

Reliability, Validity, Sensitivity and Usefulness Testing of Dietetic Specific Monitoring and Evaluation Indicators and Measurement Scales

The American Dietetic Association (ADA) is soliciting membership participation in evaluating nutrition care outcome scales to be used by dietitians in the monitoring and evaluation of nutrition care interventions. Members may participate by designing and implementing a research project targeting evaluation of one or a combination of the following factors according to the Nutrition Care Process (NCP): reliability, validity, sensitivity and usefulness, or may participate in projects designed by fellow dietitians. This is an opportunity for all members to contribute to the development of the dietetics standardized language, published in the International Dietetics & Nutrition Terminology (IDNT) (1). ADA has the intention to generate some level of scholarship support for projects submitted.

Background

Three landmark publications, *Ensuring Quality Cancer Care* (2), *To Err is Human* (3) and *Crossing the Quality Chasm* (4) have changed the landscape of health care in America. These three reports, published by the Institute of Medicine, exposed the enormous quality gaps that exist in our nation's health care delivery system and have instigated a powerful national initiative to improve the quality, safety and reduce process variation in our nation's health care delivery system. The new national health care agenda calls for transition to an electronic health record by 2014, focuses on evidence-based practice, quality indicators and outcome measures. The Institute of Medicine's definition of quality is "The degree to which health services for individuals and populations increase the likelihood of desired health outcomes and are consistent with current professional knowledge." In response to this mandate, the American Dietetic Association (ADA) developed a comprehensive model called the Nutrition Care Process and Model accompanied by a dietetic specific standardized language to standardize the *process* of nutrition care delivery, demonstrate efficacy and effectiveness, and enable nutrition professionals to compete successfully in a rapidly changing environment (5). Use of a standardized language allows nutrition professionals to compare outcomes for large numbers of patients across practice settings, diagnoses, age groups, or other factors of interest. Scales developed to communicate progress on specific nutrition care outcomes related to reference standards or treatment goals require validation by practitioners in both clinical and community settings.

Purpose of Monitoring and Evaluation (M & E)

M & E is the fourth step in the NCP and is routinely done to determine whether nutrition intervention goals and objectives are being achieved. It is the process used to quantify the amount of progress the patient/client or target group has made as a result of a specific nutrition intervention designed for a single client or targeted population. M & E terms have been standardized to enhance communication within and outside the profession of dietetics, improve the consistency and quality of nutrition care and ensure precision in measuring nutrition care outcomes. Data collected as a part of this step is frequently pooled and aggregated to form an outcome management system (1).

The following steps are involved in M & E (1):

- Nutrition monitoring – preplanned review and measurement of selected nutrition indicators relevant to a target population's or client's nutrition diagnosis, nutrition intervention, and desired outcome, to determine the effectiveness of nutrition care in improving nutrition related knowledge, behavior and/or nutritional status.
- Measuring outcomes – Assessment of the results of nutrition intervention on preselected nutrition indicators relevant to the nutrition diagnosis, etiology and signs and symptoms. May reflect a

change in such things as a client's nutrition related knowledge, attitude, food or nutrient access and/or intake, lab values or anthropometric measures.

- Evaluating outcomes against criteria – A judgment made about the degree of progress made toward a nutrition related outcome, based upon a comparison of current measures of one or more nutrition care indicators with nutrition intervention goals and objectives. Program goals and objectives may be based on science-based reference standards (e.g., national, institutional, and/or regulatory standards), or an individual nutrition prescription or goal.

Terminology used in monitoring and evaluation is the same as that used in nutrition assessment with the exception of the Client History category of terms. The categories of nutrition care outcomes include:

- Food/Nutrition-Related History
- Anthropometric Measurement
- Biochemical Data, Medical Test, and Procedures
- Nutrition- Focused Physical Findings

In the past, many nutrition experts focused on medical, disease and health related outcomes. These are important, but the goal of the NCP incorporating standardized language is to measure and report nutrition care outcomes which support health and disease outcomes (e.g., incidence or severity of disease), cost outcomes (e.g., decreased hospital and/or drug utilization) and patient outcomes (e.g. disability and quality of life). Lack of a standardized process and language has impeded measurement of nutrition specific outcomes and public policy advocacy related to the value and impact of nutrition care (6, 7).

Reliability, Validity, Sensitivity and Usefulness Evaluation and Testing Validity is a concept concerned with the extent to which an instrument actually measures what it is supposed to measure. It is assessed through different facets (content, construct, criterion, discriminant, and predictive validity). Reliability reflects the amount of error inherent in any measurement. Sensitivity to change corresponds to the property of an instrument to identify small but clinically significant changes in attitude or practice.

Reliability is an estimation of the consistency or repeatability of a measurement. It reflects the degree to which an instrument or scale measures the same way each time it is used under the same condition with the same subjects (8). A reliability coefficient is frequently used to report an estimate of reliability. There should be compelling evidence that consistent results are achieved across raters (inter-rater reliability) and across measurement occasions (9). Two methods commonly used to estimate reliability are test/retest and internal consistency measurement.

Validity is an indication of how well an instrument measures what it is truly supposed to measure. There are numerous types or facets of validity. Face validity is the easiest to establish. It reflects whether a test or scale appears to measure what it is intended to measure. Content validity is similar, but requires more rigorous testing to establish that the concept being measured represents all essential aspects of the outcome measured (e.g., adherence takes into account patient report and biomarkers if both are deemed necessary to define adherence). Construct validity is a bit harder to establish. This means that a test or scale is really measuring the construct it intends to measure. This is frequently used in psychometric testing and ensures that an instrument designed to measure a construct such as breastfeeding self-efficacy is truly measuring self-efficacy and not a similar construct such as outcome expectancy or motivation (10).

Sensitivity or responsiveness to change is an important attribute of an M&E scale. It must be able to detect small, but clinically significant changes in a phenomenon over time. This may be done by comparing longitudinal measures of the same outcome i.e., at baseline and discharge or a series of

measures over time (11). A nutrition outcome indicator cannot have more than one scale. For example, if a scale is designed to reflect significant improvement in plasma glucose, implementation of the scale must be appropriate in both the ICU setting and with patients enrolled in a diabetes self management clinic. The scale needs to be sensitive to changes in both situations.

Usefulness of nutrition care outcomes measures means that concepts being measured are clear, unambiguous, universally understood by nutrition experts and represent key patient/client states, behaviors, and perceptions that are sensitive to nutrition care interventions. Nutrition professionals must be able to measure key outcomes easily and with confidence.

History of M & E Terminology and Scale Development by other Allied Health Disciplines

The American Dietetic Association is not alone in pursuing discipline specific outcome measures and scales. Professional organizations including nursing, physical therapy, occupational therapy, and speech-language pathology have also taken similar action due to concerns about accountability for patient/client outcomes (12,13,14,15). These groups define and measure outcomes sensitive to their professional interventions and are working to have these outcomes included in national data sets routinely analyzed for health policy decisions. Essential for adoption of outcome measures by a profession is evaluation of the reliability, validity, sensitivity to change and usefulness of M & E indicators and measurement scales. Demonstration of the ability of outcome measures to support dietetic efficacy and effectiveness research will increase practitioner confidence in these measures and lead to incorporation of terms and scales into universal electronic clinical documentation systems. This will simplify routine use of the NCP and language permitting routine collection of dietetic relevant data in large national data sets, in turn facilitating further development of the profession's knowledge base.

American Speech-Language Hearing Association

The speech-language pathology and nursing disciplines were willing to share the processes they used for evaluating intervention outcomes. In 1993, the American Speech-Language Hearing Association (ASHA) formed a task force to evaluate existing nationally aggregated databases and database collection systems for outcomes relevant to functional communication and found existing systems were not sensitive enough to measure outcomes relevant to their professional work. Over the following two years, advisory groups were formed to initiate the development of a national database for speech-language pathologists and audiologists working with adults and children in both school and health care settings. In 1997, the National Outcomes Measurement System (NOMS) was developed, which was diagnosis specific and reflected seven gradations of functional communication and/or swallowing ability. In 2008, eight of the 15 Functional Communication Measures (FCM) from the Adult National Outcomes Measurement System (NOMS) were submitted and endorsed by the National Quality Forum and have become part of the public domain. Examples of these scales and information about their development and use can be accessed on the ASHA website

(<http://www.asha.org/members/research/NOMS/default.htm>). In short, the process for developing the speech-language pathology outcomes and scales involved (14,15):

- Advisory group(s) identified patient characteristics that would affect each of the outcome measures.
- Measures were then drafted into 7 gradations of change.
- After extensive review, face validity was established through peer review with 100-150 certified speech-language pathologists.

- Measures were field tested across the continuum of healthcare settings. Analysis was performed on the feedback from field-test sites.
- Based on these results, the outcomes were revised, peer-reviewed and sent again for field-testing. The peer-review, field-testing and revision process was repeated until consensus was reached on the face validity of each measure.
- Scenarios were developed for each measure for reliability testing.
- A non-random sample of members was chosen to score scenarios. Further revisions of the measures were made based on scenario scoring.
- The peer-review, field-testing and revision process was repeated until the final measures were approved.
- Additionally, the outcome system also underwent external assessment through an independent review organization, Psychometric Technologies, an independent body in Hillsborough, North Carolina. They found the Speech-Language Pathology outcomes to be valid measurement tools.

Appendix A provides a more detailed description of this process. Scales developed by ASHA are significantly different than those currently being considered by ADA, since each scale developed is diagnosis specific and based on seven stages of functional communication and swallowing ability. The NCP/SL Committee determined that this was not a practical approach for the field of dietetics, since outcomes are more diverse in nature and must be very specific to the nutrition problem and intervention. For example, if a client has a stated nutrition diagnosis of “excess carbohydrate intake”, a functional scale would not adequately describe progress toward a goal.

ADA did glean some lessons from the ASHA process. A review of existing databases revealed a lack of dietetics specific nomenclature. ADA established the Nutrition Care Process/Standardized Language (NCP/SL) Committee composed of expert dietetic practitioners and researchers, to define the NCP and specifically, define nutrition problems/diagnoses commonly treated by dietitians. These diagnoses are in the process of being validated by dietitians in the field (16,17). Terminology used in nutrition assessment, intervention and monitoring and evaluation was also delineated and defined. Terms were sent to experts practicing in the field to establish face validity and were published in the IDNT Reference Manual.

Nursing Profession

The nursing community also recognized the need for a national system to assess outcomes achieved through nursing intervention. Starting in the 1990s, the Iowa Outcome Project Research Team developed and published a Nursing Outcomes Classification (NOC) system, which defines nursing outcome indicators and includes five-point Likert-type measurement scales (1 is always the worst and 5 is always the best score) (13). A description of the techniques they used to evaluate the NOC is provided in their manual (13). Fehring's methodology for assessing content validity of nursing diagnoses was used with minor revisions to estimate content validity and sensitivity to nursing interventions (18). Whitley, 1999 recommended concerted effort to support group research activities that target priority areas of language development. This research might include: concept analysis, expert validation, clinical validation, instrument development, larger studies, powerful statistical analyses, replication and comparison of studies (19). These recommendations have been incorporated into these proposal guidelines.

Interrater reliability was assessed by two registered nurses who rated patient's independently within the same half hour to one-hour period in the acute care setting , within the same day in the long-term care setting and the same patient visit in the ambulatory care setting. If rater's agreement was less than 80%, they discussed the rationale for the differences and each repeated the rating. Both ratings were captured along with the reasons for the differences in data collection.

Interrater agreement was assessed to ensure stable and consistent outcome evaluation across raters. Absolute agreement (percentage of identical paired ratings for the same outcome label) and near agreement (numerical ratings for the same outcome label that do not differ by more than 1 value on a 5-point Likert scale) were calculated. A level of 0.80 for near agreement and 0.60 for absolute agreement were established as acceptable levels of agreement. Nurses involved in the study were novices in using the outcome language.

Intraclass correlations (ICC), a method to estimate the agreement among multiple paired ratings of the same phenomenon among members of a group, was calculated. This technique was used as the final analysis of interrater reliability and an ICC of 0.70 or better was considered acceptable evidence of interrater reliability.

Validity was evaluated for those outcomes for which there were standardized tools to measure the same or similar outcome. For example, the NOC for “compliance behavior” was compared to the existing measurement tool published by DiMatteo et al, 1992 titled “Medical Outcome Study General Adherence Scale” (17). Generally, outcomes scales related to physiological outcomes (i.e., vital signs) were not available. Measures that exactly matched the NOC definitions were frequently difficult to find. Nurses were asked to compare outcomes and criterion measures within areas of their specialization. Only 40 of 330 outcomes have been evaluated in this way and analysis of variance showed a higher correlation score for NOC ratings and criterion measures when the criterion tool was judged to be a close versus a moderate match with the outcome measured. Because standardized tools selected to assess validity frequently represented only a moderate representations of the exact meaning of the NOC, a criterion estimate for validity was set at $r = .050$ or higher, coupled with statistical significance of $p < 0.05$. Criterion measures were not found for knowledge and many physiological outcomes (e.g., v vital signs).

Tools selected to report outcomes must be sensitive to change. Nursing outcomes were not designed specifically to assess change, but assessed outcomes related to the same criteria each time (e.g., a scale such as never, rarely, sometimes, often and consistently demonstrated would be used each time). Random samples of masters prepared nurses, working in diverse practice settings were used to validate each outcome and its associated indicators along with their sensitivity to nursing interventions. Nurses rated the importance of each indicator for assessing the outcome and the contribution of nursing care to that outcome (19).

To assess usefulness of the NOC, practitioners were asked to comment on data collection forms about any problems associated with evaluating the outcomes using the provided scales and to provide suggestions for revisions (13).

Characteristics of the Nursing Standardized language include:

- Easy to use organizational structure
- Targets patients, family, caregivers and community
- Used in all settings and specialties
- Research-based/grouped in practice
- Developed inductively & deductively
- Pilot studies and field tested, then published
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Figure 1 shows the types of scales incorporated in the NOC. Note the 5-point Likert-type scale with anchor terms moving from 1 to 5 indicating improvement. At present, the NOC consists of 17 different scales. Figure 1, illustrates five of these scales. Outcomes are assessed using this type of scale after each nursing intervention. Progress is assessed by comparing scores on subsequent visits e.g., knowledge was “Limited” at visit one and is “substantial” at visit three.

Figure 1. Sample of NOC System Scales

Title	1	2	3	4	5
Systolic/ Diastolic Blood Pressure	Severely compromised	Substantially compromised	Moderately compromised	Mildly compromised	Not compromised
Knowledge	None	Limited	Moderate	Substantial	Extensive
Social support	Not adequate	Slightly adequate	Moderately adequate	Substantially adequate	Totally adequate
Self-care indicators	Never demonstrated	Rarely demonstrated	Sometimes demonstrated	Often demonstrated	Consistently demonstrated
Sensory function: Taste & Smell	Severe deviation	Substantial deviation	Moderate deviation	Mild deviation	No deviation

The Iowa Outcome Project Research Team received a four-year grant to conduct psychometric testing in variety of settings on the NOC system and resulted in the following:

- Six scales retired, two scales added
- “Other” removed as an indicator
- Anchor terms modified
- 330 outcomes
 - 161 not been evaluated for reliability, validity, sensitivity and clinical usefulness with clinical data
 - 169 outcomes tested, but further testing desired

Dietetic M&E Scale Development

The dietetics profession requires reliable, valid, sensitive and useful outcome indicators and scales to demonstrate the impact of nutrition intervention. It is desired to have these measures as soon as is practical to facilitate measuring outcomes and research and to incorporate terms and scales into electronic medical record templates currently being developed. The 2006-2007 ADA NCP/SL Committee decided to take the following action:

- First, publish the nutrition care outcomes and indicators in the upcoming publication, along with the references related to the criteria and sample documentation examples. This is a significant step toward enabling demonstration of the impact of nutrition care.

- Next, consider options for a more detailed approach to testing and/or validating the indicators and scales, such as the approach taken by the speech-language pathology discipline. Time and cost considerations would need to be evaluated.

Appendix B contains a summary of the NCP/SL Committee discussions regarding several nutrition monitoring and evaluation scale options considered. No decision was made regarding a scale method to use. Slides provide further background for this discussion and are found in Appendix C. The use of a 5-point Likert-type progress scale was demonstrated; the slide set includes an example of how the scale might be used. The 2006-2007 NCP/SL Committee spent considerable time evaluating scale options. Scales evaluated are included in Appendix D. Scales found in Section A of this appendix are the final product of the committee's work. The committee acknowledged that further input from practitioners and researchers was necessary to identify the optimal scale methodology to utilize.

Aim/Purpose of Project: The purpose of this project is to provide a structure to guide evaluation of the reliability, validity, sensitivity and/or usefulness of nutrition care outcomes (described in the IDNT Reference Manual) and proposed measurement scales suggested by the American Dietetic Association NCP/SL Committee. The goal is to engage faculty, students and practitioners from diverse areas of dietetic practice to submit research proposals with the purpose of evaluating nutrition care outcomes and the associated indicators. Broad participation of the membership will ensure the language reflects practice needs and will instill confidence that scales used to report nutrition outcomes are reliable. This report outlines the terms (listed in the IDNT Reference Manual) and scales most urgently in need of evaluation. The hope is to be able to solicit funds to provide scholarship dollars to researchers involved in these projects.

Proposal Guidelines

The following guidelines are provided to assist researchers and coordinate efforts made to validate and test nutrition care outcome indicators and scales. Proposals should be submitted to Ms. Kay Howarter, Senior Research Manager, Research and Strategic Business Development, khowarter@eatright.org for review, recommendations and potential funding. Proposals should include the following four components: introduction, methodology (to include identification of the study population and sample, the nutrition care indicator (s) to be evaluated, scales to be evaluated, a description of the research design and data collection methods), timeline and references. **Proposals are to be submitted by April 15 and November 15th.** A committee of experts will evaluate proposals and identify those to receive funding within 30 days of these dates. Six months following funding, an interim report is required describing progress in accordance with the established timeline, preliminary findings and may include questions researchers may have.

Components of the research proposal are described in detail below.

1. **Introduction:** Include background, research question and sub-questions, hypothesis (if applicable), and definition of terms.
2. **Methodology:** Use of sound methodology is essential to evaluate nutrition care indicators and scales. A combination of quantitative and qualitative research techniques may be used. Harris and colleagues reviewed key components of food and nutrition-related qualitative research including the research question, objectives, study design, sample selection, methodology, outcomes and conclusions (20). This article found in Appendix E may be of value in guiding this work. If research is to be accomplished as part of a thesis or doctorate, a member of the ADA research staff or NCP/SL Committee can be appointed as a mentor or could serve on an academic committee.

- a. **Identify the population and study sample:** Describe the rationale for selecting the population, study sample, sample size determination, and the recruitment method. If you are involving practitioners, in the final report, describe their practice setting and number of years the practitioner has been in practice. An overview of ADA membership and practice characteristics is available as a part of the ADA/Commission on Dietetic Registration Compensation & Benefits Survey results found in Appendix F. This may prove helpful when developing a sampling plan.

