Nutrition Care Process and Model Update: Toward Realizing People-Centered Care and Outcomes Management

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THE NUTRITION CARE PROCESS (NCP) is a systematic method that nutrition and dietetics practitioners use to provide nutrition care.[1] In this article, nutrition and dietetics practitioners or professionals; dietitians; dietitians-nutritionists; and dietetic technicians, registered, are collectively referred to as professionals. The Nutrition Care Process Model (NCPM) describes the NCP by presenting the workflow of professionals in diverse individual and population care delivery settings. Implementation of the NCPM has been associated with several advantages, including use of a common framework for nutrition care and research, promotion of critical thinking, more-focused nutrition care documentation, increased acknowledgement of the value of nutrition care by other health care professionals, and improved application of evidence-based guidelines.[2-5] Potential target audiences for the NCPM include practitioners, educators and students, professional credentialing agencies, health system accrediting agencies, health care funding organizations, payers, and clients.

The Academy of Nutrition and Dietetics (Academy) adopted the NCP and NCPM for use in the United States in 2003.[1] Since then, international dietetics associations have supported adoption of the NCPM.[6] The development history of the NCPM is described in detail by Hammond and colleagues.[7]

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The NCPM is updated approximately every 5 years, which aligns with other Academy resources such as Evidence-Based Nutrition Practice Guidelines.[8] This ensures that the NCPM reflects current practice.

This article presents an expert consensus update review of the NCPM completed during the year 2013-2014 by the Nutrition Care Process and Terminology (NCPT) Committee (which became the Nutrition Care Process Research Outcomes Committee in 2015) and its international workgroup. Twenty-four experts from around the world participated in a consensus-building process for each component of the NCPM. They considered comments submitted to the NCP website, feedback from translators and users, as well as international information on health quality goals. The current NCPM update highlights three themes that emerged as a result of the consensus process: use of concise language in the NCPM, promotion of professionals' responsibility for outcomes management, and support for people-centered care (PCC).[9] Finally, experts recommend associated actions to advance the NCPM as the Academy embarks into its second century initiatives toward a world where all people thrive through the transformative power of food and nutrition. International input was an important influence for improvement of the current revision. The information in this article replaces previous information describing the NCPM.

BACKGROUND

The NCP is a roadmap and consists of four separate yet interconnected steps: Nutrition Assessment and Reassessment, Nutrition Diagnosis, Nutrition Intervention, and Nutrition Monitoring and Evaluation (Figure 1). The four steps are divided into two components: problem identification and problem solving. This distinction is important for application purposes. Problem identification includes Nutrition Assessment and Reassessment (Step 1), and Nutrition Diagnosis (Step 2). Problem solving includes Nutrition Intervention (Step 3), and Nutrition Monitoring and Evaluation (Step 4). It has been helpful for new adopters to implement the NCP in two consecutive phases where Phase 1 involves implementation of problem identification, and Phase 2 involves the addition of problem solving. Each step is important to complete before advancing to the next step. In practice, as new information becomes available, professionals revisit previous steps of the NCP to reassess, update nutrition diagnoses, adapt interventions, and/or modify goals and monitor outcomes. The NCPM (Figure 2) is depicted unidirectionally where one progresses from Nutrition Assessment and Reassessment to Nutrition Diagnosis, and so on; yet, in practice, the model is dynamic and multidirectional to support critical thinking and timely care. This is important in follow-up care of clients. As new information is collected, a professional may revisit previous steps of the process to remove, add, or change nutrition diagnoses, adjust interventions, or modify goals and monitoring data. Monitoring and evaluation data from the prior client interaction (or visit) is data that begins the reassessment of the subsequent interaction. Hence, the model carries over care from one interaction to the next.

The NCPM incorporates scientific evidence and aims to move professionals from experience-based to

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Step 1: Nutrition Assessment and Reassessment	
Definition and purpose	Nutrition Assessment is a systematic approach to collect, classify, and synthesize important and relevant data from clients (where "client" refers to individual and population). This step also includes Reassessment, which additionally includes collection of new data, and comparing and re-evaluating data from the previous interaction to the next. Nutrition Assessment is an ongoing, dynamic process that involves initial data collection as well as continual reassessment and analysis of the client's status compared with accepted standards, recommendations, and/or goals
Data sources/tools for assessment	• Screening or referral form • Client interview • Medical or health records • Consultation with other caregivers, including family members • Community-based surveys and focus groups • Statistical reports, administrative data, and epidemiologic studies
Types of data collected	• Food- and nutrition-related history • Anthropometric measurements • Biochemical data, medical tests, and procedures • Nutrition-focused physical examination findings • Client history
Nutrition assessment components	• Review data collected for factors that affect nutrition and health status • Cluster individual data to identify at least 1 nutrition diagnosis as described in diagnosis reference sheets • Identify accepted standards, recommendations, and/or goals by which data will be compared
Reassessment components	• Collect new data • Compare data with previous interaction/s: • Compare the monitoring and evaluation outcomes/indicators documented in the previous interaction to new data • Evaluate if the client's nutritional status has changed to demonstrate effectiveness of intervention • Evaluate the status of the Nutrition Diagnosis • Evaluate whether the nutrition assessment data from the previous interaction need to be reassessed or changed depending on the client's status or situation • Identify new nutrition assessment data to monitor and evaluate during the next interaction
Critical thinking	• Determining important and relevant data to collect • Determining the need for additional information • Selecting assessment tools and procedures that match the situation • Applying assessment tools in valid and reliable ways • Validating the data
Determination for continuation of care	If upon completion of an initial Nutrition Assessment or Reassessment, it is determined that the problem cannot be modified by further nutrition care, discharge, or discontinuation from this episode of nutrition care may be appropriate
Step 2. Nutrition Diagnosis	
Definition and purpose	Nutrition Diagnosis is a nutrition and dietetics professional's identification and labeling of an existing nutrition problem that the nutrition and dietetics professional is responsible for treating
Data sources/tools for diagnosis	Organized assessment data that is clustered for comparison with defining characteristics of suspected diagnoses as listed in diagnosis reference sheets

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Figure 1. The 4 Steps of the Nutrition Care Process Model with distinguishing characteristics.

Nutrition Diagnosis components	The Nutrition Diagnosis is expressed using nutrition diagnostic terms and the etiologies, signs, and symptoms that have been identified in the reference sheets describing each diagnosis. There are three distinct parts to a nutrition diagnostic statement: 1. The Nutrition Diagnosis describes alterations in a client's status 2. Etiology is a factor gathered during the Nutrition Assessment that contributes to the existence or the maintenance of pathophysiological, psychosocial, situational, developmental, cultural, and/or environmental problems • The etiology is preceded by the words "related to" • Identifying the etiology will lead to the selection of a nutrition intervention aimed at resolving the underlying cause of the nutrition problem whenever possible 3. Signs/symptoms (defining characteristics) The defining characteristics are a cluster of signs and symptoms that provide evidence that a Nutrition Diagnosis exists • The signs and symptoms are preceded by the words "as evidenced by" • Signs are the observations of a trained professional • Symptoms are changes reported by the client
Nutrition diagnostic statement	A well-written nutrition diagnostic statement should be: • Clear and concise; • Specific to a client; • Limited to a single client problem; • Accurately related to 1 etiology; and • Based on signs and symptoms from the assessment data
Critical thinking	• Finding patterns and relationships among the data and possible causes • Making inferences • Stating the problem clearly and singularly • Ruling in/ruling out specific diagnoses • Identifying an etiology that may be resolved, lessened, or managed by the Intervention/s • Identifying signs and symptoms that are measurable or their change may be tracked • Prioritizing identified problems
Determination for continuation of care	Because the Nutrition Diagnosis names and describes the problem, the determination for problem solving follows the Nutrition Diagnosis step. If a professional does not identify a Nutrition Diagnosis or the potential exists for a Nutrition Diagnosis to develop, a professional may determine an appropriate method and interval for continuation of care
Step 3. Nutrition Intervention	
Definition and purpose	A Nutrition Intervention is a purposefully planned action(s) designed with the intent of changing a nutrition-related behavior, risk factor, environmental condition, or aspect of health status. Nutrition Intervention consists of two interrelated components: planning and intervention. The Nutrition Intervention is typically directed toward resolving the nutrition diagnosis or the nutrition etiology Less often, it is directed at relieving signs and symptoms
Data sources/tools for Interventions	• The Academy of Nutrition and Dietetics' Evidence-Based Nutrition Practice guidelines or other evidence-based guidelines from professional organizations • The Academy of Nutrition and Dietetics' Evidence Analysis Library and other evidence such as the Cochrane Library • Current research literature • Results of outcome management studies or quality improvement projects

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Figure 1. *(continued)* The 4 Steps of the Nutrition Care Process Model with distinguishing characteristics.

Nutrition Intervention components	1. Planning • Prioritize interventions based on urgency, influence, and available resources • Write a nutrition prescription based on a client's individualized recommended dietary intake of energy and/or selected foods or nutrients based on current reference standards and dietary guidelines and a client's health condition and nutrition diagnosis • Collaborate with the client to identify goals of the intervention for each diagnosis • Select specific intervention strategies that are focused on the etiology of the problem and that are known to be effective based on best current knowledge and evidence • Define time and frequency or care, including intensity, duration, and follow-up 2. Implementation • Collaborate with the client to carry out the plan of care • Communicate the plan of nutrition care • Modify the plan of care as needed • Follow-up and verify that the plan is being implemented • Revise strategies based on changes in condition or response to intervention
Critical thinking	• Setting goals and prioritizing • Defining the nutrition prescription or basic plan • Making interdisciplinary connections • Matching intervention strategies with client needs, nutrition diagnoses, and values • Choosing from among alternatives to determine a course of action • Specifying the time and frequency of care
Determination for continuation of care	If a client has met intervention goals or is not at this time able/ready to make needed changes, the professional may discharge the client from this episode of care as part of the planned intervention
Step 4. Nutrition Monitoring and Evaluation	
Definition and purpose	During the first interaction, appropriate outcomes/indicators are selected to be monitored and evaluated at the next interaction. During subsequent interactions, these outcomes/indicators are used to demonstrate the amount of progress made and whether goals or expected outcomes are being met. Nutrition monitoring and evaluation identifies outcomes/indicators relevant to the nutrition diagnosis and intervention plans and goals
Data sources/tools for Nutrition Monitoring and Evaluation	Self-monitoring data or data from other records including forms, spreadsheets, and computer programs Anthropometric measurements, biochemical data, medical tests, and procedures Client surveys, pretests, posttests, and/or questionnaires Mail, telephone, and electronic media follow-up, such as e-mail
Types of outcomes measured	• Nutrition-related history • Anthropometric measurements • Biochemical data, medical tests, and procedures • Nutrition-focused physical findings • Knowledge gained • Behavior change
Nutrition Monitoring and Evaluation components	• In the first interaction: Select appropriate outcomes/indicators • In subsequent interactions This step includes three distinct and interrelated processes 1. Monitor progress • Check client understanding and adherence with plan; • Determine whether the intervention is being implemented as prescribed;

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Figure 1. *(continued)* The 4 Steps of the Nutrition Care Process Model with distinguishing characteristics.

