Agency for Healthcare Research and Quality
Advancing Excellence in Health Care

NATIONAL GUIDELINE CLEARINGHOUSE

General

Guideline Title

Oncology evidence-based nutrition practice guideline.

Bibliographic Source(s)

Academy of Nutrition and Dietetics. Oncology evidence-based nutrition practice guideline. Chicago (IL): Academy of Nutrition and Dietetics; 2013. Various p.

Guideline Status

This is the current release of the guideline.

This guideline updates a previous version: American Dietetic Association (ADA). Oncology evidence-based nutrition practice guideline. Chicago (IL): American Dietetic Association (ADA); 2007 Oct. Various p. [46 references]

This guideline meets NGC's 2013 (revised) inclusion criteria.

Recommendations

Major Recommendations

Ratings for the strength of the recommendations (Strong, Fair, Weak, Consensus, Insufficient Evidence), conclusion grades (I-V), and statement labels (Conditional versus Imperative) are defined at the end of the "Major Recommendations" field.

Oncology (ONC): Nutrition Status and Outcomes of Adult Oncology Patients

ONC: Nutrition Status and Outcomes in Adult Oncology Patients

The registered dietitian nutritionist (RDN) should collaborate with other health care professionals, administrators and public policy decision-makers to ensure that the evaluation of nutrition status is a key component of the adult oncology patient care process. Research indicates that poor nutrition status is associated with higher rates of hospital admissions or re-admissions, increased length of hospital stay (LOS), lower quality of life (QoL) and mortality in adult oncology patients. Poor nutrition status is also associated with decreased tolerance to chemotherapy and radiation treatment in adult oncology patients undergoing these therapies.

Strong, Imperative

Recommendation Strength Rationale

- Conclusion statements are Grades I and II.

ONC: Screening for Malnutrition Risk and Referral of Adult Oncology Patients

ONC: Screening for Malnutrition Risk and Re-Screening of Adult Oncology Patients

All adult patients should be screened for malnutrition risk on entry into oncology services. Early identification and management of malnutrition risk improves and protects nutrition status and QoL, which leads to improved outcomes. Re-screening should be repeated routinely throughout treatment to facilitate referral as needed.

Consensus, Imperative

ONC: Referral of Adult Oncology Patients Identified as Malnutrition Risk to the RDN

If an adult oncology patient has been identified at screening to be at risk for malnutrition, the patient should be referred to an RDN for evaluation. If indicated, the RDN conducts a nutrition assessment and provides medical nutrition therapy (MNT) including the nutrition care process: Nutrition assessment, nutrition diagnosis, nutrition intervention, nutrition monitoring and evaluation. Management of malnutrition risk improves and protects nutrition status and QoL, which leads to improved outcomes.

Consensus, Conditional

Recommendation Strength Rationale

- Consensus

ONC: Malnutrition Screening Tools for Adult Oncology Patients

ONC: Malnutrition Screening Tools for Adult Oncology Patients

Adult oncology patients should be screened using a malnutrition screening tool validated in the setting (inpatient or ambulatory/outpatient) in which the tool is intended for use. Research indicates that the following tools are valid and reliable for identifying malnutrition risk in oncology patients.

The following have been shown to be valid and reliable for identifying malnutrition risk in adult oncology patients in the inpatient setting:

- Patient-Generated Subjective Global Assessment (PG-SGA)
- Malnutrition Screening Tool (MST)
- Malnutrition Screening Tool for Cancer Patients (MSTC)
- Malnutrition Universal Screening Tool (MUST)

The following have been shown to be valid and reliable for identifying malnutrition risk in adult oncology patients in the ambulatory/outpatient setting:

- PG-SGA
- Malnutrition Screening Tool (MST)

Strong, Imperative

Recommendation Strength Rationale

- Conclusion statement is Grade I.

ONC: MNT in Adult Oncology Patients Undergoing Chemotherapy or Radiation Therapy

ONC: MNT in Adult Oncology Patients Undergoing Chemotherapy or Radiation Treatment

If an adult oncology patient is undergoing chemotherapy or radiation treatment, the RDN should provide MNT. MNT has been shown to be effective in improving multiple treatment outcomes in patients undergoing chemotherapy, radiation or chemoradiotherapy in ambulatory or outpatient and inpatient oncology settings.

Strong, Conditional

ONC: MNT as Part of Multi-modal Therapy in Adult Oncology Patients Undergoing Chemotherapy or Radiation Treatment

The RDN should be a member of the interdisciplinary team providing multi-modal therapy to adult oncology patients undergoing chemotherapy or radiation treatment. Multi-modal therapy includes coordinated interventions from a variety of health care disciplines. Multi-modal therapy that

includes MNT demonstrates positive outcomes.

Fair, Conditional

Recommendation Strength Rationale

- Conclusion statements are Grades I, II, and III.