Since the same outcome scale must be used across practice settings, it may be desirable to recruit a cross-section of practitioners from a variety of practice settings likely to use a particular outcome. ADA will provide researchers e-mail access to members in the following Dietetic Practice Groups (DPGs) for the purpose of recruiting practitioners who may be willing to participate in a nutrition care outcome scale development project.

Clinical Nutrition Management
Consultant Dietitians in Health Care Facilities
Diabetes Care and Education
Dietetics in Physical Medicine and Rehabilitation
Dietitians in Nutrition Support
Healthy Aging
Medical Nutrition Practice Group
Nutrition Education for the Public
Oncology Nutrition
Pediatric Nutrition
Public Health/Community Nutrition
Renal Dietitians
Research
Sports, Cardiovascular and Wellness Nutrition
Weight Management
Women's Health

Additional methods may also need to be employed to recruit an adequate sample. Among ADA members, hardcopy surveys reap a much better response rate (40% to 68%) than on-line surveys (15-20%). When a hardcopy survey is sent and an online option is given, a small minority (e.g. 17%) complete the survey on line (discussion with Chris Reidy, Senior Director, Commission on Dietetic Registration/Credentialing, Feb 2009).

- b. **Selection of Nutrition Care Indicators to Evaluate:** The NCP/SL Committee has recommended the indicators listed in Appendix G be the focus of initial scale development projects. These indicators were selected because they are commonly used by many practitioners, represent a variety of outcome domains and include nutrition care monitoring and evaluation indicators identified in ADA Evidence Analysis Library Nutrition Care Guidelines. Researchers may wish to select one or a combination of these nutrition care outcomes and/or indicators to evaluate as part of this project. Nutrition care outcomes and indicators are clearly defined markers that can be observed and measured and are used to quantify change in the patient's/client's or target group's nutrition diagnosis, etiology and/or signs/symptoms as a result of nutrition intervention.

The high frequency nutrition care indicator list includes intake of energy, food, fluid/beverages, breast milk and infant formula, enteral and parenteral nutrition and all macronutrients. Also included are knowledge, behavior (adherence), and physical activity and function indicators. All anthropometric measures were included on the list along with lab values found in the electrolyte and renal profile, glucose/endocrine profile and lipid profile. Two types of nutrition-focused physical findings were included – bowel function from the

digestive system and blood pressure from vital signs. Initial focus on these indicators will reap maximum impact and lessons learned may be applied to indicators in the same class.

- c. **Scale(s) to Evaluate:** Appendix D describes nutrition care outcome scales considered by the NCP/SL Committee and criteria considered important to scale development. It is the scales listed in Section A in this attachment that the committee would like evaluated for reliability, validity, sensitivity and/or usefulness. The scale is intended to communicate the degree of change in the indicator (progress made) from baseline toward a science-based criteria or an individualized goal/expected outcome.
- d. **Describe the research design:** Methods used to evaluate nutrition care indicators must be grounded in research and well described. If a component of the research aim and purpose, each of the following should be described:
 - Method used to evaluate reliability
 - Method used to evaluate validity
 - Method used to evaluate sensitivity
 - Method used to evaluate usefulness
- e. **Data collection and analysis:** Describe data collected and method of analysis used in the evaluation.

3. Reference list

Include key references used in the proposal.

4. Timeline

Describe your timeline in detail including implementation of components of the research design, analysis, report writing and submission.

Final Report

If funded, the proposal must be completed and report submitted within 18 months of notification of acceptance. The final report must include the sections described above detailing the methodology used along with added sections for results, discussion and recommendations.

Results

Describe the study sample in terms of practice setting and practice level. Describe findings.

Information to answer the following questions would be useful.

- a. Were monitoring and evaluation indicators sufficient to reflect nutrition care outcomes (e.g., indicators listed under "Fat Intake" represented the correct nutrition care indicators)
- b. Were units of measure recommended on monitoring and evaluation reference sheets appropriate?
- c. Was the scale useful for reporting M&E progress? Would it be helpful as coded information in an electronic medical record?
- d. Was a 5 point Likert scale appropriate? Why or why not?
- e. Were the anchor terms on the scale appropriate? Why or why not?
- f. Was the scale adequately sensitive to change? Describe
- g. Was there a clear distinction between ratings of 2 and 3, and 3 and 4? Describe
- h. Was the scale reliable? Describe
- i. Was the scale a valid method to report progress? Describe

- j. What recommendation would you have for changing the scale and why?

Discussion

Discuss findings including strengths and weaknesses of scales and indicators.

Recommendations

Make final recommendations regarding monitoring and evaluation indicators and scales based upon the findings of the research.

Point of Contact for Questions

Please contact Ms Kay Howarter, Senior Research Manager at the American Dietetic Association at khowarter@eatright.org or 312-899-4797, if you have any questions.

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Appendix A American Speech-Language-Hearing Association (ASHA) National Outcomes Measurement System (NOMS) Scale Development

Development of NOMS Functional Outcomes Measures:

In 1993, ASHA formed a Task Force on Treatment Outcomes and Cost Effectiveness that was initially charged with determining the suitability and usefulness of existing nationally aggregated databases and database collection systems. The task force was comprised not only of ASHA members with expertise in research and payment policies, but also advisors from the Department of Veterans Affairs, National Institutes of Health and the National Rehabilitation Hospital. The task force also included advisors from the private sector.

After an exhaustive search of existing measures, the Task Force concluded that none were comprehensive or sensitive enough to account for speech-language pathology interventions. The task force found that different types of functional measures would be needed based on the population and that distinct approaches would need to be developed for speech-language pathology services.

Development process for Functional Communication Measures (FCMs):

- ASHA solicited input via publications, communication with larger health care facilities, presentations and other public input regarding specific treatment areas on which FCMS should be based.
- Speech-language pathologists with a wide variety of clinical expertise were appointed to advisory group(s) that met to discuss the target measures. The goal of the advisory group(s) was to identify those patient characteristics that would impact each of the measures, and the typical sequence through which patient's progress on their way to fully-restored functionality. Based on input from advisory group(s), ASHA staff drafted information into 7 gradations of change and FCM draft(s).
- Based on input from the advisory groups, the FCMs were revised and follow-up conference calls with advisory group members were convened until consensus for FCM draft(s) was reached.
- Face validity of each FCM was established through peer review with 100-150 certified speech-language pathologists once the advisory group agreed on the draft.
- After **face-validity** was established, the measures were field tested across the continuum of healthcare settings including acute care hospitals, acute care rehabilitation units, inpatient rehabilitation hospitals, skilled nursing facilities, and other outpatient settings.
 - Analysis was performed on the feedback from field-test sites. Based on these results, the FCMs were revised, peer-reviewed and sent again for field testing. The peer-review, field testing and revision process was repeated until consensus was reached on the face validity of each measure.
- Scenarios were developed for each FCM for the purposes of **reliability testing**. For pre-implementation reliability testing, patient case histories at various levels of functioning were randomly selected and scored on the FCMs by 50 – 100 SLPs. A minimum of 80% reliability of scoring was needed.

- A non-random sample of members was chosen to score scenarios.
 - Further revisions of the FCMs were made based on scenario scoring.
- The peer-review, field testing and revision process was repeated until a final FCM was approved.
- The FCMs were finalized and implemented into NOMS.
- To ensure **continued rater reliability**, each speech-language pathologist (SLP) participating in NOMS must complete the self-study training program and pass the SLP User Registration Test prior to initiating the data collection process. In the SLP User Registration Test for the Adult and Pre-Kindergarten Components, the SLP scores a series of case histories using the applicable FCM(s) and must receive a score of 80% or greater to be approved for participation.

Additional Reliability and Validity Testing:

NOMS underwent extensive external assessment through an independent review organization. Psychometric testing was undertaken by Psychometric Technologies, an independent body in Hillsborough, North Carolina. They found NOMS to be a valid patient assessment and outcomes measurement tool and reported as such in their 2002 “Validation of the Adult Version of the ASHA Functional Communication Measures.”

Outcomes Measured:

- The NOMS scales were developed to measure outcomes of therapeutic intervention.
- Scales are chosen by the speech-language pathologists (SLP) at admission to SLP services based on the recommended treatment plan to depict the amount of change in communication and/or swallowing ability after speech and language intervention. For each case entered into NOMS, the speech-language pathologist selects specific FCM(s) based on the patient’s actual cognitive, communication, and/or swallowing impairments. By scoring the FCMs that specifically relate to the patient’s treatment program, clinicians can assess the amount of functional change for the current level of care. The scales document a person’s status with regard to individualized goals and reflect functional outcomes from admission to discharge of SLP services.
- The FCMs are *not* dependent upon administration of any particular formal or informal assessment measures, but are clinical observations provided by the speech-language pathologists of the patient’s communication and/or swallowing abilities to be addressed in an individualized treatment plan.
- In addition to scoring the FCMs, clinicians collect data on the following pieces of information: age, medical/SLP diagnoses, gender, race/ethnicity, funding, current/previous treatment setting, prior SLP services, frequency/intensity of services, service delivery, reason for discharge.

NOMS Functional Communication Measures:

- ASHA’s NOMS utilizes Functional Communication Measures, (FCM) a series of disorder-specific rating scales designed to describe the change in an individual’s functional communication ability over time, from admission to discharge, in various

speech-language pathology treatment settings. The full set of Adult FCMs consists of 15 scales: (1) Alaryngeal Communication; (2) Attention; (3) Augmentative-Alternative Communication; (4) Fluency; (5) Memory; (6) Motor Speech; (7) Pragmatics; (8) Reading; (9) Problem Solving; (10) Spoken Language Comprehension; (11) Spoken Language Expression; (12) Swallowing; (13) Voice; (14) Voice Following Tracheostomy; and (15) Writing. (see sample below)

- Each scale contains seven discrete gradations of change designed to gauge progress in the areas most commonly addressed by speech-language pathologists. Each scale ranges from least functional (level 1) to most functional (level 7).
- Ordinal scales (fair, good, better, best) seemed to be the best way for speech-language pathologists to capture functional progress in areas related to treatment. For the purposes of NOMS, multi direction scales did not seem to be beneficial. Scales that went from least functional to most functional level captured regression as well as progress. For example, an individual could start at a Swallowing FCM level 3 and progress to an FCM level 5 or that individual could start at a level 3 and decline to a level 2 at discharge. Other data points captured could identify contributing factors for progress or decline in status. Reason for discharge in NOMS data collection is identified (treatment goals met, decline in medical status, etc.)
- Status and behavior classification are incorporated into each scale and clearly defined within context of scale. Each level of the FCMs contain references to the intensity and frequency of the cueing method and use of compensatory strategies that are required to assist the patient in becoming functional and independent in various situations and activities. Both the amount and intensity of the cueing are considered in scoring an FCM. Separate classification scales can be used; however definitions must be clearly defined (e.g. difference between somewhat below vs. significantly below, quantification of rarely > 20% of the time, occasionally 20-24% of the time, etc). Quantifying patient outcome by current status, behavior and level of knowledge are important markers. Could one scale sufficiently quantify this information?
- For the purposes of NOMS, use of a limited scale (3-5 pt) did not allow for sufficient quantification of level of functioning, level of assistance/supervision needed, etc.. This was part of rationale for expansion to 7-point rather than 5-point scales.
- Use of 7 point scale allowed us to quantify an individual's performance from total independence to total assistance where as use of smaller scale often combines levels (i.e. combines a level that describes an individual's abilities anywhere from total to moderate assistance).
- Monitoring progress could be determined procedurally. For NOMS, outcomes are captured at 2 points in time. Scales could be scored at admission and discharge or monthly, etc.
- For NOMS, treatment goals are determined by clinician and scales are used at the initiation of treatment. Long term and short term goals are identified by the treating clinician and documented on a monthly basis. Projected outcome measures are not reported as part of NOMS documentation, only initial and discharge scores to depict the amount of functional change as a result of treatment. There is a mechanism for modifying NOMS (i.e. new target area addressed or discharged) using an Add/Close Form.

Practical Application:

Healthcare organizations participate in NOMS and submit outcomes data to national registry. Individuals have access to data reports profiling facility specific and national data. Facilities may also run customized analyses of their data as well as the national data. The data is being utilized by clinicians and administrators in demonstrating the importance of speech-language pathology services. It is useful in caseload planning and management as well as with meeting state and federal guidelines. It can answer questions such as: on average, how many sessions are needed to treat an adult with a specific problem (ie. swallowing problems)? How much gain will a patient demonstrate during a given time period within a specific treatment setting? How long will it take to get to a non-functional level to a functional skill level?

Sample FCM: Adult Component

Spoken Language Comprehension

- Level 1:** The individual is alert, but unable to follow simple directions or respond to yes/no questions, even with cues.
- Level 2:** With consistent, maximal cues, the individual is able to follow simple directions, respond to simple yes/no questions in context, and respond to simple words or phrases related to personal needs.
- Level 3:** The individual usually responds accurately to simple yes/no questions. The individual is able to follow simple directions out of context, although moderate cueing is consistently needed. Accurate comprehension of more complex directions/messages is infrequent.
- Level 4:** The individual consistently responds accurately to simple yes/no questions and occasionally follows simple directions without cues. Moderate contextual support is usually needed to understand complex sentences/messages. The individual is able to understand limited conversations about routine daily activities with familiar communication partners.
- Level 5:** The individual is able to understand communication in structured conversations with both familiar and unfamiliar partners. The individual occasionally requires minimal cueing to understand more complex sentences/messages. Individual occasionally initiates the use of compensatory strategies when encountering difficulty.
- Level 6:** The individual is able to understand communication in most activities but some limitations in comprehension are still apparent in vocational, avocational, and social activities. The individual rarely requires minimal cueing to understand complex sentences. The individual usually uses compensatory strategies when encountering difficulty.
- Level 7:** The individual's ability to independently participate in vocational, avocational, and social activities is not limited by spoken language comprehension. When difficulty with comprehension occurs, the individual consistently uses a compensatory strategy.

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Appendix B

Nutrition Monitoring and Evaluation Scale Development Discussion

Objective: To develop reliable and valid scales that indicate the impact of nutrition care on nutrition monitoring and evaluation indicators.

Background: At the August 2008 NCP/SL Committee meeting, the members reviewed outcome scales adopted by other allied health professions e.g. nursing and speech-language pathology, and those considered for adoption by the dietetics field. Case studies were reviewed to assess the functionality of various types of scales. The lesson learned from this exercise was the importance of well-defined goals associated with each monitoring and evaluation indicator. The desire not to radically change dietetic practice was voiced.

Concepts discussed thus far include:

- o Scale specific to the M&E indicator, not the diagnosis or clinical setting
- o Reflect type/magnitude of progress from baseline toward criteria
- o Criteria may be a reference standard or patient specific goal
 - o Reference standards are more objective and clinically meaningful
 - o Client goals are a moving target
 - Subjective, lack meaning over time
 - Do not allow for cross comparison
 - o Many M&E indicators have no reference standard
 - o Some reference standards are not in the realm of possibility for some patients, but are valid for comparison e.g., patient may not meet ATP III goals, so medication may be the appropriate next step
- o With limited length of stay, scale must be able to indicate even slight progress
- o Use of the scale should not influence practice (e.g. RDs set smaller goals to show progress)
 - o Assist in uniform collection/evaluation of data (lack of progress from baseline should signal need to re-evaluate the intervention)
 - o Simplicity desired

Issues:

- o Scales must be reliable, valid and sensitive to provide added value
- o Scales used by other allied health professionals require clinical judgment and are in the process of validation (see Table 1)
- o Measurement of magnitude of change toward a reference standard is more meaningful outcome measure than a magnitude of change toward a client goal

Discussion:

- o **Option 1:** 3-point progress scale (assessment from baseline)
 - o Easy to use, but low precision
 - o Adequate to assess type of progress, but not magnitude
 - o Fails to indicate the significance of progress over time e.g., 5mg/dL vs 50 mg/dL cholesterol reduction at 4 wks vs 8 wks achieve the same rating

Progress from baseline (3 pt)	1 Regression from baseline	3 No change from baseline	5 Improvement from baseline
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- o **Option 2:** Five-point progress scale (assessment from baseline)
 - o Requires interpretation e.g., differentiation between some/significant progress
 - o Provides slightly more precision
 - o Value diminishes over time since the criteria is baseline e.g., all the progress could have been made the first month, with very little further progress

Progress scale (from baseline)*	1 Regression	2 No change	3 Some progress	4 Significant progress	5 Goal achieved
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- o **Option 3:** Scale based upon level of achievement of the reference standard/goal
 - o Evaluate present status against the reference standard/goal
 - o Other allied professionals use this model (Table 1 shows nursing scales)
 - o Progress is the delta between baseline and current status
 - o Can move up and down the continuum during care
 - o Scale validity and reliability are critical issues
 - o Not all indicators have a reference standard (goals are less meaningful)
 - o Scale characteristics discussed previously
 - o 5-point Likert scale – adequate precision
 - o Uniformly organize worst to best score e.g., energy intake – (5) met, whether goal ↑ or ↓ intake
 - o Scores need to be consistently meaningful

Sample nursing outcome scale anchors

Title	1	2	3	4	5
S/D Blood Pressure	Severely compromised	Substantially compromised	Moderately compromised	Mildly compromised	Not compromised
Knowledge	None	Limited	Moderate	Substantial	Extensive
Social support	Not adequate	Slightly adequate	Moderately adequate	Substantially adequate	Totally adequate
Self-care indicators	Never demonstrated	Rarely demonstrated	Sometimes demonstrated	Often demonstrated	Consistently demonstrated
Deviation from standard	Severe deviation	Substantial deviation	Moderate deviation	Mild deviation	No deviation

Change in rating score represents the outcome achieved from the intervention e.g., knowledge moved from none to moderate

Sample application:

M&E Indicator: **LDL-cholesterol (lipid profile)**

Client with LDL level 160 mg/dl, reference standard 100 mg/dl

Date	LDL level	Discrete progress scale (3 pt)	Progress from baseline (5 pt)	Deviation from standard
1/1/08	160	Baseline	Baseline	2
4/1/08	140	5	3	3
7/1/08	120	5	4	4
10/1/08	100	5	5	5

M&E Indicator: **Wt change**

Weight management client, current weight 180; reference standard for % weight change in weight mgmt: 10% wt loss over 6 - 12 months*

Date	Weight	% wt change	Discrete progress scale (3 pt)	Progress from baseline (5 pt)	Deviation from standard
1/1/08	180	Baseline	Baseline	Baseline	Baseline
3/1/08	173	3.9%	5	3	2
5/1/08	170	5.5%	5	4	3
7/1/08	175	2.7%	5	3	2

*Wt change reference standards differ by circumstance/practice setting e.g., wt gain vs wt loss; pediatric vs adults; this reference standard is time dependent

M&E Indicator: **Self-reported adherence:** Patient reports there adherence on a scale of 1-10; Goal 8

Date	Self-reported adherence	Discrete progress scale (3 pt)	Progress from baseline (5 pt)	Deviation from standard
1/1/08	5	Baseline	Baseline	Baseline
3/1/08	5	3	2	3
5/1/08	3	1	1	2
7/1/08	7	5	4	4

M&E Indicator: **Knowledge level** (inadequate, basic, moderate, comprehensive) Goal is comprehensive knowledge

Date	Knowledge level	Discrete progress scale (3 pt)	Progress from baseline (5 pt)	Deviation from standard
1/1/08	Inadequate	Baseline	Baseline	Baseline
3/1/08	Basic	5	3	2
5/1/08	Moderate	5	4	3
7/1/08	Moderate	5	4	3

Key questions:

How will scale information be used?