	• Provide evidence that the plan/intervention strategy is or is not changing client behavior or status; • Identify other positive or negative outcomes; • Gather information indicating reasons for lack of progress; and • Support conclusions with evidence 2. Measure outcomes/indicators • Gather data for outcomes/indicators that are relevant to the nutrition diagnosis or signs or symptoms, nutrition goals, medical diagnosis, outcomes, and quality management goals 3. Evaluate outcomes/indicators • Compare current findings with previous status, intervention goals, and reference standards
Critical thinking	Selecting appropriate outcomes/indicators • Using appropriate reference standard for comparison • Defining where client is in terms of expected outcomes • Explaining variance from expected outcomes • Determining factors that help or hinder progress • Deciding between discharge or continued care
Determination for continuation of care	Based on the findings, the professional may actively continue care; or if nutrition care is complete or no further change is expected, discharge the client. If nutrition care continues, reassessment may result in refinements to the diagnosis and intervention. If care does not continue, a client may still be monitored for a change in status and re-enter nutrition care at a later date

Figure 1. *(continued)* The 4 Steps of the Nutrition Care Process Model with distinguishing characteristics.

evidence-based practice. The NCPM strives to provide quality, consistent practice and to achieve expected outcomes at all levels of career development. If the NCPM is applied consistently, quality of care and improved health outcomes should enhance recognition for professionals on multidisciplinary teams. Current research demonstrates that it is possible to measure application of the NCPM and demonstrate efficacy of the NCPM in practice.[5]

NCPM

Core

The focus of the NCPM is a central Core that embraces the many and varied areas in which nutrition and dietetic care is practiced. Consequently, professional interactions that influence individuals and populations are recognized and incorporated into the model. Populations refers to demographically defined groups or otherwise identifiable groups. Individuals and populations are referred to as clients throughout this article and client also includes supportive individuals (eg, family and caregivers) and structures (eg, social service agencies and faith-based organizations). In the Core, the word *interacts* describes the dynamic relationship between a professional and a client in which PCC and client engagement contribute to treatment decisions, intervention strategies,[10] or environment changes. Interacts is a broader and more inclusive word than relationship, which was used in the previous NCPM.[11] Interacting encompasses the care of populations and groups as well as individuals. For example, a population survey is an interaction not a relationship. An interview is an interaction between a client and a professional through which a relationship can develop. Also, an in-person or remote visit with client(s) is an interaction.

Nutrition Assessment and Reassessment: Step 1

Nutrition Assessment and Reassessment is a systematic approach for collecting, classifying, and synthesizing data to describe nutritional status, related nutrition problems, and their causes. Nutrition Assessment is initiated from nutrition screening or client referral. Nutrition Assessment is a continuous process requiring initial data collection with continued reassessment and analysis of a client's data compared with accepted standards, recommendations, and/or goals like growth charts, dietary guidelines, and/or individual needs. Although professionals are familiar with performing a Nutrition Assessment, the systematic approach of Nutrition Assessment and Reassessment coupled with standardized terminology facilitates organized documentation, encourages critical thinking, and supports communication, collaboration, and quality care for clients with nutrition-related problems.[4]

In this update, Nutrition Assessment and Reassessment is clarified further to describe specifically what a professional is expected to do (Figure 3). A critically thoughtful professional acquires, analyzes, and interprets the important and relevant data contributing to the potential nutrition-related problem or problems. Critical thinking tasks may vary with level of practice (Figure 4).[12]

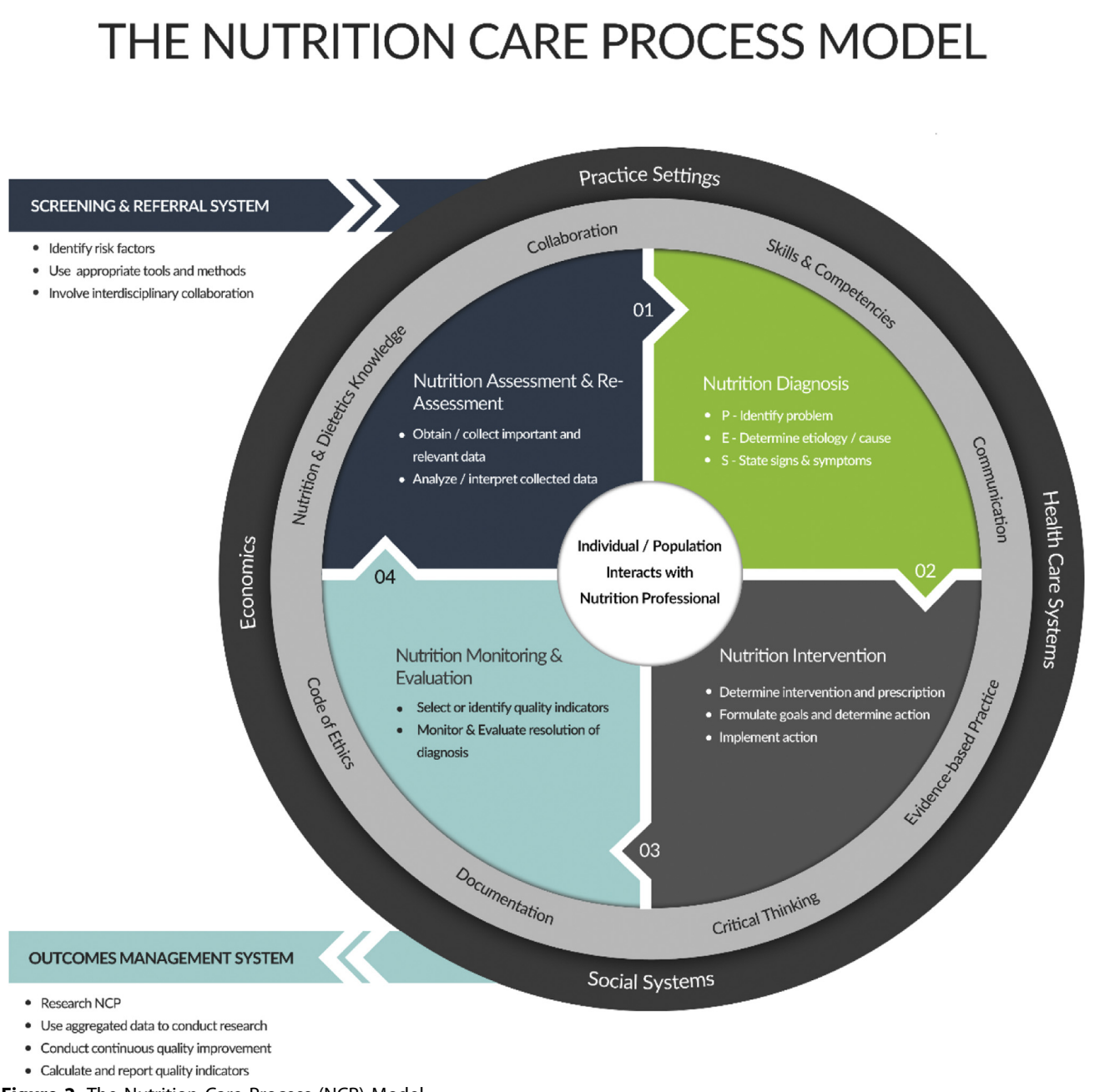

Figure 2. The Nutrition Care Process (NCP) Model.

The data collected and analyzed during this step direct professionals in the selection of a Nutrition Diagnosis. New information that is collected during follow-up interactions (ie, interactions that occur after the initial one), and comparison of data between interactions provide the basis for Reassessment, and the possibility for changed or resolved Nutrition Diagnoses. As the nutrition intervention unfolds during follow-up interactions, the relevant Monitoring and Evaluation data of the previous interaction(s) inform Reassessment and the possibility for changed nutrition diagnoses. Thus, in a follow-up interaction, the Reassessment begins where Monitoring and Evaluation ended during the previous interaction. It should be highlighted that Reassessment is not only comparing results from one interaction to the next to establish change/progress between interactions. Reassessment is also an opportunity to collect new important and relevant information to develop or modify a Nutrition Diagnosis that best fits the present situation of a client.