ONC: Nutrition Assessment Tools for Adult Oncology Patients

ONC: Nutrition Assessment Tools for Adult Oncology Patients

The RDN should use an assessment tool validated in the setting (inpatient or ambulatory/outpatient) in which the tool is intended for use as part of the complete nutrition assessment. Research indicates that the following tools have been shown to elicit valid and reliable data as part of a comprehensive nutrition assessment of adult oncology patients in ambulatory and acute care settings:

- PG-SGA
- Subjective Global Assessment (SGA)

Strong, Imperative

Recommendation Strength Rationale

- Conclusion statement is Grade I.

ONC: Nutrition Assessment Criteria for Adult Oncology Patients

ONC: Assessment of Food/Nutrition-related History of Adult Oncology Patients

The RDN should assess the food, beverage and nutrient intake and related history of adult oncology patients including, but not limited to the following:

- Energy and protein intake
- Changes in food and fluid/beverage intake
- Adequacy and appropriateness of nutrient intake or nutrient administration
- Actual daily intake from enteral nutrition (EN) and parenteral nutrition (PN) and other nutrient sources
- Changes in type, texture, or temperature of food and liquids
- Use of medical food supplements (MFS)
- Food avoidance and intolerances
- Meal or snack pattern changes
- Prescription medications, over-the-counter medications, herbal preparations and complementary or alternative medicine products
- Factors affecting access to food

Assessment of the above factors is needed to effectively determine nutrition diagnoses and plan the nutrition interventions. Inability to achieve optimal nutrient intake may contribute to poor outcomes.

Consensus, Imperative

ONC: Assessment of Anthropometric Measurement in Adult Oncology Patients

The RDN should assess the following anthropometric measurements in adult oncology patients:

- Height and weight
- Weight change
- Body mass index (BMI)

Any weight loss that is unintended in adult oncology patients has potential significance, as oncology patients often experience weight loss prior to admission to oncology services. Low muscle mass is a common and independent predictor of immobility and mortality, is a particularly adverse prognostic indicator in obese patients and is associated with greater toxicities of chemotherapy leading to treatment interruptions including dose reductions, treatment delays and treatment termination.

Assessment of the above factors is needed to effectively determine nutrition diagnoses and plan the nutrition interventions.

Consensus, Imperative

ONC: Assessment of Biochemical Data, Medical Tests, and Procedures on Adult Oncology Patients

The RDN should evaluate available data and recommend as indicated: biochemical data, medical tests and procedures of adult oncology patients. Examples include:

- Glucose
- White blood cell (WBC)
- Nutritional anemia profile (hemoglobin, hematocrit, folate, B12, iron)
- Electrolyte and renal profile
- Liver function
- Inflammatory profile, including C-reactive protein (CRP)
- Gastrointestinal (GI) function tests (i.e., swallowing study, abdominal films, gastric emptying, transit time)

Assessment of these factors is needed to effectively determine nutrition diagnoses and plan the nutrition interventions.

Consensus, Imperative

ONC: Assessment of Nutrition-Focused Physical Findings and Client History of Adult Oncology Patients

The RDN should evaluate available data regarding the nutrition-focused physical findings and client history of adult oncology patients including, but not limited to:

Nutrition-focused physical findings:

- Age greater than 65 years
- Loss of muscle mass
- Loss of subcutaneous fat
- Presence of pressure ulcers or wounds
- Nutrition impact symptoms including but not limited to: nausea, vomiting, diarrhea, constipation, stomatitis, mucositis, alterations in taste and smell and anxiety
- Changes in appetite
- Vital signs
- Functional indicators (i.e., Karnofsky score, grip strength)
- Localized or generalized fluid accumulation

Client history:

- Patient/family/client medical/health history:
  - Nutrition impact symptoms including but not limited to: dysphagia, depression and pain/ fatigue
  - Medical treatment or therapy
  - Other diseases, conditions and illnesses including cancer cachexia

Social history: Psychological/socioeconomic factors (e.g., social support).

Assessment of the above factors is needed to effectively determine nutrition diagnoses and plan the nutrition interventions.

Consensus, Imperative

Recommendation Strength Rationale

- Consensus

ONC: Nutrition Assessment for the Stages of Cancer Cachexia in Adult Oncology Patients

ONC: Nutrition Assessment for the Stages of Cancer Cachexia in Adult Oncology Patients

As part of the nutrition assessment, in patients with lung, pancreatic or head and neck and GI cancers or those who are at high risk for weight loss or have experienced unintended weight loss, the RDN should assess for nutrition impact symptoms, markers of inflammation (e.g., elevated CRP) and other signs of wasting, which may indicate pre-cachexia or cancer cachexia.

The presence of cachexia does not always indicate end of life or need for hospice. Therefore, the identification of cachexia leading to intervention can positively impact clinical outcomes.