Is the intent to close the NCP by documenting M&E follow-up (progress vs no progress—insufficient progress not necessary)?

Will information be treated as an outcome measure and compared across clients and healthcare settings?

Is a qualitative description of magnitude of change important?

Which option most closely meets the need of the dietetic profession at this point in time?

Scales Development

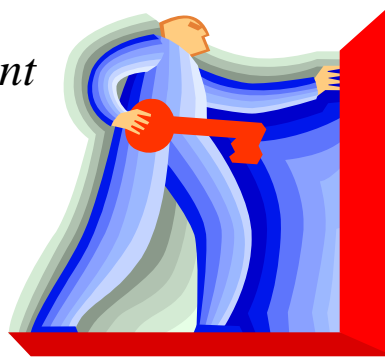
Joanne M. Spahn, MS, RD, FADA

August 19, 2008

NCP/SL Goals

- ☛ Give visibility to RD's health care contribution
- ☛ Promote uniformity within profession
- ☛ Incorporation of nutrition data in EHR
 - RD data in large national, international data sets
- ☛ Facilitate measures of efficacy/effectiveness
- ☛ Evaluate structural/process innovations
- ☛ Key for RD play in health care policy formulation

*Quantification of outcomes
key
to goal accomplishment*

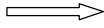
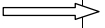
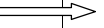

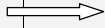




Background

- ☛ '06-'07 committee addressed M&E
 - Identified, organized/defined nutrition care indicators
 - Addressed criteria: previous status, intervention goals, reference standards
 - Explored scale options
- ☛ '07 – '08 committee focused on assessment
 - Expanded nutrition care indicator data set
 - Refined groupings/definitions

M&E Data Linked to Outcomes

Cascade of Nutrition Care and Health Care Outcomes

	Nutrition Care Outcomes				Health Care Outcomes		
	Food/Nutrition-Related History	Anthropometric Measurements	Biochemical Data, Medical Tests and Procedures	Nutrition-Focused Physical Findings	Health and Disease Outcomes	Cost Outcomes	Patient Outcomes
INTERVENTION	 Improved nutrient intake, knowledge, behavior, access, and ability and nutrition quality of life.	 Normalization of anthropometric measures.	 Normalization of biochemical data, tests, and procedures.	 Normalization of physical findings.	 ↓ Risk Improvement of disease or condition. Prevention of adverse event.	 ↓ Diagnostic and treatment costs. ↓ Hospital and outpatient visits.	 ↓ Disability ? Quality of life.

Nutrition Care Outcomes

- ☛ Practitioner/nutrition care impact independently
- ☛ Linked to nutrition intervention goals
- ☛ Measurable with available tools/resources
- ☛ Occur in reasonable time period
- ☛ Logical and biologically or psychologically plausible stepping stones to other health care outcomes (e.g., health and disease, cost, and patient/client outcomes)

Definitions

- ☛ **Nutrition monitoring**—pre-planned review and measurement of selected nutrition care indicators
- ☛ **Nutrition evaluation**—systematic comparison of current findings with previous status, goals, effectiveness of overall care, or reference standard
- ☛ **Nutrition care outcomes**—results of nutrition care that are directly related to the nutrition diagnosis and the goals of the intervention plan

Nutrition Care Indicator

- ☛ Marker reflects nutrition relevant outcomes
 - Linked to nutrition diagnosis and intervention
- ☛ Evaluate against established criteria
 - Nutrition prescription/goal (e.g., behavior change)
 - Reference standard (e.g., intake goals)
- ☛ Evaluate change – progress toward goal
- ☛ Document change in indicator using scale
 - Degree indicator changed to meet criteria

Purpose of Scale

- ☛ Describe nutrition care outcomes
- ☛ Reflect type and magnitude of progress
- ☛ Assist in uniform collection of data

Strategic Plan Required

- ☛ Immediate need due to EHR development
- ☛ Nutrition care outcome data vital
- ☛ Step care approach desired
- ☛ Create scales
- ☛ Create strategic plan to validate
 - Elicit researcher/practitioner support
 - Field test/solicit feedback (e.g., usability, additions)
 - Assist with psychometric integrity testing
 - Link assessment tools/methods

Nursing Outcomes

- ☛ Standardized language used
- ☛ Easy to use organizational structure
- ☛ Targets pts, family, caregivers, community
- ☛ Used in all settings and specialties
- ☛ Research-based/grounded in practice
- ☛ Developed inductively & deductively
- ☛ Pilot studies & field testing → published
- ☛ 4-year grant received for psychometric testing in variety of settings

Result of 4-Year Grant

- ☛ Six scales retired, two scales added
- ☛ “Other” removed as an indicator
- ☛ Anchor terms modified
- ☛ 330 outcomes
 - 161 not been evaluated for reliability, validity, sensitivity and clinical usefulness with clinical data
 - 169 outcomes tested, but further testing desired

Nurse Outcome Scales

- ☛ 17 measurement scales
- ☛ 5-point Likert-type scale
- ☛ 1 is always worst/5 always best score
- ☛ Primary & secondary scales for some indicators
- ☛ Outcome content references cited

Nursing Measurement Scales

NOC Scale	1	2	3	4	5
a	Severely compromised	Substantially compromised	Moderately compromised	Mildly compromised	Not compromised
b	None	Limited	Moderate	Substantial	Extensive
c	Severe deviation from normal range	Substantial deviation from normal range	Moderate deviation from normal range	Mild deviation from normal range	No deviation from normal range
d	Not adequate	Slightly adequate	Moderately adequate	Substantially adequate	Totally adequate
Fall Occurance	10 and over	7-9	4-6	1-3	None
e	Never demonstrated	Rarely demonstrated	Sometimes demonstrated	Often demonstrated	Consistently demonstrated
f	Poor	Fair	Good	Very good	Excellent

Strategies for Testing

- ☛ Content analysis
- ☛ Concept analysis
- ☛ Survey of experts
- ☛ Similarity analysis
- ☛ Hierarchical clustering analysis
- ☛ Multidimensional scaling
- ☛ Usefulness tested in 10 clinical field sites

Speech Pathology

- ☛ Functional Communication Measures (FCM)
- ☛ Drafted by advisory group
- ☛ Face validity - peer review
- ☛ Field tested across the continuum of HC settings
- ☛ Peer-review, field testing/revision cycle repeated

Atch 1

FCM Scales

- ☛ 15 disorder-specific rating scales
- ☛ Based upon treatment plan
- ☛ Status related to individualized treatment goals
- ☛ Continuum 1- least functional to 7- most functional
 - Captures regression as well as progress
 - Amount/intensity of cueing considered in scoring
- ☛ Ordinal scales (fair, good, better, best) capture functional progress

FCM Scales in Practice

- ☛ Healthcare organizations participate
 - Submit outcome data to national registry
- ☛ Data demonstrates value of services and best interventions
- ☛ Self-study training required
- ☛ Registration test ensures rater reliability

Dietetics Scale Development

Phase one

- Identify, define and organize nutrition care outcomes
- Expert review for face validity of indicators
- Publish – initiate peer-review, field testing and revision process
- Initiated dietetic scale concept development

Dietetic Scale Development

Phase II

- Refine nutrition care outcome scales
- Develop test plan
 - Validity, reliability and specificity of measures
 - Field testing (continuum of care settings)
- Engage researcher/practitioner involvement
- Publish scales and plan in 2010 publication

Phase 1: Scale Criteria

- ☞ Clear, easy to use
- ☞ Indicators neutral (blood glucose level vs blood glucose control)
- ☞ Scale = degree indicator meets criteria
 - Nutrition prescription/goal
 - Reference standard
- ☞ Scores need to be consistently meaningful
 - Energy intake – (5) met, whether goal ↑ or ↓ intake

Atch 2

Phase 1: Scale Criteria

- ☞ Continuum rather than discrete (met/not met; improved/stabilized/deteriorated)
- ☞ 5-point Likert scale – adequate precision
- ☞ Uniformly organize best/worst score
 - Score of 1 always worst; score of 5 always best

5-Point Likert Scales

Title	1	2	3	4	5
Progress	Regression from goal/ reference standard	No change from goal/reference standard	Some progress toward goal/reference standard	Significant progress toward goal/reference standard	Goal/reference standard achieved
Knowledge	None	Limited	Moderate	Substantial	Extensive
Access	None	Limited	Moderate	Substantial	Extensive
Readiness to Change	Precontemplation	Contemplation	Preparation	Action	Maintenance
Nutrition QoL	Regression from baseline		No change from baseline		Improvement from baseline

Progress Scale

- ☛ Food and nutrient intake
- ☛ Anthropometric measures
- ☛ Biochemical data, medical tests and procedures
- ☛ Nutrition-focused physical findings

Progress Scale

Score	Application of Scale Terms
1	Regression – change in opposite direction than desired
2	No change – zero or very little change in intake; patient/client has not yet made progress toward achieving this goal/standard
3	Some progress – intake is moving in the right direction; patient/client has made some positive change to achieve goals and must continue to identify strategies to modify intake
4	Significant progress – intake data clearly moving strongly in the right direction; patient/client actions are having desired impact; moderate adjustments in action plan necessary to achieve goals
5	Goal achieved - patient/client actions have resulted in goal achievement; development of maintenance skills may be necessary

Progress Scale Application

Biochemical Test

Comparison to Goal or Reference Standard

1) Goal: The patient/client's serum triglyceride level is 490 mg/dL. The goal is serum triglycerides < 250 mg/dL. (Note: while reference standards are generally used for laboratory measures, a goal might be used in a special situation such as a patient/client with a familial hypertriglyceridemia where a normal reference standard of <150 mg/dL may not be realistic.)

2) Reference standard: The patient/client's LDL cholesterol is 159 mg/dL compared to the NHLBI recommended level of < 100 mg/dL.

Sample Scale Application

Serum Triglycerides mg/dl	Rating		LDL Cholesterol mg/dL	Rating
490	<i>Baseline (from assessment or previous contact)</i>		159	<i>Baseline (from assessment or previous contact)</i>
500	1—Regression		175	1—Regression
490	2—No Change		159	2—No Change
400	3—Some Progress		145	3—Some Progress
300	4—Significant Progress		115	4—Significant Progress
250	5—Goal Achieved		<100	5—Goal Achieved

Sample Documentation

Initial encounter with patient/client	The patient/client LDL cholesterol is 159 mg/dL compared to the NHLBI reference standard of < 100 mg/dL, and triglycerides are 490 mg/dL with goal, based on family history, of 250 mg/dL. Will monitor LDL cholesterol and triglycerides at next encounter in 3 months.
Re-assessment after nutrition intervention	The patient's LDL cholesterol is 145 indicating Some Progress toward goal/reference standard of <100 mg/dL (score = 3). Triglycerides are 300 indicating Significant Progress toward goal of 250 mg/dL (score = 4).

Progress Scale Application

Food/Nutrient Intake

Comparison to Goal or Reference Standard

1) Nutrition prescription or goal: Patient's current fat intake of 50% of total calories is > client goal to reduce fat intake to less than 40 mg/day

2) Reference standard: Patient's fat intake of 50% of total calories per day is above the Adult Treatment Panel III guidelines of less than 30% of total calories per day.

Sample Scale Application

% Calories from fat	Rating applied
50%	No rating; baseline established
55%	1
47%	2
36%	4
31%	4

Sample Documentation

Initial encounter with patient/client	Based upon a three-day food diary, patient/client consuming approximately 50% of calories from fat. Will monitor fat and calorie intake at next appointment.
Re-assessment at a later date	Significant progress toward the recommended intake of 30% calories from fat. Based on a three-day food diary, patient/client fat intake decreased from approximately 50% calories from fat/day to approximately 36% calories from fat/day.

Plans for Today

- ☛ Review current scales
- ☛ Apply them to case studies
- ☛ Identify pro's and con's of scales
- ☛ Identify potential improvements
- ☛ Plan development for validity, reliability, and field testing across the practice spectrum

Appendix D Nutrition Monitoring and Evaluation
Scales Considered by the 2006-2007 NCP/SL Committee

The purpose of nutrition care indicator scales is to facilitate documentation of patient status now in terms of expected outcomes. Below are templates of scales considered to communicate patient progress toward goals. Incremental small change can be significant, therefore use of a Likert-type scale was thought to be more descriptive than a met or not met evaluation tool.

Many of our initial recommendations were based upon scales seen in the Nursing NOC book. We have received input from Speech-Pathology. Physical Therapy and Occupational Therapy professional organizations did not want to share this information.

Nutrition Monitoring and Evaluation, Scales currently being considered (Section A)

Nutrition-related behavioral-environmental outcomes domain: Progress, Knowledge, Readiness to change, Self-efficacy and outcome expectancy, and Access

Food and nutrient intake outcomes domain: Progress

Nutrition-related physical sign/symptom outcomes domain: Progress

Nutrition-related patient/client-centered outcomes domain: Nutrition quality of life

Nutrition Monitoring and Evaluation, Other scales considered (Section B)

Nutrition-related behavioral-environmental outcomes domain: Belief and attitude, Behavioral and cognitive strategies,

Food and nutrient intake outcomes domain: Intake

Nutrition-related physical sign/symptom outcomes domain: Deviation

Nutrition-related patient/client-centered outcomes domain: none

Nutrition Monitoring and Evaluation Examples (Section C)

Application of scales is demonstrated to stimulate thought. This was a case used early in the scale development period to assess the pro's and con's of template scales considered. This example uses the scale to compare patient data to baseline, most recent data collected and from goal (deviation scale).

Issues/considerations the TF identified

- Clear, easy to use
- Need scale that is consistent with how the TF has defined a scale which is “the degree to which the indicator meets the criteria”
- **Are we evaluating change or a point in time? A change in the amount of fat over X time or fat compared to the criteria (goal or reference standard).**
- 5-point scale
 - Thus far, the TF has agreed on the concept of left to right 1-5 if it is a 5-point scale
 - Distinguish 1-5?
 - Definitions help
 - Clinical judgment
 - Clinical significance, e.g., is a change from K⁺ 3.5 to a K⁺ 3.2 a clinically significant change?
 - In the chapter we note that selection and interpretation of the indicator is impacted by setting (critical vs. long-term care) population (peds vs. geriatrics), disease state and severity (lines 410-434 in ME Intro). This could affect clinical judgment and clinical significance.
 - Three of the current scales (knowledge, readiness, access) progress from 1=low score, 5=high score with 5 individually defined choices
 - Progress scale is unbalanced with the “no change” as a score of 2 verses a score of 3. Should it be a balanced scale with “no change” as a score of 3?
 - NQOL scale has only three choices, neutral in the middle, and a 5 point scoring system
 - Scores need to be consistently meaningful. For example:
 - If the goal is to increase energy intake and the patient meets the goal, the score is five (5) met goal.
 - If the goal is to decrease energy intake and the patient meets the goal, the score is also five (5) met goal.
 - Scale used for each Indicator rather than the overall outcome (format like nursing NOC book to make this clearer?)
 - Progress scale
 - Comparison to Baseline or Comparison to Most Recent Measure? Practitioners use both. Potential for error, confusion, and an additional degree of difficulty?
 - There must be two measures to use Progress scale. No scale rating for baseline. No scale rating if practitioners only see patient/client once. The progress scale seems to assess how the indicator meets the criteria over time. Does this meet our definition and need? The NCP article says, “Innovative methods can be used to contact patients/clients to monitor progress and outcomes.” It goes on to list mailings, phone follow-up as potential methods.
 - This scale could be used for most of the measures, which does reduce confusion compared to many different scales.

- Deviation scale (not currently in use)
 - There is no need to specify what the comparison points are since they are stated in the scale.
 - The word “deviation” may not be acceptable to some.
 - Could there be a “generic” deviation scale to encompass all of the measures
- 10 point scale
 - Needed for Self-efficacy and Outcome Expectancy Scale since this is consistent with how it is used in literature.
- Validation is important, but since very few scales have been validated, this should not be a barrier.

Practical points

- Provide scale on each reference sheet or in chapter—this may depend how many are used
- Indicate whether it is a validated scale or not
- Provide definitions for each score on the scale
- Provide example of how it is used in every reference sheet
 - Give an example of every score on the scale?
 - Emphasize that clinical judgment is used. A K⁺ of 3.9 will not always yield the same scale score.

SECTION A (Scales to be evaluated)

Progress Scale: This scale is not validated

1 Regression from goal/ reference standard	2 No change from goal/reference standard	3 Some progress toward goal/reference standard	4 Significant progress toward goal/reference standard	5 Goal/reference standard achieved
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Score	Application of Scale Terms
1	Regression – change in opposite direction than desired
2	No change – zero or very little change in ability to control portions; patient/client has not yet made progress toward achieving this goal
3	Some progress – ability to select and consume appropriate portion sizes is moving in the right direction; patient/client has made some positive change in portion control and must continue to hone this skill
4	Significant progress – ability to select and consume appropriate portion sizes of food is clearly moving strongly in the right direction; portion control abilities are close to desired; only moderate adjustments necessary
5	Goal achieved - patient/client demonstrated ability to select and consume appropriate portion sizes of food

Knowledge Scale: This scale is not validated

1 None	2 Limited	3 Moderate	4 Substantial	5 Extensive
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Score	Application of score terms
1	Material is new to patient/client, does not know terms or concepts
2	Able to verbalize pertinent information, knows common terms/concepts, but has difficulty answering application questions or demonstrating application
3	Understands and is able to explain facts, principles, and predict consequences; able to apply some information, but not consistently; when demonstrates application of information, needs coaching
4	Able to apply nutrition concepts and principles in new and practical situations, solves problems, uses correct methods/procedures; answers scenario questions well; can demonstrate application of knowledge in a variety of settings/circumstances
5	Possesses analytical skills, able to see patterns, recognize hidden meanings, infer, trouble shoot, recognize logical fallacies in reasoning; thorough knowledge; could teach others

SECTION A (Scales to be evaluated)

Readiness to Change Scale: This scale is not validated.

1 Precontemplation	2 Contemplation	3 Preparation	4 Action	5 Maintenance
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Score	Application of Scale Terms
1	Precontemplation – no recognition of need for or interest in change
2	Contemplation – recognition of need to change, and may do so in the next 5 months
3	Preparation – planning for change
4	Action – actively making lifestyle changes now and over the past 6 months
5	Maintenance – changed behavior is sustained for a period of time

Self-efficacy and Outcome Expectancy Scale: This scale is not validated.

Patient's level of confidence he/she can do a specific behavior (self-efficacy) or achieve a specific nutrition related outcome (outcome expectancy)	1	2	3	4	5	6	7	8	9	10
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1 = Not Confident

10 = Very Confident

Access Scale: This scale is not validated.