Nutrition Diagnosis: Step 2

From Nutrition Assessment data, a professional is able to determine whether there is a nutrition problem and label it as a Nutrition Diagnosis. Nutrition Diagnosis identifies and describes a specific problem or problems that can be resolved or improved

through Nutrition Intervention. A Nutrition Diagnosis (eg, inconsistent carbohydrate intake)[13] is different from a medical diagnosis (eg, diabetes mellitus). As the client responds to Nutrition Intervention, the Nutrition Diagnosis can improve or resolve. Critical thinking is needed to prioritize nutrition diagnoses for Nutrition Intervention. As shown in Figure 4, a variety of critical thinking tasks are important to develop the Nutrition Diagnosis. For example, stating the problem clearly and singularly is expected to be carried out efficiently by a novice professional. Other skills, such as finding patterns, may be conquered with greater experience. It is possible and desirable that professionals of all career stages are able to carry out necessary critical thinking tasks.[14]

The Nutrition Diagnosis is communicated as an identify problem, determine etiology/cause, and state signs and symptoms (PES) statement. This PES statement is written with linking words (ie, problem "related to" etiology "as evidenced by" signs and symptoms). The NCPT, which is discussed more later in this article, provides a standardized nutrition diagnostic terminology that defines nutrition problems.[13] It is important to review the specific Nutrition Diagnosis definition to confirm that this is the most appropriate Nutrition Diagnosis for the situation. It is as important to review the reference sheet of the Nutrition Diagnosis from the NCPT to verify that at least one indicator described in the respective reference sheet is present in the client's assessment data. Next, a professional determines the etiology or root cause of the nutrition problem. The selection of interventions that address the etiology are more likely to provide desired nutrition care outcomes. To finalize the PES statement, a professional selects signs and symptoms that can demonstrate resolution or improvement in the nutritional diagnosis as a result of Nutrition Interventions.

Nutrition Intervention: Step 3

When possible, Nutrition Intervention is collaborative between a professional and a client. The professional plans the Nutrition Intervention after prioritizing Nutrition Diagnoses by critically considering the severity of the nutrition problem and the client's values and safety (Figure 4). Nutrition intervention has two related planning phases. In the first phase, the professional and client jointly determine achievable and measurable goals. These goals are important to define the time frame during which the nutrition problem is to be resolved, provide direction to the plan, select and implement interventions intended to achieve the goals, provide criteria to measure results of intervention during Nutrition Monitoring and Evaluation, and evaluate effectiveness of intervention and revise when indicated. The next phase is to determine the nutrition prescription and interventions that will meet the agreed upon goals. The specified activity to determine a nutrition prescription, a client's recommended dietary intake based on current reference standards and dietary guidelines,[13] is new to the current revision of NCPM (Figure 3).

Interventions are a planned set of specific behaviors or actions performed, delegated, coordinated, or recommended by a professional that move a client toward a desired outcome. The chosen interventions intend to alter or eliminate the etiology to resolve the Nutrition Diagnosis. With goals agreed upon, prescription and interventions selected, action is undertaken to implement Nutrition Intervention before proceeding to Monitoring and Evaluation.

Nutrition Monitoring and Evaluation: Step 4

During Nutrition Monitoring and Evaluation, a professional examines the timely results following implementation of Nutrition Interventions. For this update, wording was clarified to incorporate key Nutrition Monitoring and Evaluation practice actions (Figures 2 and 3). These actions include selecting quality indicators derived from best practices and evidence-based guidelines. Indicators use readily available data to provide a quantitative measure for health professionals, organizations, and planners aiming to achieve improvement in the care and the processes by which client care is delivered.[15]

A professional monitors and evaluates the progress or resolution of the Nutrition Diagnosis and determines whether Reassessment is necessary. Standardized terms to assess the extent of Nutrition Diagnosis resolution have not been developed. But, as an example, the Academy of Nutrition and Dietetics Health Informatics Infrastructure (ANDHII) currently uses the following descriptors for resolution: resolved, continued, and removed (for more information on ANDHII, see the dedicated section in this article). A Nutrition Diagnosis can be monitored and evaluated at the end of a single visit. For example, learning assessment may be evaluated at the conclusion of a nutrition education session.

Framing Rings

Two framing rings (outer and middle) contextualize the four steps of the NCP (inner ring), and the Core (Figure 2). The outer ring represents the social context of nutrition care. There are no changes in the terms used to define the outer ring. However, the scope of these terms is broader. As defined in 2008, the outer ring represented the influences on how people received nutrition information.[11] In the updated NCPM, this ring also represents how professionals engage their clients. Examples of client engagement in the outer ring include advocating public policy within social systems or using a client portal within a health care system's electronic health record for chronic care management.

The middle ring represents the required qualities and attributes that differentiate the nutrition and dietetics professionals from other professions.[11] This is to emphasize that the nutrition and dietetics professionals contribute the critical thinking, code of ethics, and evidence-based practice that are unique to nutrition and dietetics science and practice. A significant change within the middle ring was placing the word *documentation* in this ring after removing the word *document* from each step of the NCP. The expectation to document the NCP remains. Although one may argue that *communication*, also included in this ring, implies the act of documentation, in some countries communication might be limited to verbal means and documentation may not be required or might not be an allowed privilege for nutrition and dietetics professionals. The explicit inclusion of the concept of

Function	The NCP Model	The NCP Model
Review year	2008	2015
Standardized language	• International Dietetics and Nutrition Terminology • Print format (book) • Second edition (purple cover) • Third edition (green cover) • Fourth edition (yellow cover)	• Electronic • NCP Terminology • Electronic format (web-based)
Nutrition Assessment and Reassessment step (inner ring)	• Obtain/collect timely and appropriate data • Analyze/interpret with evidence-based standards • Document	• Obtain/collect important and relevant data • Analyze/interpret collected data
Nutrition Diagnosis step (inner ring)	• Identify and label problem • Determine cause/contributing risk factors • Cluster signs and symptoms/defining characteristics • Document	• Identify problem • Determine etiology/cause • State signs and symptoms
Nutrition Intervention step (inner ring)	• Plan nutrition intervention (set goals and determine a plan of action) • Implement nutrition intervention (care is delivered and actions are carried out) • Document	• Determine intervention and prescription • Formulate goals and determine action • Implement action
Nutrition Monitoring and Evaluation step (inner ring)	• Monitor progress • Measure outcome indicators • Evaluate outcomes • Document	• Select or identify quality indicators • Monitor and evaluate resolution of diagnosis
Outcomes management system	• Monitor the success of the NCP implementation • Evaluate influence with aggregate data • Identify and evaluate causes of less-than-optimal performance and outcomes • Refine use of NCP	• Research NCP • Use aggregated data to conduct research • Conduct continuous quality improvement • Calculate and report quality indicators
Center circle (core)	• Relationship between patient/client/group and nutrition and dietetics practitioner	• Individual/population interacts with nutrition and dietetics practitioner
Middle ring	• Dietetics knowledge • Skills and competencies • Critical thinking • Collaboration • Communication • Evidence-based practice • Code of ethics	• Dietetics knowledge • Skills and competencies • Critical thinking • Collaboration • Communication • Evidence-based practice • Code of ethics • Documentation
Outer ring	• Practice settings • Health care systems • Social systems • Economics	• Practice settings • Health care systems • Social systems • Economics

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Figure 3. Comparison of functions in the Nutrition Care Process (NCP) Model.

Function	The NCP Model	The NCP Model
Screening and referral system	• Identify risk factors • Use appropriate tools and methods • Improve interdisciplinary collaboration	• Identify risk factors • Use appropriate tools and methods • Improve interdisciplinary collaboration

Figure 3. *(continued)* Comparison of functions in the Nutrition Care Process (NCP) Model.

documentation in a framing ring was deemed appropriate and necessary to underline that documentation is a requirement for professionals adopting the NCPT internationally. This was important given the range of practices or requirements internationally that vary from documentation in the health record which is a legal requirement in some countries to no written documentation by dietitians because of different levels of privileges. Documentation is a desirable source of data for monitoring and evaluating care and supporting the Outcomes Management System.

The role and placement of nutrition informatics in the framing rings was considered. The consensus was that informatics provides useful tools for all parts of the NCPM and its supporting structures and did not need designation within the NCPM. Informatics tools may not be available to all professionals and professionals depend upon the outer ring for their availability.

SUPPORTING STRUCTURES

Screening and Referral System

The Screening and Referral System is external to the rings of the NCP because it may be carried out by collaborators outside the nutrition and dietetics profession. This supporting system is often developed and managed by professionals. The purpose of this system is to identify and refer those individuals and populations who already have or are at risk for nutrition-related problems, who are appropriate for nutrition care services, and who would benefit from participation in the NCP. The nutrition screening process applies appropriate, valid, and reliable screening tools and resources to identify and recognize nutritional risk factors.

Outcomes Management System

The Outcomes Management System is a supporting structure outside the NCP because it can be operated by members of various professions. As with Nutrition Screening and Referral, the Outcomes Management System intends to be collaborative with leadership from professionals. In 2008, the Outcomes

