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. 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. Potential target audiences for the NCPM include practitioners, educators and students, professionals revisit previous steps of the NCPM. As new information is collected, a recommendation 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...
### 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

(continued on next page)
### 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;

Figure 1. (continued) The 4 Steps of the Nutrition Care Process Model with distinguishing characteristics.
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ulations are referred to as clients 
able groups. Individuals and pop-
ities is an interaction.

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, pro-
fessional interactions that influence 
individuals and populations are recog-
nized and incorporated into the model. 
Populations refers to demographically 
defined groups or otherwise identifi-
able groups. Individuals and pop-
ulations 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 encom-
passes 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 cli-
ent(s) is an interaction.

**NCPM**

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ent(s) is an interaction.

**Nutrition Assessment and**
**Reassessment: Step 1**

Nutrition Assessment and Reassessment is a systematic approach for col-
llecting, classifying, and synthesizing 
data to describe nutritional status, 
related nutrition problems, and their 
causes. Nutrition Assessment is initi-
ated from nutrition screening or client 
referral. Nutrition Assessment is a 
continuous process requiring initial 
data collection with continued reas-
essment 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 pro-
fessionals are familiar with performing 
a Nutrition Assessment, the systematic 
approach of Nutrition Assessment and 
Reassessment coupled with standard-
ized terminology facilitates organized 
documentation, encourages critical 
thinking, and supports communication, 
collaboration, and quality care for cli-
ents with nutrition-related problems.5

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

<table>
<thead>
<tr>
<th>Critical thinking</th>
<th>Selecting appropriate outcomes/indicators</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Using appropriate reference standard for comparison</td>
</tr>
<tr>
<td></td>
<td>• Defining where client is in terms of expected outcomes</td>
</tr>
<tr>
<td></td>
<td>• Explaining variance from expected outcomes</td>
</tr>
<tr>
<td></td>
<td>• Determining factors that help or hinder progress</td>
</tr>
<tr>
<td></td>
<td>• Deciding between discharge or continued care</td>
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</tbody>
</table>

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

*Figure 3. Comparison of functions in the Nutrition Care Process (NCP) Model.*
through Nutrition Intervention. A Nutrition Diagnosis (eg, inconsistent carbohydrate intake) 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. 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. 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

### Table: Functions of the Nutrition Care Process (NCP) Model

<table>
<thead>
<tr>
<th>Function</th>
<th>The NCP Model</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Screening and referral system</td>
<td>• Identify risk factors • Use appropriate tools and methods • Improve interdisciplinary collaboration</td>
<td>• Identify risk factors • Use appropriate tools and methods • Improve interdisciplinary collaboration</td>
</tr>
</tbody>
</table>

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

Figure 4. Acquisition of Nutrition Care Process (NCP) critical thinking. 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. 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.
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, 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.

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. 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. 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 documentation in a framing ring was deemed appropriate and necessary to underline that documentation is a requirement for professionals adopting the NCP 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 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. 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. 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. 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, 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. 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 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. 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.

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.\textsuperscript{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.\textsuperscript{11} 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.\textsuperscript{10}

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.\textsuperscript{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 ncprights.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.

References
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STATEMENT OF POTENTIAL CONFLICT OF INTEREST

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