1 None	2 Limited	3 Moderate	4 Substantial	5 Extensive
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None	Consistent concerns or problems accessing a sufficient, reliable supply of safe, healthful food. Consistent reduction in patient/client food intake.
Limited	Recurring concern or problems accessing a sufficient, reliable supply of safe, healthful food. Recurring reduction in patient/client intake on a regular basis.
Moderate	Some concern or problems accessing a sufficient supply of safe, healthful food. Some reduction in patient/client intake, however not consistently.
Substantial	Occasional concern or problems accessing a sufficient, reliable supply of safe, healthful food. Little or no reduction in patient/client intake.
Extensive	Patient/client expresses no or minimal evidence of food insecurity.

SECTION A (Scales to be evaluated)

Nutrition Quality of Life Scale: This scale is not validated

1 Regression from baseline	3 No change from baseline	5 Improvement from baseline
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SECTION B

Belief and Attitude Scale:

1	2	3	4	5
Very weak	Weak	Moderate	Strong	Very strong

Behavior Scale:

Never demonstrated	Rarely demonstrated	Sometimes demonstrated	Often demonstrated	Consistently demonstrated
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AND later.....

Behavioral and Cognitive Strategies Scale:

1	2	3	4
Almost never	Sometimes	Often	Almost always

Knowledge Scale:

1	2	3	4	5
None	Limited	Moderate	Substantial	Extensive

Function Scale:

1	2	3	4	5
Severely compromised	Substantially compromised	Moderately compromised	Mildly compromised	Not compromised

Intake Scale:

1	3	5
Below desired range	Within desired range	Above desired range

Deviation Scale:

1	2	3	4	5
Severe deviation from goal/standard	Substantial deviation from goal/standard	Moderate deviation from goal/standard	Mild deviation from goal/standard	No deviation from goal/standard

SECTION C

Case 1: Inpatient with a daily serum K⁺ measurement. This would be part of the Biochemical Data, Medical Tests and Procedures Domain.

Nursing generally uses the deviation scale when looking at labs (which is what we recommended when the TF wanted a 5-point scale in November). They also use a scale from Severely Compromised (1) to Not Compromised (5). It is applied in some situations that contain labs (e.g., *mechanical ventilation* including PaCO₂, pH, respiratory rate, vent settings etc. and *immune status* including WBC count, T-8 cell count, skin/mucosal integrity etc). However, I just used the two we have recommended until now to look at the cases.

Progress Scale:

1 Regression from goal/ reference standard	2 No progress toward goal/reference standard	3 Some progress toward goal/reference standard	4 Significant progress toward goal/reference standard	5 Goal/reference standard achieved
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Deviation Scale:

1 Severe deviation from goal/standard	2 Substantial deviation from goal/standard	3 Moderate deviation from goal/standard	4 Mild deviation from goal/standard	5 No deviation from goal/standard
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Progress Scale Note: We specified that the Progress would be comparison of “baseline” to current. However, this still needed to be determined. I had two reviewers that questioned this saying it did not make sense to compare the current measure to baseline. Before I did this exercise, I thought perhaps this only applied to their specific situations (Lipids and HgbA1c in outpatient over many months). However, it applies frequently when looking at labs over short *or* long periods of time. As a practitioner, I would not compare the patient’s serum K⁺ today with baseline. I would compare the current measure with the last measurement, although, I would take into consideration previous levels (including baseline) and patient response to intervention. In research, I could certainly see that the research may compare current to baseline. None-the-less, it seems we would need to have the practitioners specify what they were using for the comparison in lieu of dictating to what the current measure must be compared. This could introduce error, confusion, and an additional degree of difficulty.

Deviation Scale: We did not specify what would be compared because it is stated in the scale.

Case 1: Normal range 3.5-5.0 mEq/L.

	Serum K+	Progress Scale (compared to baseline)	Progress Scale (compared to most recent measure)	Deviation Scale
Day 1	2.1	No rating-baseline	No rating-baseline	Severe (1)
Day 2	2.9	Significant (4)	Significant (4)	Moderate (3)
Day 3	3.2	Significant (4)	Some (3)	Mild deviation (4)
Day 4	4.0	Goal achieved (5)	Goal achieved (5)	No deviation (5)

Case 2: K+ in a hemodialysis outpatient situation where labs are done monthly. K+ tends to run higher than the normal standard of 3.5-5.0 mEq/L, but I have not found a reference saying X range is acceptable for a hemodialysis patient. Pam will know, but I think that this is done by facility and by patient.

	Serum K+	Progress Scale (compared to baseline)	Progress Scale (compared to most recent measure)	Deviation Scale
Mo 1	6.1	Baseline	Baseline	Severe (1)
Mo 2	6.4	Regression (1)	Regression (1)	Severe (1)
Mo 3	5.8	Some (3)	Some (3)	Substantial (2)
Mo 4	6.4	Regression (1)	Regression (1)	Severe (2)
Mo 5	5.7	Some (3)	Some (3)	Moderate (3)
Mo 6	5.2	Significant (4)	Significant (4)	Mild (4)
Mo 7	5.3	Significant (4)	No change (2)	Mild (4)
Mo 8	5.5	Significant (4)	Regression (1)	Moderate (3)
Mo 9	6.0	No change (2)	Regression (1)	Substantial (2)
Mo 10	6.2	No change (2)	Regression (1)	Severe (1)
Mo 11	6.3	Regression (1)	No change (2)	Severe (1)
Mo 12	6.4	Regression (1)	No change (2)	Severe (1)

SECTION C

Case 3: Calcium intake in 65 yo female outpatient. DRI (AI) is 1200 mg/day. This is Food and Nutrient Intake, Minerals.

	Ca++ intake	Progress Scale (compared to baseline)	Progress Scale (compared to most recent measure)	Deviation Scale
March 1	500	No rating-baseline	No rating-baseline	Severe (1)
March 20	900	Significant (4)	Significant (4)	Moderate (3)
April 20	1100	Significant (4)	Some (3)	Mild (4)
June 10	720	Some (3)	Regression (1)	Substantial (2)

Perspectives in Practice



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An Introduction to Qualitative Research for Food and Nutrition Professionals

JEFFREY E. HARRIS, DrPH, MPH, RD; PHILIP M. GLEASON, PhD; PATRICIA M. SHEEAN, PhD, RD; CAROL BOUSHEY, PhD, MPH, RD; JUDITH A. BETO, PhD, RD, FADA; BARBARA BRUEMMER, PhD, RD

ABSTRACT

The purpose of this article is to define qualitative research, explain its design, explore its congruence with quantitative research, and provide examples of its applications in dietetics. Also, methods to ensure validity, reliability, and relevance are addressed. Readers will gain increased knowledge about qualitative research and greater competency in evaluating this type of research. The hope is that food and nutrition professionals will be inspired to conduct and publish qualitative research, adding to the body of peer-reviewed dietetics-related qualitative publications. This type of research must be methodically planned and implemented with attention to validity, reliability, and relevance. This rigorous ap-

proach boosts the probability that the research will add to the scientific literature and qualify for publication.

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To many food and nutrition professionals the term *research* elicits thoughts of data, numbers, measurement, controls, controlled environments, reliability, randomized clinical trials, interventions, and outcomes. Epistemologists refer to this as quantitative research (1-3). It is well suited to testing the effectiveness of interventions, evaluating outcomes, mining statistical associations, and elucidating the effects of risk factors. When phenomena are not easily measured, processes must be evaluated, knowledge is limited about a culture, or reasons must be discerned for outcomes a different approach is warranted.

Epistemologists acknowledge that the best approach to the aforementioned situations is qualitative research, which is particularly relevant to the applied science of dietetics (1-3). Figure 1 contains terms and definitions important to qualitative research. To completely understand nutrition and food-related phenomena, an appreciation of qualitative research is essential. As with quantitative research, qualitative research requires meticulous attention to elements such as research questions, objectives, study design, sample selection, methodology, outcomes, and conclusions to be valid, reliable, and relevant. The purpose of this article is to define qualitative research, explain its design, examine its congruence with quantitative research, and provide examples of its applications in dietetics.

CHARACTERISTICS OF QUALITATIVE RESEARCH

Qualitative research produces findings not derived from standard statistical procedures or other means of quantification. It is defined as a naturalistic approach that seeks to understand phenomena in uncontrolled, context-specific settings (1,4). For example, suppose a clinical trial using a university-based cardiovascular risk reduction program tailored for African-American men was highly effective in reducing risk factors. When the pro-

J. E. Harris is an associate professor and didactic program director, Department of Health, West Chester University, West Chester, PA. P. M. Gleason is a senior fellow, Mathematica Policy Research, Geneva, NY. P. M. Sheean is an instructor, Northwestern University Feinberg School of Medicine, Chicago, IL. C. Boushey is an associate professor and director, Coordinated Program in Dietetics, Purdue University, West Lafayette, IN. J. A. Beto is a professor, Nutrition Sciences, Dominican University, River Forest, IL. B. Bruemmer is a senior lecturer, Department of Epidemiology, director, Didactic Program in Dietetics, and technical advisor, Center for Public Health Nutrition, University of Washington Graduate Program in Nutritional Sciences, Seattle, WA.

Address correspondence to: Jeffrey E. Harris, DrPH, MPH, RD, Department of Health, 302 Sturzebecker Health Sciences Center, West Chester University, West Chester, PA 19383. E-mail: jharris@wcupa.edu

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Term	Definition
Epistemology	Study of theories of knowledge or ways of knowing, particularly in the context of the limits or validity of the various ways of knowing. An epistemologist studies the acquisition of knowledge (3).
Qualitative research	Approach that produces findings not derived from standard statistical procedures or other means of quantification. Defined as a naturalistic approach that seeks to understand phenomena in uncontrolled, context-specific settings, in which data are not numbers, but text, audio, or visual (1,2,4).
Quantitative research	Approach in which findings are derived from standard statistical procedures and other means of quantification. Experiments are conducted under controlled conditions in which data are numbers. The gold standard for this type of research is the randomized, controlled, clinical trial (1,2,4).
Induction	Method of study that begins with observation and is followed by derivation of conclusions (4).
Deductive	Method of study that collects data to determine if they are consistent with predetermined assumptions and hypotheses (4).
Ethnography	Research method that observes social systems, cultures, and social life, including activities of daily life (4,5).
Grounded theory	Systematic examination of qualitative data (eg, transcripts of interviews or protocols of observations) aiming at the generation of theory (3,4,5).
Phenomenology	Study of peoples' first-hand emotions, attitudes, thoughts, meanings, perceptions, and bodily experiences as or after they have experienced a phenomenon (3,4,5).
Symbolic interaction	Investigation of how people create meaning based on social interactions. Qualitative methods are used such as participant observation to observe relationships between people and the nature of social interaction in a setting (3,4,5).
Narrative	Life histories or biographies are collected to understand a phenomenon (3,4,5).
Participatory action research	Approach that involves planning and implementing an action and then observing the effect, taking into consideration the setting, characteristics of the community, culture, interveners, materials used, methods used, and other important factors to get a complete understanding of the effect of the intervention. Qualitative version of a clinical trial (3,4,5).
Case study	Meticulous investigation of individuals, groups, institutions or other social units. A subsequent report is written describing the unit (3,4,5).
Purposive sampling	Intentional sample selection based on a specific characteristic or characteristics (1,4,5,11).
Maximum variation sampling	Purposeful selection of a wide variety of participants to get a balanced perspective (1,4,5,11).
Extreme case sampling	Selection of participants who are extremes for the purpose of comparing and contrasting the extremes (1,4,5,11).
Homogeneous sampling	Selection of like participants to study their culture and experiences of phenomena (1,4,5,11).
Criterion sampling	Definition of a variety of criteria a participant must meet to be included in the sample for specificity of examination (1,4,5,11).
Theoretical sampling	Selection of participants based on the possession of a given theoretical concept characteristic or characteristics (1,4,5,11).
Snowball sampling	Purposeful selection of participants who identify others who would be interesting to add to the sample to best understand a phenomenon. Those individuals, in kind, are asked to identify more people until participant saturation has been reached and there are enough participants for the purpose of the study (1,4,5,11).
Focus group	Collection of seven to 12 individuals by purposive sampling who are asked questions relevant to general research questions and prompted to respond freely (13,19).
Delphi Technique	Method for reaching group consensus on any issue or phenomenon (4,19).
Field notes	Real time written or typed descriptions of sounds, interactions, settings, behaviors, processes, and activities (4,5,19).
Personal notes	Written or typed personal impressions, reactions, and memories (16).
Methodology notes	Writings about methods used, reasons for using those methods, and changes in methods (16).
Theoretical notes	Writings about emerging concepts, interrelationships, and hypotheses (16).
Content analysis	Approach to data collection that involves organizing, classifying, and summarizing qualitative data; writing a cohesive description of the setting, context, and people; discovering patterns and themes; determining the meaning of phenomena to participants; summarizing what has been learned as it relates to the research questions; conceptualizing hypotheses and theories; and deciding what to report to others (17,19).
Coding	Method in which classification codes are created either before or during qualitative data analysis to organize the data (4).
Triangulation	Method of data validation that involves multiple methods, sources, and/or investigators to promote cross comparison of results (19,23).
Respondent validation	Results are presented to the community of respondents and their comments are solicited on the accuracy of the conclusions. Respondents can confirm or disconfirm the accuracy of the results as well as comment on the methodology. This is also referred to as a member check (3,5,10).
Mixed methods research	Qualitative and quantitative research methods are combined in a single study to gain a fuller understanding of a phenomenon (24).
Constant comparison	Initial coding schemes are developed and as data are collected coding schemes are modified as the data warrants (17).
Practice-based research	Systematic inquiry into the systems, methods, policies, interventions, and programmatic applications in dietetics practice. Conducted in practice-oriented settings (36).

Figure 1. Key terms and definitions relevant to qualitative research.

gram is offered to African-American men, in a real-life community setting, it is only moderately effective. Qualitative research can be conducted to explore why the program was less effective in the naturalistic, community setting.

An individual researcher is the measuring instrument in qualitative research (1,4). She or he observes behavior in settings, conducts interviews with groups or individuals, takes notes, observes videotapes, evaluates documents, and/or analyzes interactions between people. In addition, the researcher analyzes textual, audio, and visual data and determines themes, concepts, meanings, emotions, and interaction patterns. She/he also links themes and concepts.

Words, sounds, and pictures are the data elements in qualitative research (1,4). These are captured in transcripts, audiotapes, videotapes, field notes, photographs, memos, and personal documents. Direct quotations are often presented as data.

Rather than definitive outcomes, processes are examined, including possible reasons for outcomes (1,4). An outcomes-oriented quantitative study might be supplemented by a qualitative approach that discovers the reasons for the outcomes. Suppose a feeding study comparing the effectiveness of a vegan diet to a typical Western diet in modifying inflammatory markers (eg, C-reactive protein) reveals no difference. Interviews with participants might reveal that those receiving the vegan diet did not enjoy its flavors and consumed animal products thus compromising the vegan diet. The reason for no effect was poor compliance to the vegan diet.

Qualitative research tends to be inductive (1,4). Theoretical positions and predefined hypotheses often drive quantitative research. Often, in qualitative research, data are collected and analyzed with the intention of generating theory and hypotheses.

A qualitative researcher is concerned with meaning, participant perception, and culturally specific language and symbols (1,4). He or she is not necessarily concerned whether research education is offered in dietetics education programs, but how program directors perceive this subject area and view the barriers and benefits to implementation. In the same way, nutrition policy experts might believe it is essential to have supermarkets in inner cities, but qualitative researchers are concerned with food companies' perceptions about urban areas and why they do not build them there.

A qualitative research study may not have all these characteristics, but will contain most.

Qualitative research is labor-intensive because of the necessity of detailed data gathering and the amount of observation that must be done. Also, similar to excellent quantitative research, superior qualitative research involves research questions, thorough planning, and methodical implementation, with special attention to validity, reliability, and relevance.

PURPOSES OF QUALITATIVE RESEARCH

The purpose of qualitative research is to discern the meanings people give to their experiences (5). It is of utmost importance to understand phenomena from the perspective of research participants.

Determine Causal Explanations of Phenomena in Their Natural Settings

A qualitative researcher might use qualitative methods to determine why politicians in Myanmar did not admit or distribute food supplies to their people after the spring 2008 cyclone. Investigators, through interviews with a sample of reliable Myanmar informants, determine the culturally specific reasons for the barriers to food assistance. Qualitative methods are used to identify situation-specific causes for phenomena.

Study the Process or Natural History of a Phenomenon

A clinical nutrition manager might use participant observation to study the natural history of the implementation of the Nutrition Care Process (NCP) in his or her facility (6). By examining memos and official documents from upper administration, field notes written as staff members are observed talking about the process, observations of in-service education sessions, and patient records this investigator can write a narrative of the implementation of the NCP. Lessons learned from this study can be used to improve implementation. If rigorous enough, this research may help food and nutrition professionals at similar clinical settings to introduce the NCP. Ways to ensure rigor will be addressed later in this article.

Understand the Culture, Traditions, Symbols, Perception, Emotions, Language, and Meaning of Phenomena to Participants

Suppose a nutrition support dietitian works in a hospital that serves a Latino community. She or he understands there is variation in how different cultures cope with end-of-life situations in their families. She or he believes it would be beneficial to study the meaning of the process of death in this community. She or he could use qualitative methods to study the ways in which people make decisions about nutrition support and hydration in end-of-life situations based on their cultural norms. This could help nutrition support practitioners effectively assist in this decision-making process.

Qualitative research is also used to understand the perceptions and emotions of people about an issue. These methods could be used to study physicians and their perceptions and emotions related to referring patients to food and nutrition professionals. Focus groups and interviews with physicians could be done to understand these perceptions and emotions with the intent of promoting strategies to improve relationships between food and nutrition professionals and physicians.

Describe the Context of Phenomena

Qualitative methods are used to understand the role of context in human life as it relates to food, dietary issues, and health behaviors (4,5). Instructors for an inner-city weight management program might find motivated participants are not engaging in the prescribed physical activity. Instructors convene focus groups of obese community members to determine environmental barriers to physical activity associated with their community. An understanding of the neighborhoods of weight management program participants might lead to the development of innovative approaches to physical activity.

Complement Quantitative Research

Qualitative research is complementary to quantitative research. This understanding is essential in applying a research approach that fully explores a phenomenon. This purpose is discussed in a subsequent section.

Generate Tentative Theories and Hypotheses

Through surveys it might be evident in particular school systems that foodservice directors are resistant to changing their menus to offer more health-promoting food choices. Through participant observation, interviews, focus groups, and document analysis, food and nutrition professionals devise a theory about foodservice directors' propensity to favor less health-promoting foods over those that are more so. Hypotheses are developed and tested using quantitative methods.