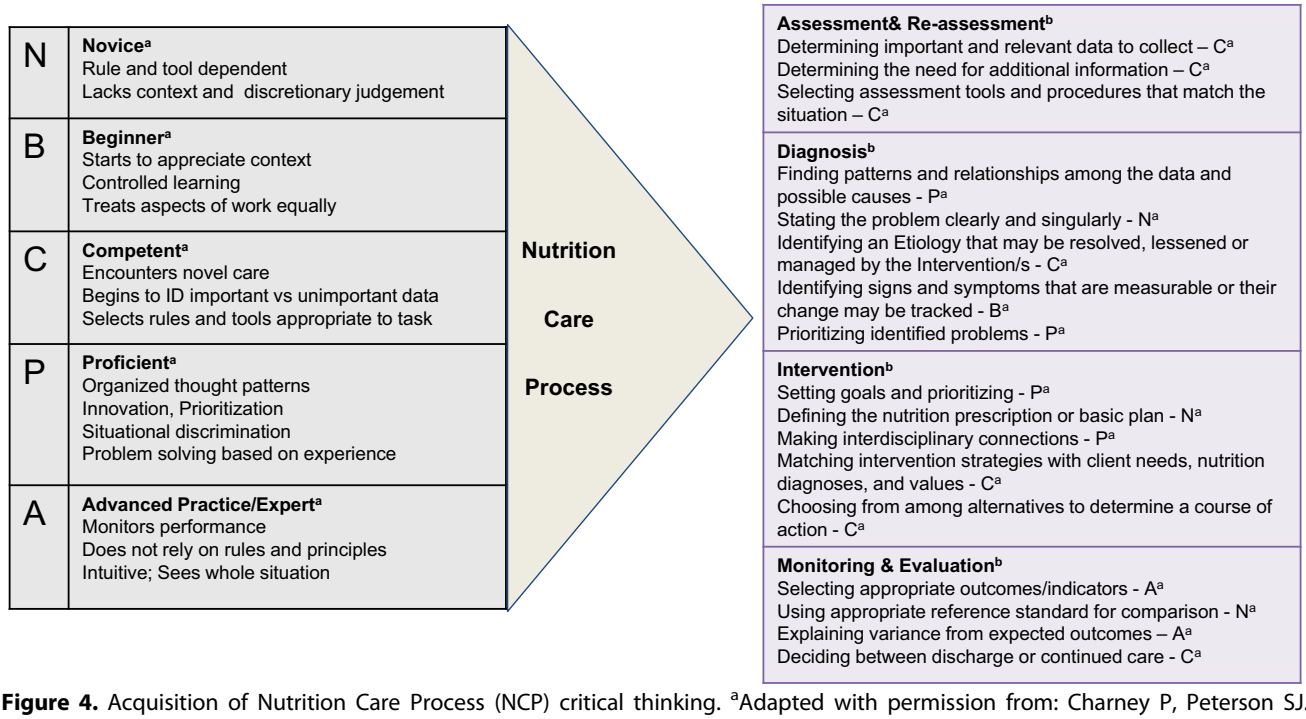

Figure 4. Acquisition of Nutrition Care Process (NCP) critical thinking. [a]Adapted with permission from: Charney P, Peterson SJ. Critical thinking skills in nutrition assessment and diagnosis. http://www.eatrightpro.org/resource/practice/position-and-practice-papers/practice-papers/practice-paper-critical-thinking-skills-in-nutrition-assessment. Published November 2013. Accessed February 16, 2017.12. [b]For each NCP step, the stated critical thinking task is labeled with the career development stage by which one should feel confident performing the task. ID=identification.

Management System emphasized improving and strengthening the NCPM within the profession through the following four actions: monitor the success of the NCP implementation, evaluate the influence [of the NCP] with aggregate data, identify and analyze causes of less than optimal [NCP] performance and outcomes, and refine the use of the NCP. These outcomes management actions continue and are combined in the updated model as Research NCP (Figure 2 and Figure 3).

The updated NCPM challenges professionals to demonstrate the improved nutritional health of clients through participation in research and quality improvement activities. Aggregated data continue to be the foundation of NCP research. Infrastructure to aggregate and manage data from the NCP did not exist in 2008. An example of this new infrastructure is the ANDHII.[16] ANDHII makes possible the new activity, "Use aggregated data to conduct research." This wording places Outcomes Management in the center of research priorities, which is necessary to drive improvements at the organization and health systems levels.[17] The implication is that all professionals when using the NCP become research participants as data contributors. Outcomes Management is no longer a function reserved for those knowledgeable in research design, data processing, and statistical analysis; rather, it becomes an integral, collaborative activity for all professionals.

Outcomes research not only includes NCP research to benefit professional development and practice, but also aims to show the beneficial effect of the NCP on the health of clients.[5] To this end, two new activities are incorporated into the Outcomes Management System of this updated NCPM. First, "Conduct continuous quality improvement" applies to improving the model and care delivery as professionals participate in a learning organization. The second activity, "Calculate and report quality indicators," supports the Academy's engagement to promote the reporting of malnutrition quality measures within the US health care system, (http://www.eatrightpro.org/resource/practice/quality-management/quality-improvement/malnutrition-quality-improvement-initiative), and the reporting of quality indicators pursued by other national health systems. These activities support professionals' ability to report quality measures and other results from the Outcomes Management System to the framing rings. The Outcomes Management System is linked to the selection of quality indicators during Nutrition Monitoring and Evaluation. Through the fully deployed Outcomes Management System, professionals influence the NCP environment defined by the framing rings.

NCPT

A terminology that describes the NCP is necessary to document the delivery and study of nutrition care. Creation of the NCPT is a contemporaneous endeavor with the development of the NCP. Terminology work began in 2003,[18] and a terminology to support the NCP was published as a printed manual in 2009: *International Dietetics and Nutrition Terminology Reference Manual: Standard Language for the Nutrition Care Process*.[19] In 2014, International Dietetics and Nutrition Terminology was converted to an electronic database, called the eNCPT, as the management of an expanding terminology (Figure 3) exceeded the capabilities of a printed manual. eNCPT is currently translated from US English into Swedish, German (Swiss), French (Canadian), Norwegian, and Danish. At the time of this writing, Chinese (Simplified), Chinese (Mandarin), Portuguese (Brazilian), and Spanish (Mexican) translations are in progress.

NCPT can be used to document nutrition care in any medium, but it is fundamental when documenting in an electronic health record. In 2011, work began to map and model the NCPT into international medical terminology standards. Mapping and modeling are essential for NCPT to be included in the document architecture for certified US electronic health records. These terminologies have also been adopted in other countries. Mapping and modeling are continuous processes because new terms are regularly being added to the NCPT. Recent additions include terms describing findings of the Nutrition Focused Physical Examination, terms resulting from moving Malnutrition Disorders into the clinical domain of Nutrition Diagnosis, a collection of terms focused on public health, and alternative synonyms for some behavior-related terms considered harsh by the international community. Documentation of the NCP using the NCPT creates data. The need to systematically collect these data and research the NCP led to the design of ANDHII, a web-based data registry.

ANDHII

ANDHII is a data aggregation platform designed to collect data generated by the application of the NCP. The platform has three functions: Smart Visits that enable data entry; Dietetics Outcomes Registry that generates reports using the aggregated data and support comparative effectiveness studies; and Nutrition Research Informatics, which facilitates data collection and management for quality improvement and research projects. The structure of ANDHII is the NCP with data being derived from NCPT.

Data aggregation schemes abound in health care. Data are routinely submitted to health information exchanges, accreditation agencies, payers, and government departments and ministries. Examples include metrics required by The Joint Commission concerning patient safety or information about 30-day readmissions requested by the Centers for Medicare and Medicaid Services.

As with any electronic platform, the Academy continuously works to improve ANDHII's usability and functionality to meet technologic, legislative, and international needs. There is potential for international use of ANDHII, although associated costs, translation, and varying research ethics regulations will need to be addressed. ANDHII has been used to explore the feasibility of validating malnutrition diagnostic criteria by aggregating data from the United States and Australia.[20] ANDHII has also been used to investigate the influence of evidence-based nutrition practice guidelines for the prevention of diabetes on both practice patterns and patient outcomes.[5,21,22]

These studies have demonstrated the potential of incorporating tools such as ANDHII into practice. With the availability of ANDHII, the Outcomes Management System can be integrated into practice much like the process of learning to write a Nutrition Diagnosis.

LOOKING AHEAD

This article describes the current NCPM update and compares and contrasts it with the 2008 version of the model.[11] Themes that emerged were concise language to promote translation, dissemination and adoption of NCP, promotion of professional-driven outcomes management with the emergence of smartphone applications and web-based data aggregation tools, and embracing PCC.[9] Further, the article describes how the NCPM is supported by its standardized terminology, NCPT, and outlines ongoing integration of NCPM/NCPT into an innovative outcomes management platform.[16]

The NCP and NCPM will continue to undergo evaluation and updating. The supporting NCPT will require refinement to sustain the reporting of quality measures and outcomes. Over the 14 years of the NCPM's adoption, the NCP community has been growing and actively contributes to the global uptake, improvement, and research of the NCP.[4-6,23-30] The NCPM has evolved with practice from a professional-defined care delivery system to a PCC interaction. The NCPM progresses from learning to write nutrition diagnoses to routinely entering outcomes of care using a data aggregation tool. The NCP is evolving to become the international standard for nutrition and dietetics care delivery. To foster this maturation, three areas of focus are recommended:

Creation of New Knowledge

- Support NCP-related research;
- use aggregated data to study all steps of the NCP in a variety of populations, practice cultures, and stages of professionals' career development;
- validate expected plans of care that link nutrition diagnoses with specific interventions to demonstrate effectiveness;
- investigate whether the NCP improves outcomes compared with not using the NCP;
- define appropriate nutrition and dietetics outcomes; and
- enhance and develop electronic, digital standards, and structures that accept NCP data.

Globalization of the NCP

- Promote adoption of the NCP and translations of the NCPT;
- support the NCP in diverse practice cultures;
- determine economic value of dietitian/nutritionist interventions with clients; and
- continue international collaborations.

Continuous Training Focused on Practice Area and Professional's Career Development Stage

- Adopt NCPM to all stages of career development, novice through expert;
- use NCPM as a framework for all practice areas, including public health, health promotion, and disease prevention;
- study NCPM as an effective tool for educating professionals in science-based practice; and
- train professionals to effectively and efficiently use PCC resources and techniques.

What Professionals Can Do

- Participate in the future and share your plans at ncp@eatright.org.
- Contribute data to ANDHII to support outcomes research.
- Collaborate in a translation of NCP and NCPT.
- Pursue continuing education focused on quality indicators.
- Advocate for the value that the NCP brings to the health of clients.
- Apply the NCP to create opportunities that integrate research, professional development, and practice for innovation and discovery.

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STATEMENT OF POTENTIAL CONFLICT OF INTEREST

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Nutrition Care Process Part II: Using the International Dietetics and Nutrition Terminology to Document the Nutrition Care Process

A regularly scheduled update of the Nutrition Care Process and Model (NCPM) was presented in Part I of this manuscript (1). Activities of registered dietitians (RDs) within the four steps of the Nutrition Care Process and Model are described using the International Dietetics and Nutrition Terminology (IDNT) (2). This standardized language or controlled vocabulary is being developed to describe the unique functions of dietetics in nutrition assessment, nutrition diagnosis, nutrition intervention, and nutrition monitoring and evaluation. The IDNT is designed to facilitate clear and consistent descriptions of the services RDs provide both within and outside the profession.

