotheses were derived from the QNO-LTC.

1. Satisfaction with food/food service is positively related to serum albumin/prealbumin levels.
2. Satisfaction with food/food service is positively related to BMI.
3. Satisfaction with food/food service is positively related to functional status.
4. Satisfaction with food/food service is negatively related to depression.

## RESULTS

### *QNO-LTC Intermediate and Long-Term Outcomes*

Results of intermediate outcomes (BMI, albumin, and prealbumin) and selected long-term outcomes (functional status and depression) are reported in Table 3. Of the 61 residents, 11 (23.9%) had a BMI <22, suggestive of malnutrition. In contrast, 16 (28.6%) had albumin levels <3.5 g/dL, indicating malnutrition. All 61 residents had normal prealbumin levels. Functional status was measured using the Katz ADL instrument. Of the 61 residents, 53 (86.9%) scored 4 or less indicating moderate-to-severe functional impairment. Of these, 11 (20.7%) were dependent in eating. Depression was measured using the GDS. Of the 61 residents, 22 (36%) demonstrated moderate-to-severe depression.

### *Reliability of the FoodEx-LTC*

Internal consistency reliability (Cronbach's alpha) estimates ranged from .69 “Exercising Choice” to .87 “Providing Good Food Service-Negative View” (Table 4). All alpha coefficients were above the .50 criterion suggested by

Table 3. Measures of Intermediate and Select Long-Term Outcomes

Outcome	Mean	SD
Intermediate outcomes		
Body mass index (BMI)	24.83	4.76
Serum albumin (g/dL)	3.59	.41
Serum prealbumin (mg/dL)	25.57	7.17
Long-term outcomes		
Functional status (Katz ADL)	1.85	1.69
Depression (Geriatric Depression Scale)	9.44	6.60

Notes: BMI <22 indicates malnutrition, albumin <3.5 g/dL = malnutrition, prealbumin <10 mg/dL = malnutrition; Katz ADL score of 6 = full function, 4 = moderate impairment, 2 or less = severe functional impairment; GDS score 0–10 = normal, 11–20 moderate depression, 21–30 = severe depression.

SD = standard deviation; BMI = body mass index; Katz ADL = Katz Index of Independence in activities of daily living; GDS = Geriatric Depression Scale.

Nunnally (13) for a new scale and 4 of the 5 scales met the more stringent criterion of .70.

Two-week test–retest coefficients ranged from .55 “Providing Good Food Service–Positive View” to .89 “Exercising Choice.” “Providing Good Food Service–Positive View” was the only scale to fall below .70.

#### Construct Validity of the FoodEx-LTC

Hypotheses derived from the theoretical model were used to test construct validity of the FoodEx-LTC. In the model, intermediate outcomes (BMI, albumin, and prealbumin) and select long-term outcomes (functional status, depression) were hypothesized to correlate with resident’s perceived satisfaction with food and food service in the nursing home (Table 5).

**Hypothesis 1.**—Albumin was positively correlated with the domains “Enjoying Food and Food Service” ( $r = .25$ ,  $p = .031$ ) and “Exercising Choice” ( $r = .30$ ,  $p = .013$ ). Residents with higher scores on these scales had higher albumin levels. There was no significant correlation with any of the domains and prealbumin.

**Hypothesis 4.**—Depression was significantly correlated with 4 of 5 FoodEx-LTC domains. Depression was negatively correlated with “Enjoying Food and Food Service” ( $r = -.48$ ,  $p = .000$ ) and “Providing Good Food Service–Positive View” ( $r = -.32$ ,  $p = .007$ ). Depression

was positively correlated with “Cooking Good Food” ( $r = .39$ ,  $p = .001$ ) and “Providing Good Food Service–Negative View” ( $r = .33$ ,  $p = .005$ ). Residents who reported not enjoying the food and food service had higher GDS scores, indicating moderate-to-severe depression.

BMI and functional status (measured by the Katz ADL) did not correlate with any of the subscales (*Hypotheses 2 and 3*).

#### DISCUSSION

The data presented in this study describe the initial validity and reliability testing of a resident satisfaction with food and food service questionnaire (FoodEx-LTC) in the context of the QNO-LTC model (Figure 1). Satisfaction with meals depends on organizational factors, such as food quality, and interpersonal aspects, such as attitude of staff. In order to determine resident satisfaction, the FoodEx-LTC instrument assesses these varied aspects of nutritional care, provides information on individual needs, and translates into operational standards for organizational enhancement (14).

Stable biochemical indicators, such as prealbumin and albumin (Figure 1), and weight maintenance are positive outcomes of resident satisfaction with food and food service (15). Conversely, lack of satisfaction with meals can result in inadequate food intake, which leads to weight loss and suboptimal BMI (16). In this study, 23.9% of residents had a BMI <22, suggestive of malnutrition. In contrast, 28.6% had albumin levels <3.5 g/dL, indicating malnutrition.