Describe an Unfamiliar Community or Culture

These methods are ideal for studying unfamiliar populations. For instance, food and nutrition professionals might find it a challenge to be person-centered with Orthodox Jews. A food and nutrition professional working in an Orthodox Jewish community would find it valuable to understand the food-related rules, traditions, and perceptions to effectively implement medical nutrition therapy. A non-Orthodox food and nutrition professional who chooses to participate or live in an Orthodox community could write a narrative describing the community so others can benefit from an understanding of the culture.

Validate Theory

Like quantitative research, qualitative research is helpful in theory validation. Theory-driven hypotheses can be tested using qualitative methodology to determine to what degree study evidence is consistent with the theory. Qualitative evidence can strengthen or weaken the usefulness of a theory. A qualitative approach could be used to validate the Health Belief Model as an explanation for human behavior (7). For example, factory workers are observed and interviewed to examine their consumption of fruits and vegetables. Evaluation of their perceptions of benefits, barriers, susceptibility to disease, and severity of disease related to fruits and vegetables could determine how well the Health Belief Model explains consumption. To what degree the evidence supports this model can confirm or disconfirm its usefulness.

Formative Evaluation

Qualitative methods are used to conduct formative program evaluation (1,4,5). Data from these methods are used in the process of accreditation of dietetics education programs by the Commission on Accreditation for Dietetics Education (8). Dietetics program faculty and site-visitors convene focus groups, conduct interviews, and observe activities to evaluate a dietetics education program.

QUALITATIVE METHODOLOGY

There are four components of qualitative research methodology: qualitative research strategies, methods of sampling, data sources and collection, and data analysis.

Qualitative Research Strategies

Qualitative investigators employ a variety of strategies. These strategies reflect an investigator's overall approach to addressing the research questions being studied. Within the framework of each strategy a variety of sampling and data collection methods are used. The most common strategies are ethnography, grounded theory, phenomenology, symbolic interaction, narrative, participatory action research, and case study (3,4).

Ethnography. Ethnography is the study of a social system, culture, social life, and activities of daily life, through observation. Often, an investigator will engage in cultural immersion to describe the culture. For instance, a food and nutrition professional working with the Special Supplemental Nutrition Program for Women, Infants, and Children serving an inner-city Hmong community studies the dietary habits of cultural Hmong. This professional lives in the Hmong community and participates in community events. She or he might live with a variety of Hmong families and participate in daily life. By immersing herself or himself in the Hmong community she or he can develop trust and be a first-hand observer of culture. Not only could she/he document her or his experience among the Hmong population, but interview informants about the foodways of the culture. In this way she or he develops a rich narrative of the culture and the daily life of Hmong individuals. With information derived from this approach the Special Supplemental Nutrition Program for Women, Infants, and Children may better serve this community.

Grounded Theory. This approach involves a research setting and asking the general question, "What is going on here?" or "What are the problems here?" but sometimes asking more specific questions such as, "How do parents of adolescent girls with anorexia nervosa cope?" Through the use of interviews, focus groups, and document analysis, an investigator allows the data to inform her/him. Rather than use pre-existing theory to structure the research, a researcher constructs situation-specific theory from the data. After the investigator derives concepts and themes from existing data, new data are analyzed and the concepts and themes are modified. The theory evolves as more cases are collected and eventually the theory is constructed. For instance, food and nutrition professionals could use existing research on generalized coping to help parents of young people with anorexia cope. However, the question arises, "Is the general coping theory appropriate for parents of people with anorexia?" It can be of practical value to construct coping theory specific to parents of people with anorexia to effectively promote healthful coping. Honey and Halse (9) conducted this kind of study. The grounded theory approach yields theory and hypotheses that warrant further testing in similar and diverse settings.

Phenomenology. Phenomenology attempts to understand people's emotions, attitudes, thoughts, meanings, perceptions, and bodily experiences as or after they have experienced a phenomenon. Suppose a food and nutrition professional wants to understand the experience of food stamp users in her/his community. Through the use of qualitative methods she/he could describe their thoughts, emotions, and perceptions. Whereas ethnographies focus

on describing a culture, phenomenologies focus on experiences of individual people. The goal is to determine themes about the perceptions of people about a phenomenon.

Symbolic Interaction. Symbolic interaction investigates peoples' creation of meaning through social interactions. Qualitative methods like participant observation are used to observe relationships between people and the nature of social interaction. The relationships, interactions, and meanings are described by investigators. For instance, a food and nutrition professional may find it useful to examine the relationships and interactions between people with bulimia in an inpatient eating disorder treatment program. She or he examines how the interactions facilitate progress or regression in treatment. Also, she or he studies the interaction patterns between parents and patients during individual counseling sessions to characterize the interactions that maintain the disorder.

Narratives. Narratives involve collecting life histories or biographies to understand a phenomenon. Suppose a food and nutrition professional in private practice specializing in people with celiac disease is interested in looking for themes related to food, family background, family history, human development, and disease history to increase the effectiveness of treatment and early detection. This professional could use a narrative approach. Through interviews, she or he compiles life histories of the study participants then analyzes the text for common themes and trends to understand these patients.

Participatory Action Research. Participatory action research is the qualitative version of a clinical trial. Investigators plan and implement an action and then observe the effect, taking into consideration the setting, characteristics of the community, culture, interveners, materials used, and methods to get a complete understanding of the effect of the intervention. Suppose a food and nutrition professional working on a college campus wants to develop a Web site for student athletes to improve knowledge, attitudes, and practices related to eating and hydration. He or she convenes focus groups of athletes, coaches, sports nutritionists, and athletic directors to develop the Web site. After development, the Web site is evaluated by these same constituents. Once the Web site is implemented for athletes the investigator collects qualitative data to assess the effectiveness of the Web site, reasons for effectiveness or lack thereof, and the thoughts, attitudes, and feelings of the constituencies. Also, quantitative data are collected in a mixed methods approach. (See [Figure 1](#) for a definition of mixed methods approach.) This iterative process is intended to improve the Web site. Often qualitative action research is implemented parallel to quantitative methods in a clinical trial to gain the benefits of both approaches.

Case Studies. These can be conducted on individuals or communities. A sample of like individuals is assembled and data are compiled into a community case. Describing several like cases has more validity than studying one individual. Treatment approaches and interventions are also recorded. Suppose a sports nutritionist studies the eating and training practices of older female triathletes with osteoporosis and tibial microfractures. She or he identifies as many triathletes as possible. With physicians' help she or he collects biochemical data, and con-

ducts a nutrition assessment, including lifestyle, training, food, and supplement data. Also, using interviews, she or he asks questions about the triathlete experience. She or he also documents the dietary and medical treatments for each and their progress. The sports nutritionist then examines the data for common and differing personal characteristics, treatment approaches, reactions to treatment, compliance, and treatment response. Finally, she or he writes a report describing emerging observations and themes.

A setting or geographical site can be treated as an individual case. A foodservice manager implements a program in her or his facility to promote good citizenship behaviors among the employees. This manager, based on observation, describes the facility and employees before the program. She or he describes the nature of the intervention, and the employees' reaction to it. Finally she or he describes through observation and interviews the effect of the program on the site. This is written as a case study of this foodservice operation. The overlap between this case study approach and action research is apparent.

Methods of Sampling

The term "sampling" conjures up concepts like probability sampling, stratified random sampling, and simple random sampling. In quantitative research the goal of sampling is a representative sample; that is, one that can represent a whole population. Then the results from the sample can be generalized to the larger population from which the sample was taken. In qualitative research probability sampling is used, but purposive sampling is more prevalent.

Purposive sampling is an intentional selection of a sample based on some characteristic ([1,10](#)). This sampling is done in a methodical way to find specific research participants. Sometimes the sample is chosen with a potential to generalize the results to the larger population of like individuals, but more often not. Patton ([11](#)) has identified 16 types of purposive sampling. The most common are described here: maximum variation, extreme case, homogenous, criterion, theoretical, and snowball ([11,12](#)).

Maximum Variation Sampling. Maximum variation sampling is the purposeful choice of a wide variety of participants to get a balanced perspective of a phenomenon. An undergraduate didactic dietetics program director might choose students with varying grade point averages to have a sample representing all levels of academic achievement to gain the best perspective of dietetics students about pursuing graduate training.

Extreme Case Sampling. Extreme case sampling entails selecting participants who are extremes for the purpose of comparing and contrasting them. For instance, an investigator selects exemplary and poor dietetics instructors to compare and contrast their teaching attitudes, approaches, and perceptions. The intention is to examine both best and worst practices in teaching to design interventions to improve teaching.

Homogenous Sampling. In homogenous sampling, an investigator chooses like participants to study their culture and experiences. Inner-city Hmong people is a homogenous sample. A subcategory of homogenous is criterion sampling. In this case, the investigator defines a variety

of participant criteria for the sample. Each sample member must meet the criteria. The example given previously about triathletes illustrates this. They were included in the sample if they were older women and had osteoporosis and tibial fractures.

Theoretical Sampling. In theoretical sampling participants are chosen based on the possession of a given theoretical concept characteristic/s. For example, a sample could be chosen with an external locus of control to determine its response to action research using motivational interviewing in nutrition counseling. The sample is chosen based on possessing a theoretical construct, external locus of control.

Snowball Sampling. In snowball sampling one participant is selected and asked to identify other like individuals who could be added to the sample to understand a phenomenon. Those recruited individuals are asked to identify more people until there are enough participants to understand a phenomenon. Say an investigator is interested in studying gay food and nutrition professionals. Such a sensitive issue must be handled with care and confidentiality. One individual may be identified and asked to identify others. In a subsequent step, those food and nutrition professionals would be asked to identify others. Snowball sampling is used when it is initially difficult to identify participants.

Sampling in qualitative research is not haphazard. It is purposeful and methodically planned. Sampling must be based on well-defined, predetermined research questions. Though the resulting purposive samples are often not representative of a broader population, they serve an essential purpose.

Data Sources and Collection

Qualitative data are collected by a variety of methods. The following are used: focus groups, interviews, observation, documents inspection, photograph inspection, the Delphi Technique, and Internet methods (1-5). Field notes are drafted from these methods. Field notes are discussed in detail later in this section.

Focus Groups. A focus group is seven to 12 individuals assembled by purposive sampling who are asked questions associated with the research questions and prompted to respond freely (13). Sessions are videotaped or audiotaped. Videotaping is used to gain insights from body language. Tapes are transcribed to have a written record of responses. Facilitators of groups maintain control and specify ground rules so that all members feel free to respond. Often multiple focus groups are conducted to obtain data from a variety of constituents and have enough responses to make meaningful conclusions. The chance to observe group interactions and behaviors, attitudes, and beliefs is an advantage over individual interviews. A limitation is the risk of biasing the focus group to obtain a desired response. Standardized methodology and rigorous attention to objectivity are essential.

Interviews. Interviews are conducted with individuals (14). Each member of a sample is interviewed to obtain detailed data. Interviews can vary in their structure. They can be structured, semistructured, or in-depth. The distinguishing factor between approaches is the use of open- or close-ended questions. In the structured inter-

view, questions are scripted and require a limited answer. For semistructured interviews there is an interview guide with open-ended questions, but answers are constrained by a limited list of topics. Free exploration of an issue is somewhat limited. In-depth interviews involve asking very general questions to prompt unbounded exploration of an issue. Follow-up questions are spontaneously created based on the answers of each participant. The best approach in qualitative research is the in-depth interview because the data are detailed, comprehensive, more representative of the phenomenon, and less biased. Interviews are videotaped or audiotaped and transcribed.

Observation. Observation involves the presence of the researcher in the naturalistic setting (15). Observational data are used to describe settings, people, processes, activities, interactions, and meanings of phenomena from the perspective of the participants. Observation leads to greater depth of understanding than focus groups or interviews because phenomena can be observed in context. Spontaneous discussions are more enlightening about reality than discussions in organized environments. A researcher can fully participate in the environment or be an observer. Members of the setting may not know they are being studied. Covert observation can pose ethical dilemmas, but a discussion of that is beyond the scope of this article. It is vital that observers record field notes at intermittent times to document the observations.

Internal and External Documents. Internal and external documents are valuable sources of qualitative data. Policy and procedure manuals, daily planners, memos, e-mail messages, personnel files, employee evaluations, mission statements, diaries, newspaper accounts, and accreditation documents are examined for data. Patterns and themes are discovered. For instance, memos circulated between diabetes course instructors may document frequent malfunctions of a vital diabetes education Web site. This information may generate hypotheses related to the ineffectiveness of a diabetes education program. Also, marketing materials and advertisements provide information about the way an institution projects itself.

Photograph Inspection. Photographs provide interesting snapshots of company or environmental activities. Photographs of a foodservice operation kitchen may reveal unsanitary conditions, which may contribute to possible foodborne outbreaks. Also, photographs may reflect the context of a phenomenon. Suppose an investigator is concerned about a rapid rise in the prevalence of obesity in a village in Chile. Photos from 5 years ago reveal no presence of quick-service establishments, but recent photographs show them lined up one after another along the main boulevard. This could be a contributor to the rise in obesity in the village.

Delphi Technique. The Delphi Technique is a group interviewing approach with the goal of having participants arrive at consensus on a given issue (4). Group members are solicited anonymously for their opinions or perspectives. Responses are circulated among members and prompts are given for them to rank the responses. Ranked responses are then circulated in a series of rounds. In each round lowest ranked responses are eliminated. Participants must rank an ever-shrinking list of responses until consensus is reached on a response or set

of responses. This represents the response of the group. For example, this technique could be used to determine the diabetes care issues of highest priority to Pima Indians with type 2 diabetes mellitus.

Internet Methods. Internet-based listservs, blogs, e-mail, and Web sites can be used to collect data. Professional listservs are used to pose questions to a delimited group of people. For example, an investigator could pose a question to the Dietetic Educators of Practitioners listserv about best teaching practices among dietetics educators and gather data about teaching strategies that could improve dietetics education. As with any method of gathering qualitative data, it is vital that an investigator using Internet methods do so within the context of systematic and methodical planning of the research study.

The data derived from these methods are typewritten or handwritten notes, called field notes. Field notes are descriptions of sounds, pictures, documents, interactions, settings, behaviors, processes, and activities (1,2,4,5). For example, a foodservice director studying citizenship behaviors observes employees over an extended period of time and writes field notes about friendliness, empathy, customer interactions, and encouragement or criticism. Transcripts from video or audiotapes from focus groups and interviews are also called field notes. There are three additional types of notes that are recorded: personal, methodology, and theoretical (16). Personal notes are personal impressions, reactions, and memories. Methodology notes are explanations for using certain methods, and descriptions of changes in methods. Theoretical notes are about emerging concepts, interrelationships, and hypotheses. In addition to field notes, these notes will be used during data analysis. So the outcomes of qualitative methods are written field, methodology, theoretical, and personal notes. Note taking technique is beyond the scope of this article, but technique and strategy must be planned before the data collection in alignment with predetermined research questions. For those interested studying note taking refer to Bernard (16).

A variety of methods exist for gathering qualitative data. Methods chosen are limited by funding, time the investigator can devote to the study, and number of staff members available to assist with data collection. If a team of individuals is required to gather data, they will need training so data are collected in a reliable and valid way. Training can be expensive and time consuming. In addition, the research questions influence the choice of method.

Data Analysis

Data analysis involves organizing, classifying, and summarizing qualitative data; writing a cohesive description of the setting, context, and people; discovering patterns and themes; determining the meaning of phenomena to participants; summarizing tentative answers to the research questions; conceptualizing hypotheses and theories; and deciding what to report to others. This process is called content analysis (17). The goal of content analysis is summarized as providing knowledge and understanding of the phenomenon under study. Data analysis often goes on simultaneously with data collection. In contrast,

Software	Web site
ATLAS.ti	www.atlasti.com/index.php
MAXQDA	www.maxqda.com
NVIVO 8	www.qsrinternational.com
QDA Miner 3.0	www.provalisresearch.com/QDAMiner/QDAMinerDesc.html
Qualrus	www.ideaworks.com/qualrus/index.html
Transana	www.transana.org

Figure 2. Select qualitative data analysis software and corresponding Web sites. NOTE: Information from this figure is available online at www.adajournal.org as part of a PowerPoint presentation.

in quantitative research data are gathered first and then analyzed. As data are collected in qualitative research they are analyzed so that research questions and methods can be refined or altered.

To identify themes and patterns qualitative researchers create classification codes either before or during the analysis to organize the data (4). These codes are derived from the research questions or key words or phrases that frequently appear in the text. For instance, if the study involves organizational citizenship behaviors among employees in a foodservice operation there could be codes for each of the five citizenship behaviors (18). Codes could be represented as ALT for altruism, CRT for courtesy, CV for civic virtue, CON for conscientiousness, and SPORT for sportsmanship. Every time words or phrases related to these concepts appear in the text, sentences or paragraphs containing them are bracketed and the code written next to the bracket. In this way text can be organized based on the codes. In addition, codes are derived from categories and subcategories suggested by the data. In some instances a method called constant comparison is used to analyze qualitative data (19,20). Initial coding schemes are developed and as data are collected coding schemes are modified as the data warrants. After the data are organized by codes, a description of the data is written and themes and interrelationships are synthesized. Ultimately tentative answers to research questions are given, and meanings and themes are described.

During analysis, connections with existing theories are described, theories are modified, or new theories offered. If the sample is appropriate, findings can be generalized to other similar settings and populations. For example, findings about citizenship behaviors in a suburban community hospital foodservice in a middle-income area may be able to be applied to other hospital foodservices with similar characteristics.

Considering the laboriousness of the process, computer software can expedite data analysis. Many software packages are available that can analyze qualitative data. Figure 2 provides a list of the commonly used software packages and their Web sites. Lewins and Silver (21) have published a review of such software. Software can assist with creating codes, organizing and summarizing data, searching for interrelationships between codes, and suggesting themes.

ENSURING VALIDITY, RELIABILITY, AND RELEVANCE

Specific strategies are employed in qualitative research to ensure validity, reliability, and relevance (10,20,22). Criticism and bias against publishing qualitative research are produced when there is lack of attention to these issues.

Long-term intensive involvement by an observer in a research setting increases the chances that participants' real behaviors, perceptions, and attitudes will be revealed because they trust their observer. In addition, enduring involvement allows an observer to make observations in a variety of contexts. This enables an investigator to capture the complexity of the phenomenon and modify methodologies to better capture meanings and perspectives. Longer duration of observation is associated with a more detailed and accurate perception of the phenomenon.

Detailed note taking enables investigators to present a rigorous description of the situation and capture the complexity of the interrelationships. Investigators keep detailed field, methodology, personal, and theoretical notes to have a set of data for fully examining the settings, people, and context. Validity has to do with approximating real phenomena, and richer data increases the probability of this.

Describing exception cases and integrating them into the discussion of results can balance investigator bias. For instance, a food and nutrition professional studies breastfeeding among rural Hispanics and the participants generally do not breastfeed. The study examines the reasons for this general trend. However, suppose a subgroup of rural Hispanics does breastfeed and those people are advocates of the practice. It would be vital in reducing bias to describe this exceptional situation and integrate it into the discussion of breastfeeding. It is also important to propose hypotheses about this exception.