The NCPM and IDNT are complementary tools. The NCPM is a problem-solving model, while the IDNT provides a standardized set of terms used to describe the results of each step of the model. The vision for these tools is not only to facilitate communication, but to enable researchers to more clearly describe the types of nutrition problems observed in patient populations, the interventions provided, and the results of those interventions. These tools will also facilitate medical record documentation as the health care system moves to implement the federal mandate of an electronic health record for every American by 2014 (3). A single set of defined terms, the IDNT will facilitate including RD activities in not only electronic health records, but also in policies, procedures, rules, and legislation. The purpose of this article is to review how the standardized language is being developed and how it may be used to document care.

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BACKGROUND

The IDNT was conceived as a controlled vocabulary, defined by the National Library of Medicine as a system of terms, involving definitions, hierarchical structure, and cross-references, used to index and retrieve a body of literature in a bibliographic, factual, or other database (4). RDs are familiar with standardized languages such as the International Classification of Diseases (ICD-9/ICD-10) and the Common Procedural Terms (CPT) that are used extensively in health systems management (5,6). The American Medical Association, which owns and licenses the CPT codes, has designated two terms for use by RDs (7). The nursing, physical therapy, and occupational therapy professions have created controlled vocabularies or standardized languages that describe their unique functions (8-10). Some of these vocabularies contain nutrition terms, but none of the terms adequately describe the breadth and depth of activities unique to the profession of dietetics.

THE STANDARDIZED LANGUAGE OF DIETETICS

Development of a standardized language for dietetics began in 2003 when a logic model was created to guide the process (Figure 1). Logic models are used in industry to facilitate project management and measure project outcomes (11). Major project milestones and completion dates are included in Figure 1 and summarized in the following text. Since the NCPM was introduced, more than 60 nutrition diagnoses have been identified to describe nutrition problems that an RD can independently treat (2). More than 70 terms have been developed to describe nutrition interventions, defined as purposefully planned actions designed to change a nutrition-related behavior, environmental condition, or aspect of health status for an individual, target group, or community (2). Definitions have also been developed for more than 170 nutrition monitoring and evaluation parameters which may be used to measure change in outcomes relative to the nutrition diagnosis and intervention (2). Plans are in place to develop and validate scales for the monitoring and evaluation step of the Nutrition Care Process. A fall 2008 release is planned for the 2009 version of the standardized language which will add nutrition assessment terms to more than 300 existing terms. The hierarchy of terms and their relationship to the steps of the Nutrition Care Process is found in Figure 2.

Validation and Revision

Like other standardized languages, the IDNT is republished annually so that it can be revised based on validation studies and changes in practice (12). Members of the Dietetics Practice-Based Research Network participated in reliability and data validation studies of the nutrition diagnostic terms. These results are incorporated into the IDNT. In 2007, reference sheets for more than half of the nutrition diagnoses were clarified to more accurately reflect signs and symptoms identified in practice (2). Users of the IDNT are encouraged to submit changes to the terms using accepted forms and procedures. Local modifications of the terminology are strongly discouraged as this

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Goal: To provide data to foster nutrition practice, education, research and policy

Input → **Outputs** → **Outcomes – Impact**

Inputs *Investments*	**Activities** *What we do*	**Participation** *Who we reach*	**Short Term**	**Medium Term**	**Long Term** *Ultimate impact*
• ADA's Nutrition Care Model Workgroup • ADA's Standardized Language Task Force • ADA's members and House of Delegates • Partners • Stakeholders • Consumers	• Create the Nutrition Care Process and Model (2003) • Create the Conceptual Framework for a Standardized Nutrition Language (2004) • Create and revise the publication(s) of terminology and supporting reference material (ongoing)	• ADA members • Peer Network for Nutrition Diagnosis • Dietetic Practice Groups • House of Delegates • Board of Directors • Clients • Partners • Associated health care providers • Consultants • Agencies • Policy makers	• Consultants appointed (2004) • Create and approve Project Logic Model incorporating Nutrition-Care Process and Model and the Conceptual Framework for a Standardized Nutrition Language (2003) • Recommend interface with ABC code list (2004) • Review options for the structure of nutrition diagnostic terminology (2004) • Establish structure and processes for Task Force members to cross-walk current nutrition diagnostic terms with SNOMED (2003) • Draft cross-walk of diagnostic terms and evaluable results (2004) • Review relevant intervention terms in other controlled vocabularies (2003) • Identify important policy issues relevant to standardized nutrition language (2003)	• Decide preferred structure for International Dietetics and Nutrition Standardized Language (2003-2007) • Establish structure and processes for Task Force members to select relevant intervention terms and cross-walk with SNOMED (2004) • Draft cross-walk of intervention terms and evaluate results (2005) • Review relevant assessment terms in other controlled languages (2008) • Disseminate results of the process and outcomes of the Nutrition Care Process and Standardized Language Committee (ongoing) • Create resources and strategies for ongoing maintenance and updates of standardized terminology by ADA and/or partners (ongoing) • Design and develop mechanisms to link with other data sources and benchmarks (2005) • Draft legislative and policy agenda relevant to standardized nutrition language • Determine and market products to support both the Nutrition Care Process and International Dietetics and Nutrition Standardized Language (ongoing)	• Quality, cost-effective nutrition care delivered in partnership with providers, agencies, and communities • Nutrition care grows nationally • Standardized nutrition language included in dietitian education • Standardized language used in research contributing to the discipline (ongoing) • Ongoing maintenance and updates of standardized terminology accomplished by ADA and/or partners (ongoing) • Evaluate a national data warehouse established for a sustainable, reliable, useful database for ADA/dietitians/researchers • National, state, and local policies developed and supported to foster nutrition practice, education, and research • Incorporate Nutrition Care Process and International Dietetics and Nutrition Standardized Language into dietetics practice world-wide (ongoing)

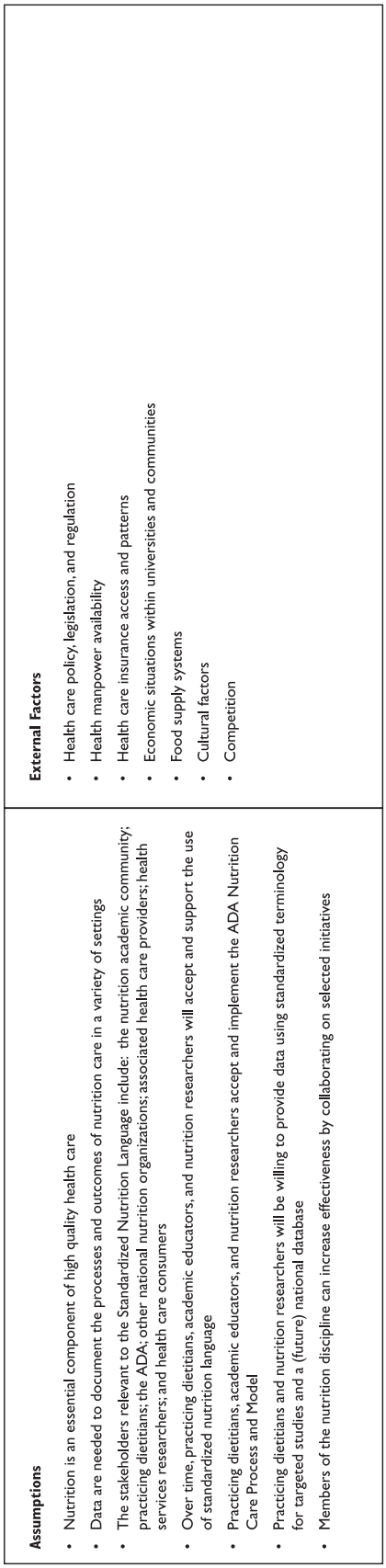

Figure 1. Logic model for standardized nutrition language within The American Dietetic Association (ADA). The goal is to provide data to foster nutrition practice, education, research, and policy.

practice not only defeats the purpose of a standardized vocabulary, but compromises the ability to compare data across institutions and practice settings. As time progresses, synonyms may be offered where there is a specified practice need for varying terms to be used to reflect the same concept.

Documentation of Nutrition Care

A primary use of the IDNT is to document nutrition care in the medical record. According to the American Health Information Management Association, a medical record serves as the legal record substantiating health care services provided to a patient, as a method of communication among health care providers caring for a patient, and as supporting documentation for reimbursement of services provided (13). Food and nutrition professionals have been documenting nutrition care in medical records since ADA and the American Hospital Association introduced joint documentation guidelines in 1966 (14).

In practice, RDs use many different formats for medical record documentation. Documentation may follow the steps of the NCP (eg, A-Nutrition Assessment, D-Nutrition Diagnosis, I-Nutrition Intervention, ME-Nutrition Monitoring and Evaluation) or the standardized language may be incorporated into other formats, including the electronic health record, which may offer a very different documentation system than conventional paper formats. Incorporating the IDNT into the electronic health record is essential to describe the nutrition care provided to patients and clients. Clearly established language describing nutrition assessment, diagnoses, interventions, and monitoring and evaluation will facilitate database queries and data compilation not practical with a paper record. A standardized language that describes unique dietetics functions will enhance the visibility of the RD to providers and further distinguish the RD as the expert provider of nutrition care. Regardless of the exact format used, quality documentation is ongoing, relevant, accurate, and timely. It includes:

- Nutrition-related assessment data, including pertinent food and nutrition history, biochemical data, medical tests and procedures, anthropometric measurements, nutrition-focused physical exam findings, and client history. The assessment may also include comparing data with pertinent standards.
- A clear concise statement of nutrition diagnosis(es) written in the general format: "Diagnosis" related to "etiology" as evidenced by "signs and symptoms" where a term from the most current version of the Nutrition Diagnosis Terminology is used to describe the problem. A nutrition diagnosis is the current impression of an RD. Therefore, it may be changed or revised as new information becomes available. The patient may have more than one nutrition diagnosis or the words "no nutrition diagnosis at this time" may be documented in the medical record if the assessment indicates that no nutrition problem currently exists that warrants a nutrition intervention.
- A description of the nutrition intervention is implemented to further the patient's/client's/group's progress toward the nutrition prescription, which is written by a registered dietitian to describe a patient's individualized needs. The intervention is linked to a specific nutrition diagnosis. Failure to link nutrition intervention to nutrition diagnosis has been identified as a deficit in existing documentation systems (15). Thus, each intervention is planned and accompanying goals are established with the patient/client/group.
- A description of the nutrition monitoring and evaluation is used to identify patient/client outcomes relevant to the nutrition diagnosis and intervention plans and goals. The change in specific nutrition outcome indicators can be measured and compared to previous status, nutrition intervention goals, or reference standards.