There are a variety of other factors that may influence resident satisfaction with food and food service. For example, a positive relationship between food satisfaction, BMI, and albumin also was demonstrated in a study using buffet-style meals to improve food quality and choice (16). In this study, mean weight and biochemical indicators remained constant, along with a 25% increase in resident satisfaction ratings on a long-term care unit and 52% on a rehabilitation unit. Quality of life also appeared to be enhanced, with residents expressing their anticipation of meals, staff noting how well residents were eating, and family members joining the residents for meals.

The loss of taste and smell that occurs with aging may influence residents’ ability to appreciate their choice of food as well, thereby affecting food intake (17). Compensating for this sensory loss, a 16-week parallel group intervention that added flavor enhancers to cooked meals was shown to be an effective way of improving dietary intake and body weight in nursing home residents (18). On average, body

Table 4. Item Analysis, Alpha Coefficients, and Test–Retest Coefficients for the FoodEx-LTC

Scale	Item Means	Item Variance	Interitem Correlations (Mean)	Item Total Correlations (Corrected)	Standardized Alpha	Test–Retest
Enjoying food and food service	2.78	1.94	.27	.26 to .66	.81	.84**
Exercising choice	2.57	1.64	.22	.24 to .49	.69	.89**
Cooking good food	1.89	1.31	.37	.40 to .75	.81	.83**
Providing good food service–positive view	3.31	1.32	.33	.29 to .67	.76	.55**
Providing good food service–negative view	1.46	1.01	.34	.36 to .76	.87	.87**

Note: \*\*Correlation significant at 0.01 level (two-tailed).

\*Correlation significant at 0.05 level (two-tailed).

Test–retest analysis  $n = 15$ .

Table 5. Correlations Between FoodEx-LTC Domains and Selected Intermediate and Long-Term Outcomes

Domain	Pearson Correlation				
	Albumin (g/dL)	Prealbumin (mg/dL)	BMI	Katz ADL	Depression
Enjoying food and food service	.25*	.05	-.05	.19	-.48**
Exercising choice	.30*	.11	.22	.21	-.14
Cooking good food	-.08	.01	.20	-.12	.39**
Providing good food service—negative view	.04	-.21	-.13	.11	-.32**
Providing good food service—positive view	-.03	.13	.20	-.11	.33**

Notes: \*\*Correlations significant at 0.02 level (one tailed).

\*Correlation significant at 0.05 level (one tailed).

BMI = body mass index; Katz ADL = Katz Index of Independence in activities of daily living.

weight in the intervention group ( $n = 36$ ) increased ( $+1.1 \pm 1.3$  kg;  $p < .05$ ) compared with that of the control group ( $n = 31$ ) ( $-0.3 \pm 1.6$  kg;  $p < .05$ ).

Food quality and choice are not the only organizational factors that can influence resident food intake. In fact, meal delivery practices also influenced food consumption in a study of 25 nursing home residents with Alzheimer's disease. Researchers found that these residents consumed more calories during breakfast than at lunch or dinner (19). This finding conflicts with current meal delivery practices in nursing homes that parallel the needs of healthy young adults whose peak mealtimes tend to occur at noontime and early evening, and it calls for a reconsideration by dietitians of calories provided for each meal.

Feeding assistance, another organizational factor, also can influence resident food intake. In a study aimed at improving food intake with additional staff to feed residents and specific evidence-based interventions, responsive residents significantly increased their food intake (20). However, the intervention required significantly more staff time to implement (an average of 38 minutes per resident per meal versus 9 minutes usually rendered by nursing home staff) than what normal staffing levels will allow. These researchers confirmed that additional staff is needed to ensure that all residents receive assistance during mealtimes if needed.

Even with sufficient numbers of staff to feed residents, the adequacy and type of assistance should be assessed. To this end, a group of researchers developed and tested a standardized observational protocol for evaluating feeding assistance quality. The protocol was found to be a reliable measure of accurate oral intake documentation and the quality of feeding assistance during mealtime (21). This standardized observational protocol, used alongside the FoodEx-LTC, may be a useful tool for nursing homes interested in quality assessment and improvement.

Given the wide array of organizational factors that affect food intake, each nursing home's quality improvement program should include an assessment of resident satisfaction. The FoodEx-LTC, tested during this study, can be viewed as "an advanced warning system" of organizational factors that could be improved by nursing home staff. Based

on its acceptable reliability and initial construct validity, the FoodEx-LTC may be used to help nursing homes tailor effective interventions aimed at improving food quality, resident choice, and feeding assistance.