Triangulation is used to increase the validity of a qualitative study (23). This entails using multiple methods, sources, and/or investigators to promote cross-comparison and validation of results. The validity of the conclusions of one method such as focus groups is strengthened if confirmed by another such as participant observation. Also, if different investigators examine the notes and other documents and arrive at similar conclusions this increases both validity and reliability. For instance, a food and nutrition professional studies how consumers make food choices during grocery shopping. To practice triangulation, she or he conducts a number of focus groups with different community members and also intermittently observes their shopping practices.

Another validity confirmation method is respondent validation (10). This is rarely used in quantitative research, but in some circumstance such as survey research would be a helpful practice to promote validity. Results are presented to the respondents, and they comment on the accuracy of the results. Respondents can confirm or disconfirm the accuracy of the results as well as comment on the methodology. If participants' perspective and meaning is to be represented, they are the best ones to say whether the results and conclusions have captured them appropriately. However, if there is incongruence between the findings and the reaction of the participants this is documented in field notes. An investigator may

still be convinced that a given finding is true and may speculate about the reasons for the incongruity.

In the pursuit of validity, comparison of results with similar qualitative studies can be done to search for consistency and discrepancies. Also, results are compared with existing theory derived from both qualitative and quantitative studies. Again, both consistencies and discrepancies are noted. The validity of a study is enhanced if results are consistent with other studies and, in the case of inconsistency, the discrepancies can be explained.

A clear, detailed exposition of methodology promotes validity. A narrative is drafted detailing the research strategy, sampling method, data sources, data collection methods, and data analysis. The narrative is written so that another investigator could repeat the study. Also, an investigator documents his or her prestudy biases so they are considered as readers interpret the results. In addition, auditors can be used to review the methods and data to ensure appropriate methods were used, and the data treated fairly.

In addition to validity, reliability is a concern. One way to ensure reliability is to use more than one person to analyze the data. Two or three trained analyzers of the data can evaluate the data independently and later compare results and interpretations to look for consistency. Greater consistency of results from different analyzers increases the chances that the findings are reliable. Multiple bouts of listening to audiotapes, reading transcripts, and viewing videotapes by the same person or different people can promote more consistency in results and interpretations. Note that even though reliability may be high, systematic bias may be present in the interpretation of data and that is why ensuring validity is important. Methods to ensure validity may uncover this systematic bias.

An investigator must document the potential usefulness of the results and establish their relevance within the context of the field of study. Can the results promote the development of food safety education strategies that can increase food safety practices in the setting or one like it? Will results about resistance to the NCP increase receptivity to it? The results may also advance the research about a phenomenon by offering hypotheses to be tested. In addition, a new theory may be suggested or existing theory modified to create a foundation for future research.

QUANTITATIVE VS QUALITATIVE RESEARCH

In some professional circles qualitative research is not considered valid research and therefore not publishable. Quantitative research is deemed the only approach to knowledge discovery. By others, qualitative research is considered an inferior approach compared to quantitative research and represents the lowest level of research. More recently, a perspective has been offered that considers quantitative and well-conducted qualitative research to be complementary (24-27). Figure 3 contrasts the characteristics of quantitative and qualitative research. The weaknesses in one can be compensated by the strengths of the other and vice versa (1,2,4). In fact, they should be used in concert to gain a complete picture of a phenomenon.

By understanding this complementary relationship,

Quantitative	Qualitative
Deductive	Inductive
Studies well-known phenomena	Often studies unknown or little-known phenomena
Testing of hypotheses and theories	Development of hypotheses and theories
Conducted in controlled settings	Conducted in naturalistic settings
Large number of subjects	Smaller number of targeted participants
Standardized numerical data collection	Textual, audio, and visual data collection
Data gathered first, then analyzed	Data gathering and analysis occur simultaneously
Statistical analysis	Content (text, audio, and video) analysis
Explore outcomes due to treatments, manipulations and outcomes	Explore complex issues and interactions between humans, reasons for outcomes, and processes

Figure 3. Contrasting characteristics of quantitative and qualitative research. NOTE: Information from this figure is available online at www.adajournal.org as part of a PowerPoint presentation.

progressive epistemologists have encouraged the use of mixed methods research in an attempt to achieve greater reliability and validity (24). Mixed methods research combines quantitative and qualitative research approaches in a single study. Mendlinger and Cwikel (24) describe five purposes for mixed methods research: corroboration of findings across different methods, one method enhancing or clarifying specific findings of the other, using results from one method to assist in the design of methods for the other, highlighting conflicting findings and paradoxes, and extending the breadth of a study.

In mixed methods research qualitative methods can be used before, after, or simultaneously with quantitative methods (24). Frequently qualitative methods are used to enhance questionnaire development for subsequent quantitative research. Also, focus groups are used to develop strategies for successfully selecting, recruiting, and retaining members of a target population for a quantitative study. With clinical trials, qualitative methods can be used simultaneously with quantitative methods to document the application of treatments, and determine the reasons for treatment effectiveness or ineffectiveness. Qualitative research might follow quantitative research to explore with greater depth a phenomenon once a problem or issue is identified by quantitative research.

Quantitative and qualitative research are complementary. Well-conducted qualitative research should not be considered second-rate to quantitative research. Qualitative research can be methodically planned and systematically designed to produce valid, reliable, and relevant results. Progressive journals are publishing more qualitative research (27). Food and nutrition professionals could add value to the field by conducting carefully designed qualitative research using mixed methods research.

APPLICATIONS TO THE FIELD OF DIETETICS

Dietetics is a promising and relevant field for the conduct of qualitative research. Combining qualitative and quantitative research can provide a more complete exposition of a phenomenon, especially in dietetics where human behavior and behavior change play an important role. The field of dietetics could be enriched by food and nutrition professionals publishing well-designed qualitative studies. Practitioners are encouraged to design and conduct the best qualitative studies possible within their natural settings. Studies of highest quality are those that are carefully planned with attention to research questions, appropriate strategies and methods, and systematic analysis of data. Attention to reliability, validity, and relevance is of utmost importance.

Figure 4 presents a list of applications of qualitative methods and associated examples of dietetics-related research questions. There are many dietetics-related issues that are amenable to study through the use of qualitative methods. Result from dietetics-related qualitative research will improve clinical, community, and foodservice practice.

Conducting excellent qualitative research requires that an investigator carefully plan the study. Well-conceived research questions must be developed and presented. Strategies and methods appropriate for the research problem must be chosen and documented. Systematic steps and procedures for data collection and analysis must then be devised. Methods for data collection related to behaviors, attitudes, and perceptions should be standardized. Observers, interviewers, and data analyzers must be properly trained to fulfill their duties. Strategies must be planned to ensure validity and reliability are implemented for approximating truth in naturalistic settings. Before conducting the study investigators must be confident that the research is relevant. When appropriate, relevant theory and testable hypotheses will have been developed or modified from analysis of the data. Theory-driven qualitative research must be conducted where relevant. Research results are likely to be published if attention is paid to these details.

Poorly designed qualitative research is at greater risk of rejection by reviewers than poor quality quantitative research because of historical bias and the perceived subjectivity of the approach. A natural or practice-oriented environment provides no excuse for haphazard, poorly planned qualitative research. To be receptive to reviewing and publishing qualitative research, investigators and authors must convince reviewers that every effort was taken to ensure reliability, validity, and relevance. Reproducibility remains a valued feature of successful research even in the process-oriented domains. Rigorous qualitative research will bring it to a new level of respect that will encourage publication in peer-reviewed journals. The prevailing attitude of the inferiority of qualitative research can only be shed if investigators and authors can carefully describe and articulate the design and methodology employed with the most objective approach to subjective outcomes possible. To better receive such manuscripts, journals need to provide specific author and reviewer guidelines that promote fair treatment of qualitative research. The *Journal of the American Dietetic Association* and its Board of Editors are in the process of

Application	Research question
Decision-making processes	How do food and nutrition professionals make decisions about discontinuing tube feedings?
Sociocultural factors that affect food and nutrition-related behaviors	What are motivators and barriers to urban African Americans consuming fruits and vegetables?
Reasons for a dietetics-related phenomenon	Why did a technology-based, interactive diabetes education program not improve diabetes self-management compared to a traditional diabetes education program?
Teaching effectiveness in dietetics	Which are best practices among dietetics educators who have been identified as excellent in their field?
Consumer and employee behavior, attitudes, and perspectives in foodservice	What are the behaviors, attitudes, and perspectives related to food safety among community hospital foodservice workers?
Exploring unfamiliar cultures regarding their mores, traditions, and beliefs related to food and nutrition	What mores, traditions, and beliefs promote obesity among Pima Indians?
Evaluation of dietetics education programs	What is the process used by a particular dietetic internship to educate their students?
Task-related processes	To what degree is the Nutrition Care Process applied in community and clinical environments?
Theory development and modification	To what degree does Social Learning Theory apply in explaining the choice between soda and milk?

Figure 4. Applications of qualitative methods and associated dietetics-related research questions. NOTE: Information from this figure is available online at www.adajournal.org as part of a PowerPoint presentation.

developing such guidelines and are prepared to publish meritorious qualitative research studies as warranted.

CONCLUSIONS

In this article, we address qualitative research as a complement to quantitative research. There are quality resources that can elaborate on qualitative research, including those by Maxwell (5), Bernard (16), and Denzin and Lincoln (28). Also, *Research: Successful Approaches* (29), published by the American Dietetic Association, has an informative chapter on qualitative research. Excellent examples of dietetics-related qualitative research studies are provided in the References section of this article (30-35). Done properly, qualitative research facilitates the study of processes and the reasons associated with a specific behavior or other phenomenon. In the field of dietetics, the process and applied behaviors involved in successful delivery of patient care, effective provision of community programs, and competent management of foodservice are important and especially relevant. There is a great need for carefully designed and conducted qualitative research that merits publication because of its reliability, validity, and relevance despite the subjective nature of its outcomes.

Some professionals have mistakenly treated the terms qualitative research and “practice-based research” synonymously. Practice-based research is applied research conducted in natural or practice-oriented settings, rather than research-oriented settings such as research universities (36). For example, a community hospital may examine postsurgical blood glucose data in patients undergoing cardiovascular care to determine the percentage of hypoglycemic bouts and percentage of patients with blood glucoses in a tight control target range to determine the effectiveness of their new postsurgical blood glucose regulation protocol. This is practice-based research. In contrast, a research hospital associated with a major univer-

sity may recruit subjects for various groups who will have cardiovascular surgery and will receive a variety of post-surgical blood glucose regulation protocols using expensive experimental medications. Staff will have as their sole responsibility the management of that study. This research may be funded by a federal grant. This is not practice-based research. Practice-based research can either be qualitative or quantitative in nature. Practice-based research, whether qualitative or quantitative, can be a valued asset to enhance and facilitate the field of dietetics, but if poorly designed, will not add effectively to the dietetics literature. Investigators are encouraged to set standards high. This article is meant to be instructive and encouraging to food and nutrition professionals intending to conduct and publish qualitative research with the intention that the research be based on specific research questions, and systematic and well-planned methodology. It is advisable that food and nutrition professionals desiring to conduct qualitative research consult with a seasoned qualitative researcher to obtain methodological guidance and advice.

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Compensation & Benefits Survey 2007: Above-Average Pay Gains Seen for Registered Dietitians

Results of the ADA/CDR Compensation & Benefits Survey of the Dietetics Profession 2007 show RD and DTR pay continuing to improve—for RDs, at a rate faster than inflation.

Results are in for the third edition of the most comprehensive survey of dietetics compensation available, and the news for dietetics professionals continues to be upbeat. The *Compensation & Benefits Survey of the Dietetics Profession 2007*, sponsored jointly by the American Dietetic Association (ADA) and by the Commission on Dietetic Registration (CDR), shows that Registered Dietitians (RDs) enjoyed wage gains greater than inflation since the 2005 survey, while Dietetic Technicians, Registered (DTRs) saw gains nearly keeping pace. RD median annualized wages are now at \$53,000, up from \$49,500 in 2005; DTR median annualized wages are now \$36,000, up from \$34,000. Some specific dietetics positions showed exceptional wage gains, while a few lagged. And the importance of increasing responsibility to earn increased compensation was again underscored. Finally, RDs and DTRs continue to receive benefits packages that might be the envy of many other professionals.

*This article was written by **Dick Rogers** of Readex Research, Stillwater, MN. His firm was responsible for design, execution, and reporting of the ADA/CDR Compensation & Benefits Survey of the Dietetics Profession 2007.*

*Address correspondence to: Dick Rogers, Readex Research, 2251 Tower Dr West, Stillwater, MN 55082, or drogers@readexresearch.com.
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PRACTITIONER PROFILE

Dietetics Employment Defined

As in both prior administrations (2005 [1] and 2002 [2]), the survey sought to measure compensation for dietetics-related employment, which was purposely conceived broadly:

A dietetics-related position is considered to be any position that requires or makes use of your education, training, and/or experience in dietetics or nutrition, including situations outside of “traditional” dietetics practice.

By way of example, respondents were referred to an enclosure naming and briefly describing 59 core dietetics positions. These positions included not only “traditional” dietetics jobs such as Clinical Dietitian, Outpatient Dietitian, or Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) Nutritionist, but also jobs in such areas as consulting, sales, and communications.

Based on this definition of dietetics-related employment, slightly more than one in six food and nutrition professionals (18%) reported they are not currently employed or self-employed in a dietetics-related position. Among the small group of professionals not currently registered as RDs or DTRs, that figure jumps to 27% (Table 1).

Table 1. Incidence of dietetics-related employment, from *Compensation & Benefits Survey of the Dietetics Profession 2007*

	No. responding	% in dietetics
Registered dietitians	10,212	82
Dietetic technicians, registered	1,424	82
Nonregistered professionals	225	73
All professionals	11,861	82

About the Survey

Over the years, ADA has received many requests from members for objective, reliable information about industry norms on pay and benefit levels for the dietetics profession. ADA responded to members' needs in 2002 by commissioning the Dietetics Compensation & Benefits Survey, the most comprehensive survey of its type in the profession up to that point. Continuing to serve the profession, ADA and CDR have underwritten subsequent administrations of the survey in 2005 and now again in 2007, building on the strengths of the initial effort and improving it with several refinements.

The 2007 survey was conducted across a probability sample drawn from the population of all domestic Active and Active-Eligible ADA members (N=52,391) plus all domestic nonmembers maintaining current registration as an RD or DTR (N=27,006). To preserve confidentiality, an outside research firm was contracted to collect data via mail survey from May 31 through July 23, 2007.

The 2007 survey carries forward a key feature of the prior efforts, presenting results not only at the level of registration (RD, DTR), but also in terms of the specific jobs (including nontraditional jobs) food and nutrition professionals hold. A key question asked respondents to identify the one position (from a set of 59 core positions) that most closely matched their actual employment. These data represent the specific jobs that account for an estimated 95% of dietetics employment.

From the mailed sample of 30,000, a total of 11,861 usable responses was received—a 40% response rate. The margin of error for all practitioners is $\pm 0.9\%$; for practicing RDs, $\pm 1.0\%$; for practicing DTRs, $\pm 2.3\%$. The strong response rate, plus the fact that more than one in seven professionals is represented in the tabulated sample, again provides an exhaustive investigation of compensation in the dietetics profession.

The balance of the results discussed here reflect the 9,698 sample members who indicated they are currently employed or self-employed

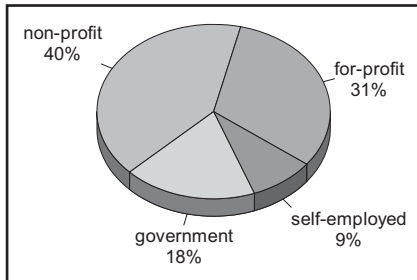


Figure 1. Employment sector of dietetics practitioners (n=9,698), from *Compensation & Benefits Survey of the Dietetics Profession 2007*.

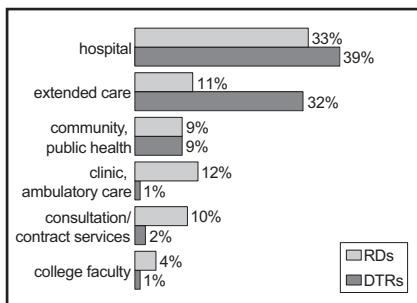


Figure 2. Work setting of practicing registered dietitians (RDs) (n=8,364) and practicing dietetic technicians, registered (DTRs) (n=1,170), from *Compensation & Benefits Survey of the Dietetics Profession 2007*.

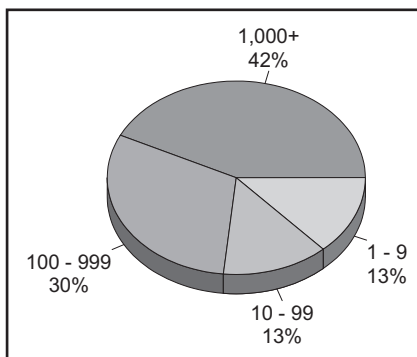


Figure 3. Size of organizations employing dietetics practitioners (number of employees at all locations, n=9,698), from *Compensation & Benefits Survey of the Dietetics Profession 2007*.

in a dietetics-related position (“practitioners”). Those who were employed or self-employed in more than one such position were asked to respond only for what they considered to be their primary dietetics-related position.

Table 2. Practice areas of practicing registered dietitians (n=8,364) and practicing dietetic technicians, registered (n=1,170), based on primary position selected, from *Compensation & Benefits Survey of the Dietetics Profession 2007*

	Registered dietitians (%)	Dietetic technicians, registered (%)
Clinical nutrition—acute care/inpatient	30	41
Clinical nutrition—ambulatory care	15	0
Clinical nutrition—long-term care	10	18
Community	11	9
Food and nutrition management	12	18
Consultation and business	11	3
Education and research	6	1

Table 3. Highest incidence positions among practicing registered dietitians (n=8,364), from *Compensation & Benefits Survey of the Dietetics Profession 2007*

	Registered dietitians (%)
Clinical dietitian	17
Clinical dietitian, specialist—renal	3
Nutrition support dietitian	3
Outpatient dietitian, general	4
Outpatient dietitian, specialist—diabetes	4
Outpatient dietitian, specialist—renal	3
Clinical dietitian, long-term care	10
WIC ^a nutritionist	5
Public health nutritionist	3
Director of food and nutrition services	4
Clinical nutrition manager	3
Private practice dietitian—patient/client nutrition care	4

^aWIC=Special Supplemental Nutrition Program for Women, Infants, and Children.

Table 4. Highest incidence positions among practicing dietetic technicians, registered (n=1,170), from *Compensation & Benefits Survey of the Dietetics Profession 2007*

	Dietetic technicians, registered (%)
Dietetic technician, clinical	39
Clinical dietitian, long-term care	3
Dietetic technician, long-term care	15
WIC ^a nutritionist	7
Director of food and nutrition services	5
Dietetic technician, foodservice management	9

^aWIC=Special Supplemental Nutrition Program for Women, Infants, and Children.

Who Are Dietetics Practitioners?