Abbreviated examples incorporating standardized language into documentation are found in Figure 3.

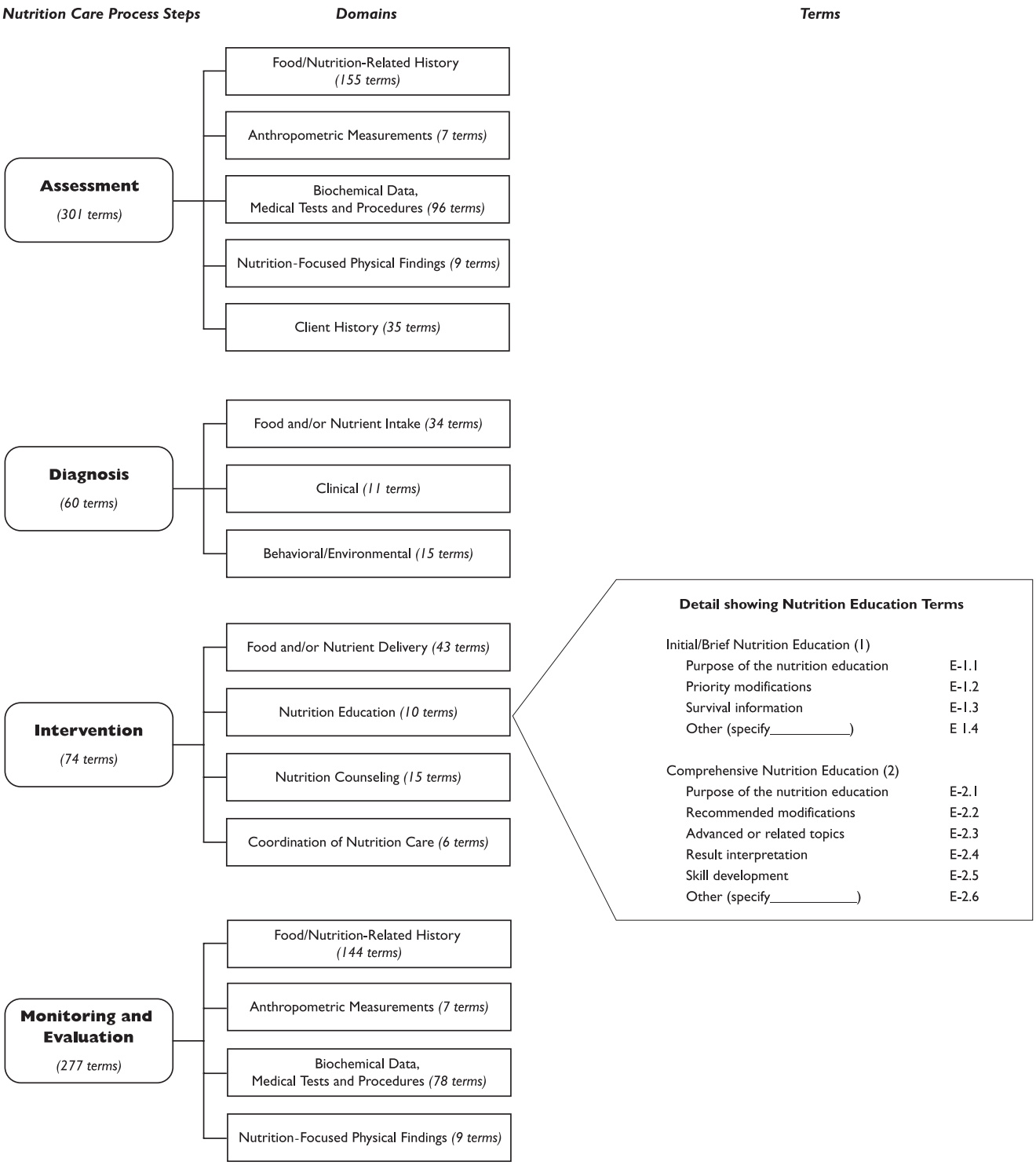

Figure 2. International Dietetics and Nutrition Terminology hierarchy.

Reimbursement and Regulation

Another use of the IDNT is to facilitate implementation of the standard protocols that RDs must use to obtain reimbursement for providing nutrition services. The IDNT is being incorporated into the evidence-based guides to practice and toolkits for use by RDs. As RDs apply these tools and collect outcomes data, clear links between nutrition diagnoses and nutrition interventions will appear. Data

Assessment	Diagnosis	Intervention	Monitoring and Evaluation
Case 1		**Acute Care, Hospital, or other Inpatient Setting**	
Biochemical data Within normal limits **Anthropometric data** Height 5'4"; weight 180 lb **Physical examination findings** Appears overweight **Client history** 47-year-old female 4th grade teacher with extensive medical and surgical history that is noncontributory to her nutrition complaint of 60 lb weight gain over 18 months. Food and nutrition history includes a usual intake of about 2,200 calories, eating when she is not hungry, and daily consumption of large portions of fried foods.	Excessive oral food and beverage intake (NI-2.2) (problem) related to lack of appetite awareness (etiology) as evidenced by history of eating when she is not hungry, and frequent consumption of fried foods (signs)	Nutrition prescription: 1,600-calorie diet Nutrition intervention: recommend, implement, or order a modification of meals and snacks (ND-1.2) Recommend, implement, or order coordination of care as needed on discharge (RC-1.2)	1. Food intake (1.3.2) 2. Total energy intake (1.2.1).
		Private Practice or Other Ambulatory Setting	
		Nutrition prescription: 1,600-calorie diet Nutrition intervention: collaborate with the patient to identify behavior change goals and use cognitive behavioral theory-based counseling strategies to address the goals over a period of several months (C-1)	1. Adherence to recommendations (BE-2.4.1) 2. Weight change (4.1).
Case 2		**Long-Term Care Setting**	
Biochemical data Within normal limits **Anthropometric data** Height 5'7"; weight 140 lb **Physical examination findings** Appears normal weight **Client history** 85-year-old nursing home resident whose weight has declined 8 lb (5%) over the last 30 days when a fall resulted in a broken shoulder.	Involuntary weight loss (NC-3.2) (problem) related to impaired self feeding ability (etiology) as evidenced by difficulty eating while wearing a cast and 5% weight loss in 30 days (signs)	Nutrition prescription: General diet with supplemental beverages twice daily Nutrition intervention: increase food and nutrient intake to the level in the nutrient prescription using supplements (ND-3.1)	1. Reports of/actual supplement intake (1.3.1) 2. Weight change (4.1).

Figure 3. Sample documentation using terms from the International Dietetics and Nutrition Terminology. Code numbers for the terms are included after each term as a convenience to the reader. It is not necessary to include the code numbers in hand-written documentation. Depending upon the system used, the codes may facilitate data retrieval from electronic health records.

demonstrating resolution of nutrition diagnoses and standardized descriptions of effective nutrition interventions can be used to demonstrate the value of dietetics services. These data can also be shared with payers, federal agencies, and accrediting bodies to influence coverage and compensation decisions.

Nutrition Informatics

It is expected that the IDNT will have an important role in nutrition informatics. Health care providers use biomedical informatics to integrate scientific knowledge with clinician expertise to optimize health outcomes (16). Nutrition informatics, defined as the effective retrieval, organization, storage, and optimum use of information data and knowledge for food- and nutrition-related problem solving and decision making is one of the newest branches of biomedical informatics. Because the purpose of NCP is to optimize nutrition-related outcomes, it makes sense that it acts as a framework for nutrition informatics in practice. The IDNT parallels like efforts in other professions as health care leaders collaborate to standardize terms and languages across disciplines for use in electronic health records. Because data management requires a consistent, structured framework and the NCP provides such a framework, food and nutrition professionals who integrate the NCP with computerized systems will be able to readily identify the datasets needed to demonstrate the impact that quality nutrition care has on health outcomes.

Standardized terminologies such as the IDNT support accurate data entry, management, retrieval, and correlation. When the IDNT is integrated into computerized systems, and clinicians consistently and correctly enter data into electronic health records, terminology experts are able to identify and retrieve not only a given dietetics term, but can also be assured that the definition of the term will remain constant regardless of geographic or temporal differences. When terminology data-

bases include the IDNT, electronic systems can be developed to recognize not only a given term, but also synonyms of that term that might be in common use.

Incorporation into Other Controlled Vocabularies

As the IDNT is further tested and validated, it can be incorporated into larger standardized languages such as the Systematized Nomenclature of Medicine—Clinical Terms; Logical Observation Identifiers, Names, and Codes; or United Medical Language Systems, which describe aspects of care provided by all medical disciplines. ADA has also been in contact with the federal Office of the National Coordinator of Health Information Technology about incorporating the IDNT into their initiatives. In addition, ADA is acknowledged by the Systematized Nomenclature of Medicine as a standards-developing organization that is developing and maintaining a standardized language.

Using the Standardized Language and Electronic Health Records in Research

If RDs consistently use the IDNT to document in electronic health records, unprecedented amounts of available data can be analyzed and the results used to improve nutrition care. If standardized language is used in reporting the results of research studies, comparison of the results from different studies and possible meta-analysis will be simplified. Incorporating the standardized language into electronic health records also offers opportunities and efficiencies to researchers conducting clinical trials, measuring outcomes and cost effectiveness, and for secondary use of data for population studies (17). Data generated in this manner can be used to support and expand dietetics practice.