### Conclusion

The FoodEx-LTC avoids many of the traditional problems associated with measurement of resident satisfaction because it uses items that are contextually relevant to the nursing home, the items emerged from consultation with the residents themselves, and the instrument addresses the multidimensional construct of satisfaction. Additionally, the FoodEx-LTC has been subjected to initial validity and reliability testing, resulting in an instrument that accurately assesses resident satisfaction with food and food service, and promotes good nutrition care in nursing homes.

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#### APPENDIX

FoodEx-LTC is an instrument that measures resident expectations, perceived control over food and food service procedures, and the organizational issues affecting food and food service in nursing homes.

#### Domain: Enjoying food and food service

##### Since I came to the nursing home:

1. I have lost my appetite.  
True   Somewhat True   Somewhat False   False
2. I am forced to eat with other people.  
True   Somewhat True   Somewhat False   False
3. I have to eat things I just hate.  
True   Somewhat True   Somewhat False   False
4. I am taken to the dining room too soon.  
True   Somewhat True   Somewhat False   False
5. I have to wait to go back to my room.  
True   Somewhat True   Somewhat False   False
6. I have food in front of me that I can not get at.  
True   Somewhat True   Somewhat False   False

##### Over the past week, during mealtime, I have received:

7. Food I dislike.  
True   Somewhat True   Somewhat False   False
8. Food that looks or smells bad.  
True   Somewhat True   Somewhat False   False
9. Foods cooked wrong.  
True   Somewhat True   Somewhat False   False
10. Food always cooked the same way.  
True   Somewhat True   Somewhat False   False
11. The same food too often.  
True   Somewhat True   Somewhat False   False

[Appendix continued on next page.]

**Domain: Exercising choice****Since I came to the nursing home:**

12. I worry that I will not get the food I ask for.  
True Somewhat True Somewhat False False

13. I feel powerless to change the food or food service.  
True Somewhat True Somewhat False False

**I enhance my satisfaction in with the food and food service at the nursing home by:**

14. Complaining about the food.  
True Somewhat True Somewhat False False

**Here at the nursing home:**

15. I have refused food I don't like.  
True Somewhat True Somewhat False False

16. I eat because I am hungry.  
True Somewhat True Somewhat False False

**How important to you is:**

17. Choosing what to eat.  
Important: 1 2 3 4 Not Important

18. Choosing when to eat.  
Important: 1 2 3 4 Not Important

19. Sending outside the nursing home for food.  
Important: 1 2 3 4 Not Important

**Domain: Cooking good food****The staff here at the nursing home:**

20. Know how to prepare a meal.  
True Somewhat True Somewhat False False

21. Make food look presentable.  
True Somewhat True Somewhat False False

22. Come up with clever ideas.  
True Somewhat True Somewhat False False

23. Have experience in food service.  
True Somewhat True Somewhat False False

**Here at the nursing home, I get:**

24. A variety of foods.  
True Somewhat True Somewhat False False

25. Foods that are appetizing.  
True Somewhat True Somewhat False False

**Over the past week:**

26. I have been satisfied with the food.  
True Somewhat True Somewhat False False

**Domain: Providing good food service –  
Negative View**

**The kitchen staff here at the nursing home:**

27. Do not order or fix enough food.  
True Somewhat True Somewhat False False

28. Have trouble cooking for large groups.  
True Somewhat True Somewhat False False

29. Sometimes have trouble getting the meal ready.  
True Somewhat True Somewhat False False

30. Serve food so late that it affects the next meal.  
True Somewhat True Somewhat False False

**Since I came to the nursing home:**

31. Food is poorly prepared or served because of equipment problems.  
True Somewhat True Somewhat False False

**Domain: Providing good food service –  
Positive View**

**Over the past week, during mealtime,  
I have received:**

32. Foods served at the proper temperature.  
True Somewhat True Somewhat False False

33. Food freshly cooked and served on time.  
True Somewhat True Somewhat False False

34. Plenty of fresh fruits and vegetables.  
True Somewhat True Somewhat False False

**Here at the nursing home, I get:**

35. Food that is healthy for me.  
True Somewhat True Somewhat False False

36. The right amount of food.  
True Somewhat True Somewhat False False

**The staff here at the nursing home:**

37. Keep a close eye on what I eat.  
True Somewhat True Somewhat False False

**The kitchen staff here at the nursing home:**

38. Work hard to serve food everyone likes.  
True Somewhat True Somewhat False False

39. Care about the food they serve.  
True Somewhat True Somewhat False False

40. Are concerned about my health.  
True Somewhat True Somewhat False False

41. Are friendly and courteous.  
True Somewhat True Somewhat False False

**The nursing home staff here at the nursing home:**

42. Get take-out food for me, if I want it.  
True Somewhat True Somewhat False False

43. Provide help in cutting-up my food.  
True Somewhat True Somewhat False False

**Since I came to the nursing home:**

44. I have been satisfied with the food service.  
True Somewhat True Somewhat False False