Ninety-seven percent of practitioners are female. The median age is 46 years; 19% are 55 or older, while 26% are under 35. Three percent indicated Hispanic heritage, and 10% indicated a race other than white (5% Asian/Native Hawaiian/Pacific Islander, 3% Black/African American, and 2% other). Racial diversity has increased modestly since the 2002 survey.

Virtually all RDs hold at least a bachelor’s degree, with 45% holding master’s degrees and 3% doctoral degrees. Among DTRs, 27% hold a bachelor’s degree or higher.

Seventy-seven percent of practicing RDs are members of ADA, compared to only 48% of practicing DTRs.

The typical (median) RD reports 16 years of work experience in dietetics/nutrition (excluding time taken off to

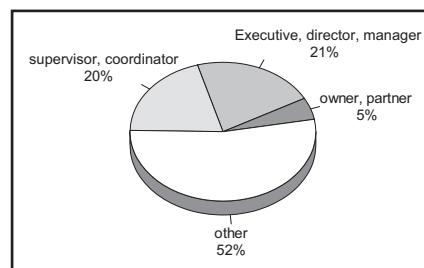


Figure 4. Responsibility level of dietetics practitioners (n=9,698) from *Compensation & Benefits Survey of the Dietetics Profession 2007*.

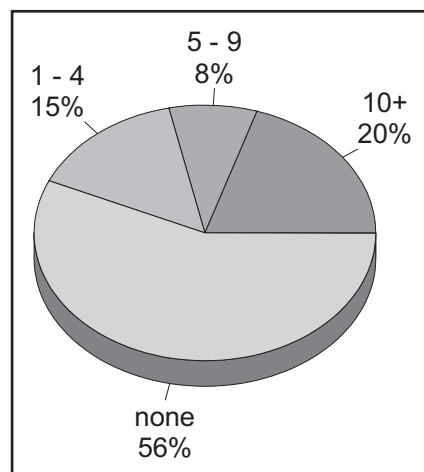


Figure 5. Number supervised directly and/or indirectly by dietetics practitioners (n=9,698) from *Compensation & Benefits Survey of the Dietetics Profession 2007*.

return to school, raise a family, or work in other areas); the median for DTRs is slightly lower, at 15 years. Forty-one percent of all practitioners have 20 or more years of work experience in dietetics/nutrition, whereas 14% have less than 5 years.

Where Do They Work?

Nine percent of practitioners are self-employed, 31% work for a for-profit firm, 40% for a nonprofit, and 18% for government. Self-employment is more common among RDs than DTRs (10% vs 2%, respectively), while a greater proportion of DTRs are found in the nonprofit sector (38% of RDs, 48% of DTRs). These figures have changed little since 2002 (Figure 1).

The most common employment setting for both RDs and DTRs is a hospital (33% and 39%, respectively). Thirty-two percent of DTRs work in an extended-care or long-term care

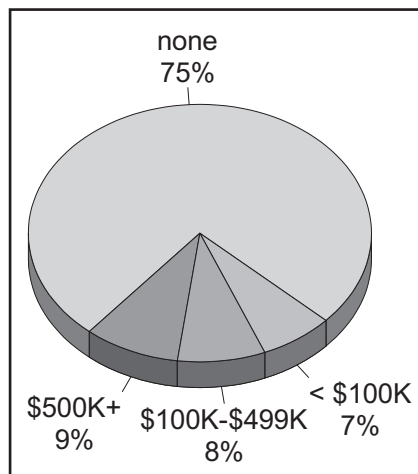


Figure 6. Budget responsibility of dietetics practitioners (n=9,698) from *Compensation & Benefits Survey of the Dietetics Profession 2007*.

facility, compared to only 11% of RDs. Twelve percent of RDs work in a clinic or ambulatory care center, compared to only 1% of DTRs. Nine percent of both groups work in a community or public health program (Figure 2).

The typical (median) practitioner works in an organization employing 683 people at all locations, virtually identical to the result seen in 2005. RDs tend to work in larger organizations than DTRs (medians 743 and 454, respectively) (Figure 3).

What Jobs Do Practitioners Hold?

Respondents were asked to review a list of 59 core position titles and brief descriptions and to identify the one description that most closely matched their primary position, even if the job title differed from their own.

Ninety-five percent of responding practitioners found a match; thus, the compensation data reported here represent the vast majority of dietetics employment situations.

The 59 positions are grouped into seven distinct practice areas, with acute care/inpatient the most prevalent, and education/research the least (Table 2).

Among RDs, the most commonly held positions are found primarily in clinical and outpatient settings (Table 3).

Among DTRs, long-term care and foodservice settings are more prevalent (Table 4).

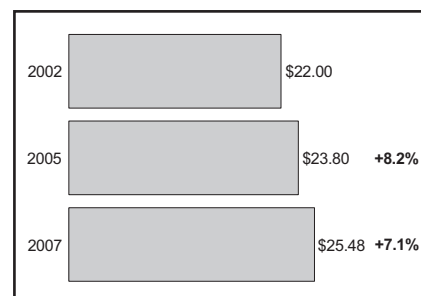


Figure 7. Registered dietitian median wage 2002 (n=8,621), 2005 (n=8,017), and 2007 (n=7,768), from *Compensation & Benefits Survey of the Dietetics Profession 2007*.

What Responsibilities Do Practitioners Have?

Six percent of RDs and 1% of DTRs indicated they are owners of or partners in their practice, while 2% of RDs and virtually no DTRs reported an executive level of responsibility. Twenty percent of practitioners overall are directors or managers, and another 20% are supervisors or coordinators (results similar between RDs and DTRs) (Figure 4). Responsibility levels have changed little since the 2002 survey.

Forty-three percent of RDs and 47% of DTRs reported they directly or indirectly supervise employees, both marginally down from 2005. For those supervising, the median number supervised is eight for RDs and 14 for DTRs (Figure 5).

Twenty-four percent of RDs and 21% of DTRs reported managing a budget, again marginally less than 2 years ago. Median budget size is \$313,000 for RDs and \$240,000 for DTRs, with 10% of RDs and 6% of DTRs managing budgets of \$500,000 or more (Figure 6).

RD COMPENSATION

A significant fraction of RDs work part-time and/or only part of the year. As defined in this survey, 71% of RDs are employed full-time (35 hours or more per week for 48 weeks or more per year), up somewhat from 68% in 2002.

Because the prevalence of part-time employment can make salary comparisons difficult, compensation is reported in two ways: in terms of hourly wage, and in terms of total cash compensation (which includes not only salary but also earnings from

Table 5. Registered dietitian compensation at selected percentiles: hourly wage (n=7,768), and total cash compensation for full-time employees in position at least 1 year (n=5,346), from *Compensation & Benefits Survey of the Dietetics Profession 2007*

	Hourly wage	Total cash
10th percentile (10% earn less)	\$18.40	\$39,000
25th percentile (25% earn less)	\$21.15	\$44,900
50th percentile (50% earn less)	\$25.48	\$53,300
75th percentile (75% earn less)	\$31.25	\$65,500
90th percentile (90% earn less)	\$38.94	\$82,500

overtime pay, on-call pay, commissions, bonuses, incentive pay, profit sharing or distributions, and cash retirement benefits received—frequently important compensation components for consultants, executives, and those in sales positions). Hourly wage is assessed for all answering respondents; total cash compensation is examined only for those working full time for at least 1 year in the position.

Median Wages Up 7.1% Over 2 Years

Among all RDs in all positions, the median hourly wage as of April 1, 2007, was \$25.48 per hour. If annualized (×40 hours/week×52 weeks/year), this equates to a full-time salary of \$53,000 per year, up from

\$49,500 in 2005. Median 2007 total cash compensation for RDs employed in the position full time for at least one year was \$53,300 (up from \$50,000).

These results are higher than the most current Bureau of Labor Statistics (BLS) median wage estimate for Dietitians and Nutritionists of \$22.59 per hour (3). Two factors help account for the discrepancy: these survey data are current as of April 1, 2007, and are thus nearly a year more current than the BLS estimate; and BLS does not restrict its estimate to RDs.

At \$25.48, the median wage for all RDs is up 7.1% from its value of \$23.80 in the 2005 survey, representing an annualized increase of 3.5% (Figure 7). This increase exceeds the

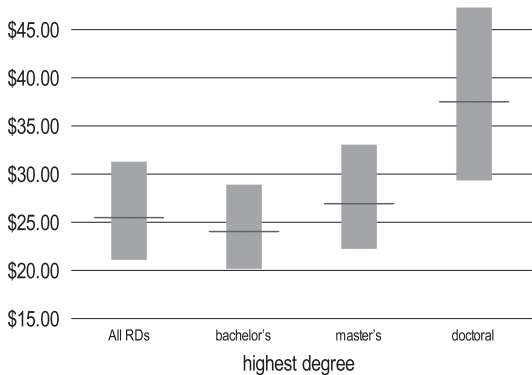
3.1% annual change in the Consumer Price Index between April 2005 and April 2007 (4).

As in prior years, the wide range of RD compensation continues to be of interest: RDs in the top 10% continue to earn more than twice as much per hour as those in the bottom 10% (Table 5).

Helping to account for that range, a number of factors show strong associations with compensation levels for RDs. The following series of exhibits demonstrates the relationship between hourly wage and education, experience, and other factors. Note that all factors are based on respondent self-reports and are thus subject to some variation in how terms were understood.

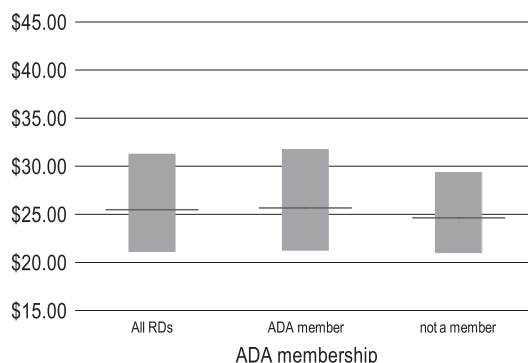
Qualifications Matter

Education beyond the bachelor's degree continues to be associated with wage gains, with the 2007 difference between the median wage of RDs with a bachelor's degree and that of RDs with a master's degree at \$2.88 per hour, up from a differential of \$2.30 in 2002. Earning a PhD is associated with even more notable gains; median earnings for those with a doctorate (at \$37.50) are more than thir-



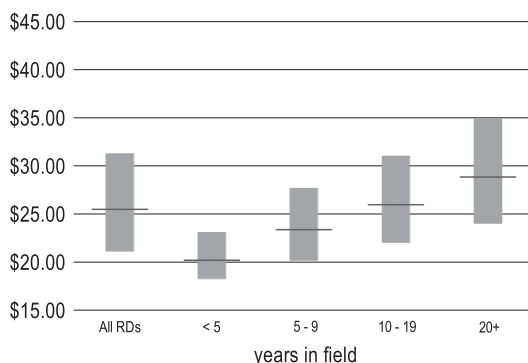
	No.	Percentiles		
		25th	50th	75th
All RDs	7,768	\$21.15	\$25.48	\$31.25
Doctoral degree	249	\$29.38	\$37.50	\$47.24
Master's degree	3,461	\$22.29	\$26.92	\$33.00
Bachelor's degree	4,001	\$20.19	\$24.04	\$28.85

Figure 8. Registered dietitian (RD) hourly wage by education level (highest degree earned). Bars are delimited by the 25th and 75th percentiles; horizontal line marks the median (50th percentile). From *Compensation & Benefits Survey of the Dietetics Profession 2007*.



	No.	Percentiles		
		25th	50th	75th
All RDs	7,768	\$21.15	\$25.48	\$31.25
ADA member	5,969	\$21.28	\$25.67	\$31.73
Not a member	1,799	\$21.03	\$24.64	\$29.33

Figure 9. Registered dietitian (RD) hourly wage by American Dietetic Association (ADA) membership. Bars are delimited by the 25th and 75th percentiles; horizontal line marks the median (50th percentile). From *Compensation & Benefits Survey of the Dietetics Profession 2007*.



	No.	Percentiles		
		25th	50th	75th
All RDs	7,768	\$21.15	\$25.48	\$31.25
20+ years	3,238	\$24.04	\$28.85	\$34.91
10-19 years	1,931	\$22.05	\$25.96	\$31.00
5-9 years	1,420	\$20.19	\$23.37	\$27.67
< 5 years	1,160	\$18.27	\$20.19	\$23.08

Figure 10. Registered dietitian (RD) hourly wage by experience (years in the field). Bars are delimited by the 25th and 75th percentiles; horizontal line marks the median (50th percentile). From *Compensation & Benefits Survey of the Dietetics Profession 2007*.

teen dollars per hour above RDs with only a bachelor's degree (Figure 8).

Having one or more specialty certifications (eg, certified diabetes educator [CDE], certified nutrition support dietitian [CNSD], and the various Certified Specialist credentials offered by the CDR) is associated with an increased median wage, adding

\$1.92 per hour median wage over those with no such certifications.

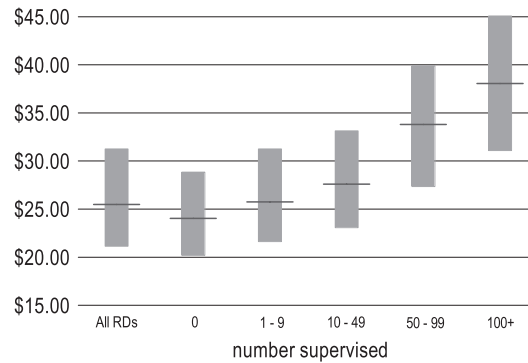
ADA Membership

As in both 2002 and 2005, results again show a small positive association between ADA membership and RD compensation; typical members

earn \$1.03 per hour more than non-members (Figure 9).

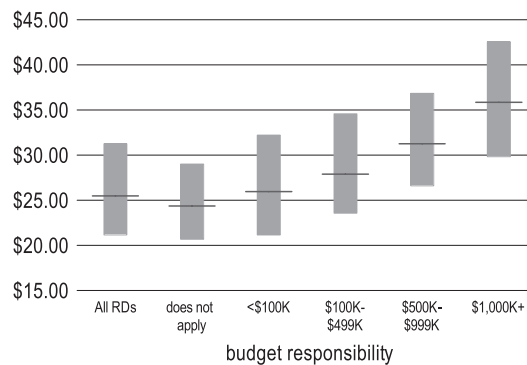
Experience and Responsibility Count, Too

As might be expected, years of dietetics experience is strongly associated with compensation; those with 20 or more years of experience earn a me-



	No.	Percentiles		
		25th	50th	75th
All RDs	7,768	\$21.15	\$25.48	\$31.25
100+	169	\$31.09	\$38.05	\$45.07
50-99	229	\$27.34	\$33.80	\$39.90
10-49	1,126	\$23.08	\$27.59	\$33.14
1-9	1,904	\$21.63	\$25.75	\$31.25
0	4,307	\$20.19	\$24.04	\$28.85

Figure 11. Registered dietitian (RD) hourly wage by number directly and/or indirectly supervised. Bars are delimited by the 25th and 75th percentiles; horizontal line marks the median (50th percentile). From *Compensation & Benefits Survey of the Dietetics Profession 2007*.



	No.	Percentiles		
		25th	50th	75th
All RDs	7,768	\$21.15	\$25.48	\$31.25
\$1,000K+	530	\$29.81	\$35.85	\$42.55
\$500K-\$999K	248	\$26.59	\$31.25	\$36.83
\$100K-\$499K	570	\$23.56	\$27.88	\$34.57
<\$100K	584	\$21.15	\$25.96	\$32.21
Does not apply	5,752	\$20.66	\$24.36	\$29.00

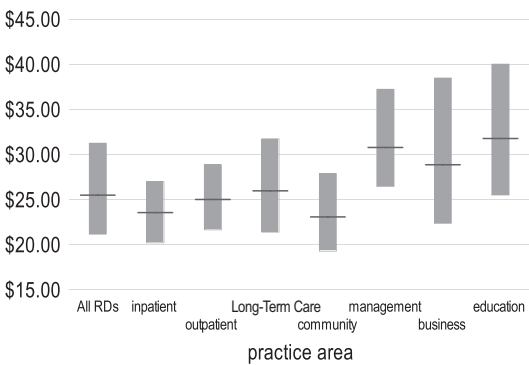
Figure 12. Registered dietitian (RD) hourly wage by budget responsibility. Bars are delimited by the 25th and 75th percentiles; horizontal line marks the median (50th percentile). From *Compensation & Benefits Survey of the Dietetics Profession 2007*.

dian wage more than \$8 per hour above those in the under-5-year bracket. Median wage increased \$0.96 since 2005 for those in the low-

est bracket, but \$2.41 for those in the highest (Figure 10).

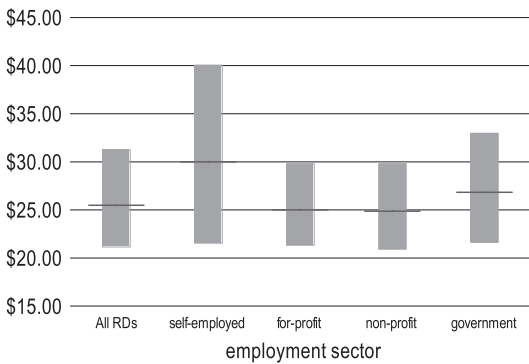
To achieve wage gains, it is important that experience reflect increasing respon-

sibility: practitioners must avoid the syndrome described by one employer whose employee “had 10 years of experience, but it was the same year 10 times.”



	No.	Percentiles		
		25th	50th	75th
All RDs	7,768	\$21.15	\$25.48	\$31.25
Acute care/inpatient	2,352	\$20.19	\$23.55	\$27.00
Ambulatory care	1,192	\$21.63	\$25.00	\$28.85
Long-term care	813	\$21.38	\$25.96	\$31.73
Community	876	\$19.27	\$23.08	\$27.88
Food and nutrition management	1,000	\$26.44	\$30.77	\$37.22
Consultation and business	767	\$22.36	\$28.85	\$38.46
Education and research	430	\$25.50	\$31.76	\$40.02

Figure 13. Registered dietitian (RD) hourly wage by practice area. Bars are delimited by the 25th and 75th percentiles; horizontal line marks the median (50th percentile). From *Compensation & Benefits Survey of the Dietetics Profession 2007*.



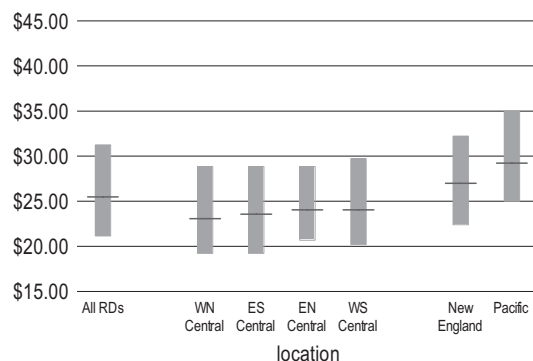
	No.	Percentiles		
		25th	50th	75th
All RDs	7,768	\$21.15	\$25.48	\$31.25
Self-employed	675	\$21.54	\$30.00	\$40.06
For-profit	2,444	\$21.33	\$25.00	\$29.81
Non-profit (other than government)	3,043	\$20.91	\$24.86	\$29.81
Government	1,467	\$21.63	\$26.84	\$32.97

Figure 14. Registered dietitian (RD) hourly wage by employment sector. Bars are delimited by the 25th and 75th percentiles; horizontal line marks the median (50th percentile). From *Compensation & Benefits Survey of the Dietetics Profession 2007*.