CONCLUSIONS

During the past 5 years, more than 300 terms describing three steps of NCP have been defined and reviewed by experts. With the release of the nutrition assessment terms in 2008, the first complete version of the IDNT will be available for use by all food and nutrition professionals in all practice settings. Once the standardized language is validated, it can be incorporated into larger documentation systems. The IDNT will be used to facilitate communication in describing nutrition problems and the effectiveness of dietetic services in practice and research.

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BACKGROUND

The IDNT was conceived as a controlled vocabulary, defined by the National Library of Medicine as a system of terms, involving definitions, hierarchical structure, and cross-references, used to index and retrieve a body of literature in a bibliographic, factual, or other database (4). RDs are familiar with standardized languages such as the International Classification of Diseases (ICD-9/ICD-10) and the Common Procedural Terms (CPT) that are used extensively in health systems management (5,6). The American Medical Association, which owns and licenses the CPT codes, has designated two terms for use by RDs (7). The nursing, physical therapy, and occupational therapy professions have created controlled vocabularies or standardized languages that describe their unique functions (8-10). Some of these vocabularies contain nutrition terms, but none of the terms adequately describe the breadth and depth of activities unique to the profession of dietetics.

THE STANDARDIZED LANGUAGE OF DIETETICS

Development of a standardized language for dietetics began in 2003 when a logic model was created to guide the process (Figure 1). Logic models are used in industry to facilitate project management and measure project outcomes (11). Major project milestones and completion dates are included in Figure 1 and summarized in the following text. Since the NCPM was introduced, more than 60 nutrition diagnoses have been identified to describe nutrition problems that an RD can independently treat (2). More than 70 terms have been developed to describe nutrition interventions, defined as purposefully planned actions designed to change a nutrition-related behavior, environmental condition, or aspect of health status for an individual, target group, or community (2). Definitions have also been developed for more than 170 nutrition monitoring and evaluation parameters which may be used to measure change in outcomes relative to the nutrition diagnosis and intervention (2). Plans are in place to develop and validate scales for the monitoring and evaluation step of the Nutrition Care Process. A fall 2008 release is planned for the 2009 version of the standardized language which will add nutrition assessment terms to more than 300 existing terms. The hierarchy of terms and their relationship to the steps of the Nutrition Care Process is found in Figure 2.

Validation and Revision

Like other standardized languages, the IDNT is republished annually so that it can be revised based on validation studies and changes in practice (12). Members of the Dietetics Practice-Based Research Network participated in reliability and data validation studies of the nutrition diagnostic terms. These results are incorporated into the IDNT. In 2007, reference sheets for more than half of the nutrition diagnoses were clarified to more accurately reflect signs and symptoms identified in practice (2). Users of the IDNT are encouraged to submit changes to the terms using accepted forms and procedures. Local modifications of the terminology are strongly discouraged as this

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Goal: To provide data to foster nutrition practice, education, research and policy

Input → **Outputs** → **Outcomes – Impact**

Inputs *Investments*	**Activities** *What we do*	**Participation** *Who we reach*	**Short Term**	**Medium Term**	**Long Term** *Ultimate impact*
• ADA's Nutrition Care Model Workgroup • ADA's Standardized Language Task Force • ADA's members and House of Delegates • Partners • Stakeholders • Consumers	• Create the Nutrition Care Process and Model (2003) • Create the Conceptual Framework for a Standardized Nutrition Language (2004) • Create and revise the publication(s) of terminology and supporting reference material (ongoing)	• ADA members • Peer Network for Nutrition Diagnosis • Dietetic Practice Groups • House of Delegates • Board of Directors • Clients • Partners • Associated health care providers • Consultants • Agencies • Policy makers	• Consultants appointed (2004) • Create and approve Project Logic Model incorporating Nutrition-Care Process and Model and the Conceptual Framework for a Standardized Nutrition Language (2003) • Recommend interface with ABC code list (2004) • Review options for the structure of nutrition diagnostic terminology (2004) • Establish structure and processes for Task Force members to cross-walk current nutrition diagnostic terms with SNOMED (2003) • Draft cross-walk of diagnostic terms and evaluable results (2004) • Review relevant intervention terms in other controlled vocabularies (2003) • Identify important policy issues relevant to standardized nutrition language (2003)	• Decide preferred structure for International Dietetics and Nutrition Standardized Language (2003-2007) • Establish structure and processes for Task Force members to select relevant intervention terms and cross-walk with SNOMED (2004) • Draft cross-walk of intervention terms and evaluate results (2005) • Review relevant assessment terms in other controlled languages (2008) • Disseminate results of the process and outcomes of the Nutrition Care Process and Standardized Language Committee (ongoing) • Create resources and strategies for ongoing maintenance and updates of standardized terminology by ADA and/or partners (ongoing) • Design and develop mechanisms to link with other data sources and benchmarks (2005) • Draft legislative and policy agenda relevant to standardized nutrition language • Determine and market products to support both the Nutrition Care Process and International Dietetics and Nutrition Standardized Language (ongoing)	• Quality, cost-effective nutrition care delivered in partnership with providers, agencies, and communities • Nutrition care grows nationally • Standardized nutrition language included in dietitian education • Standardized language used in research contributing to the discipline (ongoing) • Ongoing maintenance and updates of standardized terminology accomplished by ADA and/or partners (ongoing) • Evaluate a national data warehouse established for a sustainable, reliable, useful database for ADA/dietitians/researchers • National, state, and local policies developed and supported to foster nutrition practice, education, and research • Incorporate Nutrition Care Process and International Dietetics and Nutrition Standardized Language into dietetics practice world-wide (ongoing)

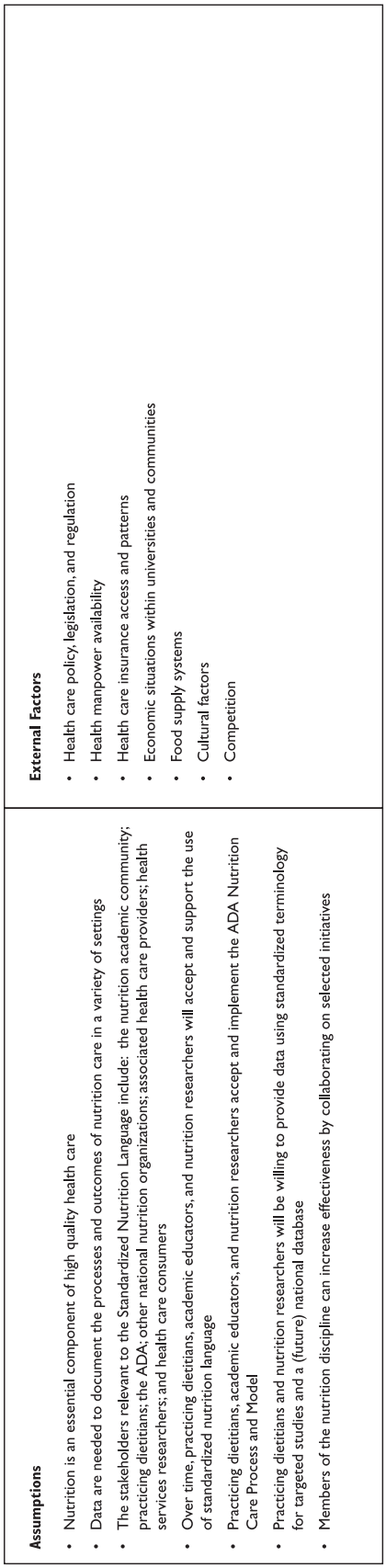

Figure 1. Logic model for standardized nutrition language within The American Dietetic Association (ADA). The goal is to provide data to foster nutrition practice, education, research, and policy.

practice not only defeats the purpose of a standardized vocabulary, but compromises the ability to compare data across institutions and practice settings. As time progresses, synonyms may be offered where there is a specified practice need for varying terms to be used to reflect the same concept.

Documentation of Nutrition Care

A primary use of the IDNT is to document nutrition care in the medical record. According to the American Health Information Management Association, a medical record serves as the legal record substantiating health care services provided to a patient, as a method of communication among health care providers caring for a patient, and as supporting documentation for reimbursement of services provided (13). Food and nutrition professionals have been documenting nutrition care in medical records since ADA and the American Hospital Association introduced joint documentation guidelines in 1966 (14).

In practice, RDs use many different formats for medical record documentation. Documentation may follow the steps of the NCP (eg, A-Nutrition Assessment, D-Nutrition Diagnosis, I-Nutrition Intervention, ME-Nutrition Monitoring and Evaluation) or the standardized language may be incorporated into other formats, including the electronic health record, which may offer a very different documentation system than conventional paper formats. Incorporating the IDNT into the electronic health record is essential to describe the nutrition care provided to patients and clients. Clearly established language describing nutrition assessment, diagnoses, interventions, and monitoring and evaluation will facilitate database queries and data compilation not practical with a paper record. A standardized language that describes unique dietetics functions will enhance the visibility of the RD to providers and further distinguish the RD as the expert provider of nutrition care. Regardless of the exact format used, quality documentation is ongoing, relevant, accurate, and timely. It includes:

- Nutrition-related assessment data, including pertinent food and nutrition history, biochemical data, medical tests and procedures, anthropometric measurements, nutrition-focused physical exam findings, and client history. The assessment may also include comparing data with pertinent standards.
- A clear concise statement of nutrition diagnosis(es) written in the general format: "Diagnosis" related to "etiology" as evidenced by "signs and symptoms" where a term from the most current version of the Nutrition Diagnosis Terminology is used to describe the problem. A nutrition diagnosis is the current impression of an RD. Therefore, it may be changed or revised as new information becomes available. The patient may have more than one nutrition diagnosis or the words "no nutrition diagnosis at this time" may be documented in the medical record if the assessment indicates that no nutrition problem currently exists that warrants a nutrition intervention.
- A description of the nutrition intervention is implemented to further the patient's/client's/group's progress toward the nutrition prescription, which is written by a registered dietitian to describe a patient's individualized needs. The intervention is linked to a specific nutrition diagnosis. Failure to link nutrition intervention to nutrition diagnosis has been identified as a deficit in existing documentation systems (15). Thus, each intervention is planned and accompanying goals are established with the patient/client/group.
- A description of the nutrition monitoring and evaluation is used to identify patient/client outcomes relevant to the nutrition diagnosis and intervention plans and goals. The change in specific nutrition outcome indicators can be measured and compared to previous status, nutrition intervention goals, or reference standards.

Abbreviated examples incorporating standardized language into documentation are found in Figure 3.

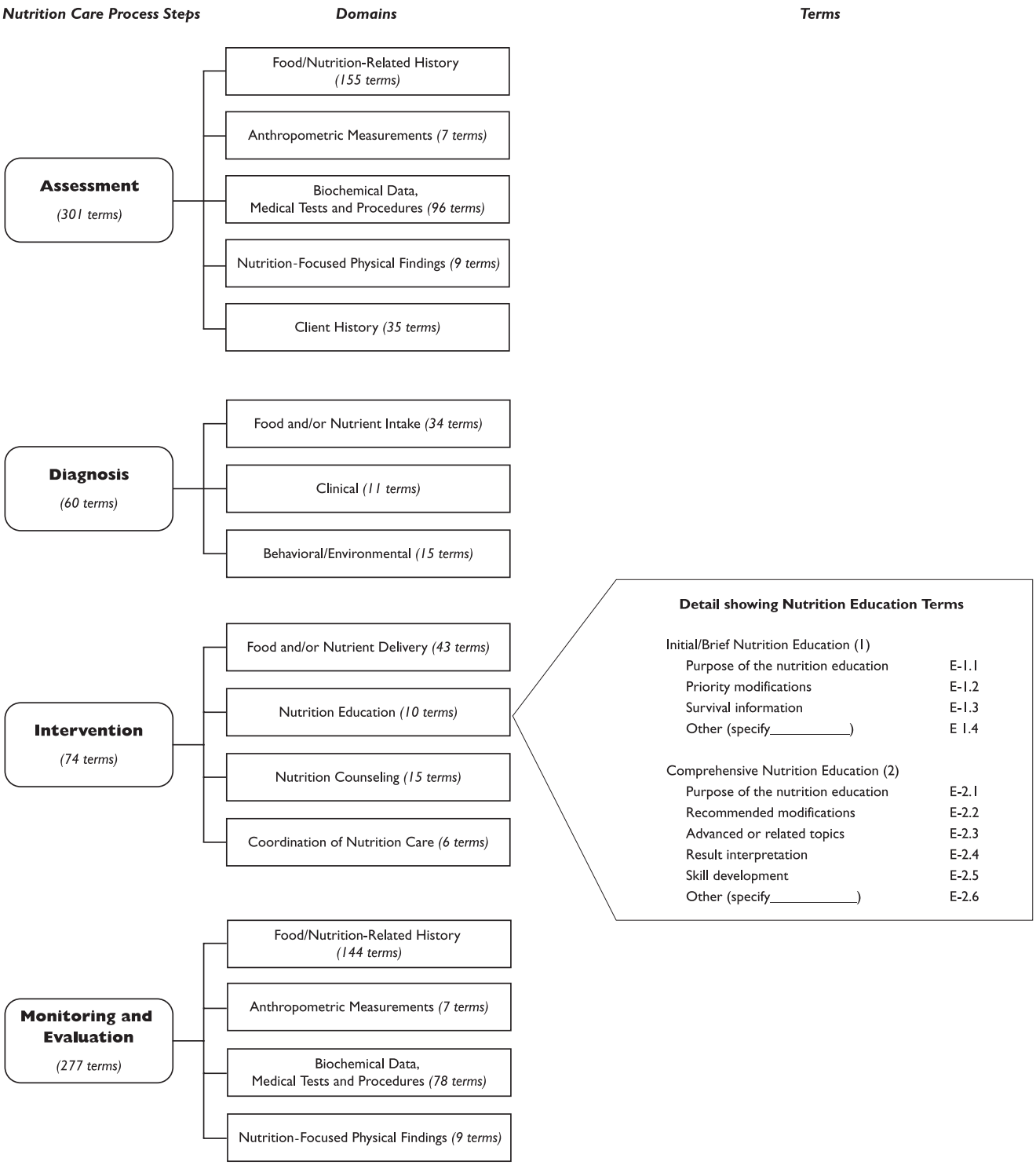

Figure 2. International Dietetics and Nutrition Terminology hierarchy.

Reimbursement and Regulation

Another use of the IDNT is to facilitate implementation of the standard protocols that RDs must use to obtain reimbursement for providing nutrition services. The IDNT is being incorporated into the evidence-based guides to practice and toolkits for use by RDs. As RDs apply these tools and collect outcomes data, clear links between nutrition diagnoses and nutrition interventions will appear. Data

Assessment	Diagnosis	Intervention	Monitoring and Evaluation
Case 1		**Acute Care, Hospital, or other Inpatient Setting**	
Biochemical data Within normal limits **Anthropometric data** Height 5'4"; weight 180 lb **Physical examination findings** Appears overweight **Client history** 47-year-old female 4th grade teacher with extensive medical and surgical history that is noncontributory to her nutrition complaint of 60 lb weight gain over 18 months. Food and nutrition history includes a usual intake of about 2,200 calories, eating when she is not hungry, and daily consumption of large portions of fried foods.	Excessive oral food and beverage intake (NI-2.2) (problem) related to lack of appetite awareness (etiology) as evidenced by history of eating when she is not hungry, and frequent consumption of fried foods (signs)	Nutrition prescription: 1,600-calorie diet Nutrition intervention: recommend, implement, or order a modification of meals and snacks (ND-1.2) Recommend, implement, or order coordination of care as needed on discharge (RC-1.2)	1. Food intake (1.3.2) 2. Total energy intake (1.2.1).
		Private Practice or Other Ambulatory Setting	
		Nutrition prescription: 1,600-calorie diet Nutrition intervention: collaborate with the patient to identify behavior change goals and use cognitive behavioral theory-based counseling strategies to address the goals over a period of several months (C-1)	1. Adherence to recommendations (BE-2.4.1) 2. Weight change (4.1).
Case 2		**Long-Term Care Setting**	
Biochemical data Within normal limits **Anthropometric data** Height 5'7"; weight 140 lb **Physical examination findings** Appears normal weight **Client history** 85-year-old nursing home resident whose weight has declined 8 lb (5%) over the last 30 days when a fall resulted in a broken shoulder.	Involuntary weight loss (NC-3.2) (problem) related to impaired self feeding ability (etiology) as evidenced by difficulty eating while wearing a cast and 5% weight loss in 30 days (signs)	Nutrition prescription: General diet with supplemental beverages twice daily Nutrition intervention: increase food and nutrient intake to the level in the nutrient prescription using supplements (ND-3.1)	1. Reports of/actual supplement intake (1.3.1) 2. Weight change (4.1).

Figure 3. Sample documentation using terms from the International Dietetics and Nutrition Terminology. Code numbers for the terms are included after each term as a convenience to the reader. It is not necessary to include the code numbers in hand-written documentation. Depending upon the system used, the codes may facilitate data retrieval from electronic health records.

demonstrating resolution of nutrition diagnoses and standardized descriptions of effective nutrition interventions can be used to demonstrate the value of dietetics services. These data can also be shared with payers, federal agencies, and accrediting bodies to influence coverage and compensation decisions.

Nutrition Informatics

It is expected that the IDNT will have an important role in nutrition informatics. Health care providers use biomedical informatics to integrate scientific knowledge with clinician expertise to optimize health outcomes (16). Nutrition informatics, defined as the effective retrieval, organization, storage, and optimum use of information data and knowledge for food- and nutrition-related problem solving and decision making is one of the newest branches of biomedical informatics. Because the purpose of NCP is to optimize nutrition-related outcomes, it makes sense that it acts as a framework for nutrition informatics in practice. The IDNT parallels like efforts in other professions as health care leaders collaborate to standardize terms and languages across disciplines for use in electronic health records. Because data management requires a consistent, structured framework and the NCP provides such a framework, food and nutrition professionals who integrate the NCP with computerized systems will be able to readily identify the datasets needed to demonstrate the impact that quality nutrition care has on health outcomes.

Standardized terminologies such as the IDNT support accurate data entry, management, retrieval, and correlation. When the IDNT is integrated into computerized systems, and clinicians consistently and correctly enter data into electronic health records, terminology experts are able to identify and retrieve not only a given dietetics term, but can also be assured that the definition of the term will remain constant regardless of geographic or temporal differences. When terminology data-

bases include the IDNT, electronic systems can be developed to recognize not only a given term, but also synonyms of that term that might be in common use.

Incorporation into Other Controlled Vocabularies

As the IDNT is further tested and validated, it can be incorporated into larger standardized languages such as the Systematized Nomenclature of Medicine—Clinical Terms; Logical Observation Identifiers, Names, and Codes; or United Medical Language Systems, which describe aspects of care provided by all medical disciplines. ADA has also been in contact with the federal Office of the National Coordinator of Health Information Technology about incorporating the IDNT into their initiatives. In addition, ADA is acknowledged by the Systematized Nomenclature of Medicine as a standards-developing organization that is developing and maintaining a standardized language.

Using the Standardized Language and Electronic Health Records in Research

If RDs consistently use the IDNT to document in electronic health records, unprecedented amounts of available data can be analyzed and the results used to improve nutrition care. If standardized language is used in reporting the results of research studies, comparison of the results from different studies and possible meta-analysis will be simplified. Incorporating the standardized language into electronic health records also offers opportunities and efficiencies to researchers conducting clinical trials, measuring outcomes and cost effectiveness, and for secondary use of data for population studies (17). Data generated in this manner can be used to support and expand dietetics practice.

CONCLUSIONS

During the past 5 years, more than 300 terms describing three steps of NCP have been defined and reviewed by experts. With the release of the nutrition assessment terms in 2008, the first complete version of the IDNT will be available for use by all food and nutrition professionals in all practice settings. Once the standardized language is validated, it can be incorporated into larger documentation systems. The IDNT will be used to facilitate communication in describing nutrition problems and the effectiveness of dietetic services in practice and research.

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