Attaining and increasing supervisory responsibility can be one component in increasing responsibility, and

it is strongly associated with wage gains: those reporting direct and/or indirect supervision of 100 or more

employees have a median wage nearly 50% greater than the typical RD (Figure 11).



	No.	Percentiles		
		25th	50th	75th
All RDs	7,768	\$21.15	\$25.48	\$31.25
West North Central	729	\$19.23	\$23.08	\$28.85
East South Central	419	\$19.23	\$23.56	\$28.85
East North Central	1,436	\$20.67	\$24.04	\$28.85
West South Central	674	\$20.19	\$24.04	\$29.73
New England	477	\$22.40	\$26.98	\$32.23
Pacific	1,094	\$25.00	\$29.23	\$35.00

Figure 15. Registered dietitian (RD) hourly wage by location (selected Census Divisions). Bars are delimited by the 25th and 75th percentiles; horizontal line marks the median (50th percentile). From *Compensation & Benefits Survey of the Dietetics Profession 2007*.

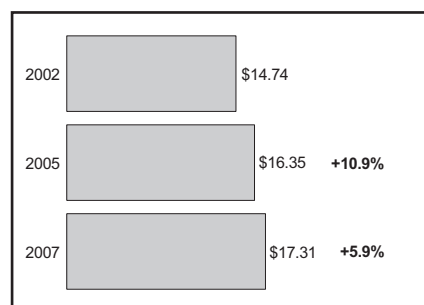


Figure 16. Dietetic technician, registered, median wage 2002 (n=1,397), 2005 (n=1,115), and 2007 (n=1,057), from *Compensation & Benefits Survey of the Dietetics Profession 2007*.

Percentage gains in median wage since 2005 were again lowest for the nonsupervisory cohort; since 2002, this group has failed to keep pace with inflation. Recalling that more than half of RDs have no supervisory responsibility, this appears to represent an area of opportunity for RDs.

Budget responsibility also correlates strongly with wages, with gains increasing as budget size increases: those responsible for budgets of \$1 million or more earn a median wage nearly 50% greater than those with no budget responsibility. One fourth

of those managing the biggest budgets earn an annualized wage of over \$88,000 (\$42.55 per hour) (Figure 12).

While 43% of all practicing RDs have some supervisory responsibility, only a quarter (24%) manage budgets. Acquiring budget responsibility represents another possible growth opportunity for RDs.

Where You Work Makes a Difference

RD wages tend to be highest in the practice areas of food and nutrition management, consultation and business, and education and research. Wages tend to be lower in the areas of acute care/inpatient, ambulatory care (outpatient), and community. Median wages outpaced inflation in all reported practice areas from 2005 to 2007, led by consultation and business (+11.6%). The largest percentage gains in median wage since 2002 have been seen for education and research (+21.4%), acute care/inpatient (+18.0%), and food and nutrition management (+17.4%) (Figure 13).

2007 RD wages by sector distribute much as in 2002 and 2005: those employed in government do somewhat better than average, while those who are self-employed post significantly

higher median wages than others (\$30.00 per hour in 2007) and even greater upside potential (75th percentile of \$40.06 in 2007) (Figure 14).

Specific work settings for which median hourly wages are highest include consultation or contract services to organizations (\$28.85), school foodservice (\$30.05), food manufacturers/distributors/retailers (\$28.85), pharmaceutical or nutrition products companies (\$33.65), and college or university faculty (\$32.69).

RD compensation continues to vary somewhat by employment location. In terms of the nine standard Census Divisions, RDs in the central part of the United States (from the Dakotas to Texas in the west, to Ohio through Alabama in the east) earn median wages somewhat below the overall average, while those in New England (Connecticut, Rhode Island, Massachusetts, Vermont, New Hampshire, Maine) and especially the Pacific states (Alaska, Hawaii, Washington, Oregon, California) again post above-average median wages (Figure 15).

High wage locations continue to be led by California, which includes five of the top eight cities for RD compensation in the United States.

Table 6. Dietetic technician, registered, compensation at selected percentiles: hourly wage (n=1,057), and total cash compensation for full-time employees in position at least 1 year (n=834), from *Compensation & Benefits Survey of the Dietetics Profession 2007*

	Hourly wage	Total cash
10th percentile (10% earn less)	\$12.79	\$27,000
25th percentile (25% earn less)	\$14.87	\$31,200
50th percentile (50% earn less)	\$17.31	\$36,400
75th percentile (75% earn less)	\$20.19	\$42,500
90th percentile (90% earn less)	\$24.04	\$51,000

Table 7. Highest-paying positions held by registered dietitians, from *Compensation & Benefits Survey of the Dietetics Profession 2007*

	No.	Median wage
Public relations and/or marketing professional	28	\$38.46
Executive-level professional	117	\$37.95
Director of nutrition	56	\$37.59
Research & development nutritionist	38	\$36.25
Director of clinical nutrition	102	\$32.45
Director of food and nutrition services	343	\$31.73
Sales representative	123	\$31.25
Manager of nutrition communications	21	\$29.76
School foodservice director	95	\$29.67

Table 8. Highest-paying positions held by dietetic technicians, registered, from *Compensation & Benefits Survey of the Dietetics Profession 2007*

	No.	Median wage
Director of food and nutrition services	58	\$21.63
Dietetic technician, foodservice management	97	\$18.27

DTR COMPENSATION

Eighty-one percent of DTRs are employed full-time (35 hours or more per week for 48 weeks or more per year), up from 75% in 2002 and 10 points higher than observed among RDs.

Median DTR Wages Up 5.9% Since 2005

Among all DTRs in all positions, the median hourly wage as of April 1, 2007, was \$17.31 per hour; if annualized, this equates to a salary of \$36,000 per year (up from \$34,000 in 2005). Median total cash compensation for DTRs employed in the position full time for at least one year is \$36,400, up from \$34,600.

As with RDs, these current survey estimates are higher than those published by the Bureau of Labor Statistics (May 2006 median wage=\$11.56) (5). The factors previously discussed

help to explain the discrepancy here as well.

Unlike RDs, DTR median pay increased marginally more slowly than the 2-year inflation rate (CPI) of 6.2%, growing by 5.9% since 2005 (Figure 16).

As in prior years, the wide range of DTR compensation continues to be of interest: DTRs in the top 10% earn nearly twice as much per hour as those in the bottom 10% (Table 6).

Major factors associated with DTR compensation levels are the same as for RDs: education, experience, responsibility, and location. As in prior years, the practice areas of food and nutrition management and consultation and business hold the greatest promise for DTRs, with median wages of \$20.19 for both categories, over \$3.00 more per hour than the median wages of those in the inpa-

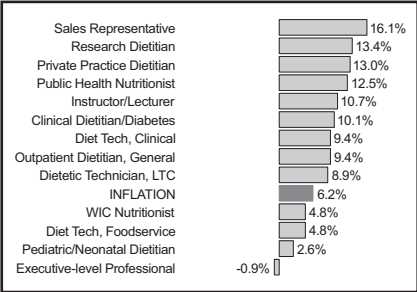


Figure 17. Percent change in median hourly wage 2005-2007 for selected dietetics positions, from *Compensation & Benefits Survey of the Dietetics Profession 2007*.

tient, long-term care, or community areas. Median wage has also grown fastest since 2002 for those in the food and nutrition management area.

DTRs do least well, on average, in the West South Central and Mountain states; median wages are highest in the Pacific and South Atlantic states.

LEADERS AND LAGGARDS

A great strength of these compensation surveys is that they present wage data not only for RDs and DTRs as a whole, but also in terms of the specific jobs (including nontraditional jobs) dietetics professionals hold. Results for 2007 show that the most rewarding nonacademic jobs typically held by RDs evidence median wages \$4 to \$13 per hour greater than the overall average (Table 7).

Top-paying positions held by DTRs are found in foodservice (Table 8).

Since 2005, several positions' median wages have increased by substantially more than the 2-year inflation rate of 6.2%, including Sales Representatives, Research Dietitians, Private Practice Dietitians, Public Health Nutritionists, Instructors/Lecturers, Clinical Dietitians (Specialists in Diabetes), Dietetic Technicians/Clinical, Outpatient Dietitians (General), and Dietetic Technicians/Long-Term Care.

Positions not keeping pace with inflation since 2005 include WIC Nutritionists, Dietetic Technicians/Foodservice Management, Pediatric/Neonatal Dietitians, and Executive-level Professionals (Figure 17).

Positions which have gained at least 20% in median wage since

2002—or five-plus points better than inflation—include Research Dietitian, Instructor/Lecturer, Clinical Dietitian/Diabetes, Director of Food and Nutrition Services, Sales Representative, and Assistant Foodservice Director.

BENEFITS

Although many are employed part-time, dietetics practitioners as a group are offered considerable fringe benefits through their work. Eighty percent receive paid vacation or personal time off, 72% paid holidays, and 70% paid sick days. Eighty percent have access to some sort of medical coverage, which is comparable to a reference group of US white collar workers in private industry, where 77% have access to medical coverage (6). Seventy-five percent of dietetics practitioners have access to dental coverage and 63% vision coverage, well above the reference group values of 53% and 32%, respectively. Sixty-seven percent of dietetics practitioners are offered a prescription drug benefit.

Sixty-nine percent can receive life insurance, and 61% some form of disability insurance, again above the norms for white-collar workers. Sixty-five percent reported access to defined contribution retirement programs (such as 401[k] plans), identical to the reference group, and 42% are offered a defined benefit (pension) retirement program, compared to only 23% of the reference group.

Fifty-four percent are offered funding for professional development (eg, conferences, seminars), down three points from 2005, while 26% can have their professional society dues paid, up four points. Thirty-eight percent are eligible to receive assistance with college tuition. Forty-four percent have access to an employee assistance or wellness program. Thirty-two percent work with comp time or flex time. Thirty-five percent have access to a fitness benefit such as a discounted health club membership or an on-site facility, up six points since 2002. Twenty-four percent are eligible for extended and/or paid maternity leave, and 11% have on-site child care or a child-care allowance, values which have changed little since previous surveys.

Benefit levels are most influenced

by employment status—self-employed vs not; full-time vs part-time. Those working in hospitals, schools, or government agencies tend to enjoy a richer array of benefits than those employed in other areas, particularly extended care.

CONCLUSION

In underwriting the *Compensation & Benefits Survey of the Dietetics Profession 2007*, ADA and CDR have provided a comprehensive and current resource to help dietetics professionals better manage their responsibilities and their careers. This survey provides valuable perspectives on how specific dietetics jobs are compensated, shows how a variety of factors relate to compensation levels, and identifies important trends.

ADA and CDR plan to periodically update the survey, and actively seek suggestions for its improvement. With the help and participation of dietetics professionals, future surveys will continue to serve as an invaluable asset to the profession.

EDITOR'S NOTE

The Compensation & Benefits Survey of the Dietetics Profession 2007 continues to provide the most comprehensive and authoritative source of information on compensation in the profession. It should prove to be an asset to professionals and their employees in all major dietetics practice settings, as well as provide reference material for self-employed dietetics professionals.

The book-length report of survey results, including detailed tabular data for RDs and DTRs, results for over 40 dietetics positions, results for dozens of metropolitan areas, and two Salary Calculation Worksheets, is available through the ADA Member Service Center: 1-800-877-1600, ext. 5000 (request item #356808). Price is \$20 for ADA members, \$250 for nonmembers.

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APPENDIX G

High Frequency Nutrition Care Outcome Indicators to Focus On for Scale Development

Food/Nutrition-Related History

Energy intake (1.2.1)

- ☐ Total energy intake FH-1.2.1.1

Food and Beverage Intake (1.3)

Type, amount, and pattern of intake of foods and food groups, indices of diet quality, intake of fluids, breast milk and infant formula

Fluid/Beverage intake (1.3.1)

- ☐ Oral fluids amounts FH-1.3.1.1
- ☐ Food-derived fluids FH-1.3.1.2
- ☐ Liquid meal replacement FH-1.3.1.3 or supplement

Food intake (1.3.2)

- ☐ Amount of food FH-1.3.2.1
- ☐ Types of food/meals FH-1.3.2.2
- ☐ Meal/snack pattern FH-1.3.2.3
- ☐ Diet quality index FH-1.3.2.4
- ☐ Food variety FH-1.3.2.5

Breast milk/infant formula intake (1.3.3)

- ☐ Breast milk intake FH-1.3.3.1
- ☐ Infant formula intake FH-1.3.3.2

Enteral and Parenteral Nutrition Intake (1.4)

Specialized nutrition support intake from all sources, e.g., enteral and parenteral routes.

Enteral and Parenteral Nutrition Intake (1.4.1)

- ☐ Access FH-1.4.1.1
- ☐ Formula/solution FH-1.4.1.2
- ☐ Discontinuation FH-1.4.1.3
- ☐ Initiation FH-1.4.1.4
- ☐ Rate/schedule FH-1.4.1.5

Macronutrient Intake (1.6)

Fat and cholesterol, protein, carbohydrate, and fiber intake from all sources including food, beverages, supplements, and via enteral and parenteral routes.

Fat and cholesterol intake (1.6.1)

- ☐ Total fat FH-1.6.1.1
- ☐ Saturated fat FH-1.6.1.2
- ☐ Trans fatty acids FH-1.6.1.3
- ☐ Polyunsaturated fat FH-1.6.1.4
- ☐ Monounsaturated fat FH-1.6.1.5
- ☐ Omega-3 fatty acids FH-1.6.1.6
- ☐ Dietary cholesterol FH-1.6.1.7
- ☐ Essential fatty acids FH-1.6.1.8

Protein intake (1.6.2)

- ☐ Total protein FH-1.6.2.1
- ☐ High biological value protein FH-1.6.2.2
- ☐ Casein FH-1.6.2.3
- ☐ Whey FH-1.6.2.4
- ☐ Amino acids FH-1.6.2.5
- ☐ Essential amino acids FH-1.6.2.6

Carbohydrate intake (1.6.3)

- ☐ Total carbohydrate FH-1.6.3.1

- ☐ Sugar FH-1.6.3.2
- ☐ Starch FH-1.6.3.3
- ☐ Glycemic index FH-1.6.3.4
- ☐ Glycemic load FH-1.6.3.5
- ☐ Source of carbohydrate FH-1.6.3.6

Fiber intake (1.6.4)

- ☐ Total fiber FH-1.6.4.1
- ☐ Soluble fiber FH-1.6.4.2
- ☐ Insoluble fiber

Knowledge/Beliefs/Attitudes (3)

Understanding of nutrition-related concepts and conviction of the truth and feelings/emotions toward some nutrition-related statement or phenomenon, along with readiness to change nutrition-related behaviors.

Food and nutrition knowledge (3.1)

- ☐ Area(s) and level of knowledge FH-3.1.1
- ☐ Diagnosis specific or global FH-3.1.2 nutrition-related knowledge score

Beliefs and attitudes (3.2)

- ☐ Readiness to change nutrition-related behaviors FH-3.2.7
- ☐ Self-efficacy FH-3.2.8

Behavior (4)

Patient/client activities and actions, which influence achievement of nutrition-related goals.

Adherence (4.1)

- ☐ Self-reported adherence score FH-4.1.1
- ☐ Nutrition visit attendance FH-4.1.2
- ☐ Ability to recall nutrition goals FH-4.1.3
- ☐ Self-monitoring at agreed upon rate FH-4.1.4
- ☐ Self-management as agreed upon FH-4.1.5

Physical Activity and Function (6)

Physical activity, cognitive and physical ability to engage in specific tasks, e.g., breastfeeding, self-feeding.

Breastfeeding (6.1)

- ☐ Initiation of breastfeeding FH-6.1.1
- ☐ Duration of breastfeeding FH-6.1.2
- ☐ Exclusive breastfeeding FH-6.1.3
- ☐ Breastfeeding problems FH-6.1.4

Physical activity (6.3)

- ☐ Consistency FH-6.3.2
- ☐ Frequency FH-6.3.3
- ☐ Duration FH-6.3.4
- ☐ Intensity FH-6.3.6
- ☐ Type of physical activity FH-6.3.7
- ☐ Strength FH-6.3.8
- ☐ TV/screen time FH-6.3.9
- ☐ Other sedentary activity time FH-6.3.10

ANTHROPOMETRIC

MEASUREMENTS (AD)

Height, weight, body mass index (BMI), growth pattern indices/percentile ranks, and weight history.

Body composition/growth/weight history (1.1)

- ☐ Height/length AD-1.1.1
- ☐ Weight AD-1.1.2
- ☐ Frame size AD-1.1.3
- ☐ Weight change AD-1.1.4
- ☐ Body mass index AD-1.1.5
- ☐ Growth pattern indices/ percentile ranks AD-1.1.6
- ☐ Body compartment estimates AD-1.1.7

Electrolyte and renal profile (1.2)

- ☐ BUN BD-1.2.1
- ☐ Creatinine BD-1.2.2
- ☐ BUN:creatinine ratio BD-1.2.3
- ☐ Glomerular filtration rate BD-1.2.4
- ☐ Sodium BD-1.2.5
- ☐ Chloride BD-1.2.6
- ☐ Potassium BD-1.2.7
- ☐ Magnesium BD-1.2.8
- ☐ Calcium, serum BD-1.2.9
- ☐ Calcium, ionized BD-1.2.10
- ☐ Phosphorus BD-1.2.11
- ☐ Serum osmolality BD-1.2.12
- ☐ Parathyroid hormone BD-1.2.13

Glucose/endocrine profile (1.5)

- ☐ Glucose, fasting BD-1.5.1
- ☐ Glucose, casual BD-1.5.2
- ☐ HgbA1c BD-1.5.3
- ☐ Preprandial capillary plasma glucose BD-1.5.4
- ☐ Peak postprandial capillary plasma glucose BD-1.5.5
- ☐ Glucose tolerance test BD-1.5.6

Lipid profile (1.7)

- ☐ Cholesterol, serum BD-1.7.1
- ☐ Cholesterol, HDL BD-1.7.2
- ☐ Cholesterol, LDL BD-1.7.3
- ☐ Cholesterol, non-HDL BD-1.7.4
- ☐ Total cholesterol:HDL cholesterol BD-1.7.5
- ☐ LDL:HDL BD-1.7.6
- ☐ Triglycerides, serum

NUTRITION-FOCUSED

PHYSICAL FINDINGS (PD)

Findings from an evaluation of body systems, muscle and subcutaneous fat wasting, oral health, suck/swallow/breathe ability, appetite, and affect.

Nutrition-focused physical findings (1.1)

- ☐ Digestive system (mouth to rectum) PD-1.1.5
- Bowel function, including flatus, specify, e.g., type, frequency, volume
- ☐ Vital signs PD-1.1.9
- Blood pressure (mmHg)