Consensus, Conditional

Recommendation Strength Rationale

- Consensus

ONC: Nutrition Diagnosis of Malnutrition in Adult Oncology Patients

ONC: Nutrition Diagnosis of Malnutrition in Adult Oncology Patients

The RDN should use clinical judgment in interpreting nutrition assessment data to diagnose malnutrition in adult oncology patients. Early identification and diagnosis of malnutrition leading to intervention can positively impact body composition, function, QoL, treatment tolerance and clinical outcomes.

The presence of two or more of the following criteria or characteristics supports a nutrition diagnosis of malnutrition in the adult oncology patient.

- Insufficient energy intake
- Unintended weight loss
- Loss of subcutaneous fat
- Loss of muscle mass
- Localized or generalized fluid accumulation (that may mask weight loss)
- Reduced grip strength

Consensus, Imperative

Recommendation Strength Rationale

- Consensus

ONC: Nutrition Intervention of Adult Oncology Patients with Cancer Cachexia

ONC: Nutrition Intervention of Adult Oncology Patients with Cancer Cachexia

In adult oncology patients who have been identified to have pre-cachexia or cancer cachexia, prompt and aggressive intervention to address nutrition impact symptoms and preserve or prevent loss of lean body mass (LBM) and weight should be initiated by the RDN. Early rather than later intervention to prevent weight loss in this population is more likely to be effective. The metabolic derangements in cancer cachexia that promote wasting can lead to loss of weight and LBM and poor outcomes.

Consensus, Conditional

Recommendation Strength Rationale

- Consensus

ONC: Fish Oil, Lean Body Mass and Weight in Adult Oncology Patients

ONC: Dietary Supplements Containing Fish Oil for the Adult Oncology Patient

If sub-optimal symptom control or inadequate dietary intake has been addressed and the adult oncology patient is still experiencing loss of weight and LBM, the RDN may consider use of dietary supplements containing eicosapentaenoic acid (EPA) as a component of nutrition intervention. Research indicates that dietary supplements containing fish oil (actual consumption, 0.26 g to 6.0 g of EPA per day), resulted in a significant effect on preservation or improvement of weight and LBM in adult oncology patients with weight loss.

Strong, Imperative

ONC: Medical Food Supplements Containing Fish Oil for the Adult Oncology Patient

If sub-optimal symptom control or inadequate dietary intake has been addressed and the adult oncology patient is still experiencing loss of weight and LBM, the RDN may consider use of a MFS containing EPA as a component of nutrition intervention. Research indicates that MFS containing

fish oil (actual consumption, 1.1 g to 2.2 g of EPA per day) resulted in significant weight stabilization or weight gain and preservation or improvement of LBM in adult oncology patients with weight loss.

Strong, Imperative

Recommendation Strength Rationale

- Conclusion statements are Grade I and II.

ONC: Glutamine and Oral Mucositis in Adult Oncology Patients

ONC: Glutamine and Oral Mucositis in Adult Oncology Patients with Solid Tumors and Hematological Malignancies

If use of parenteral glutamine is proposed to prevent or treat oral mucositis in oncology patients with solid tumors, the RDN should advise that its use may or may not be beneficial. Limited research in head and neck and stem cell transplantation patients receiving parenteral glutamine has not established the effectiveness of L-alanyl-L-glutamine in treating or preventing oral mucositis.

Enteral or oral provision of glutamine was not evaluated.

Weak, Conditional

ONC: Parenteral Glutamine and Hematopoietic Cell Transplantation (HCT)

ONC: Parenteral Glutamine and HCT in Adult Oncology Patients

When PN is required for patients undergoing HCT, the RDN may or may not recommend parenteral glutamine (GLN) in doses ranging from 0.2 g to 0.5 g per kg per day. Research indicates parenteral GLN should be initiated early in the treatment course. Parenteral GLN is associated with improved nitrogen balance and decreased morbidity. However, decreased hospital length of stay (LOS) was found only when data from allogeneic and autologous transplants were combined.

Fair, Conditional

ONC: Nutrition Substances and Chemotherapy-Induced Peripheral Neuropathy

ONC: Nutrition Substances and Chemotherapy-Induced Peripheral Neuropathy

If an adult oncology patient is at risk for or has chemotherapy-induced peripheral neuropathy (CIPN), the RDN should advise the patient that the use of nutrition substances (vitamin E, calcium and magnesium infusions, acetyl-L-carnitine, glutamine, glutathione) may or may not be beneficial as a means of preventing or improving CIPN. Research indicates that these substances have had only limited success in preventing or improving CIPN in oncology patients receiving specific chemotherapeutic agents.

Weak, Conditional

ONC: Neutropenic Dietary Precautions for Adult Oncology Patients

ONC: Neutropenic Dietary Precautions for Adult Oncology Patients with Neutropenia (Non-Bone Marrow Transplant)

If an adult oncology patient has neutropenia, the RDN should provide dietary counseling on safe food handling and foods which may pose infectious risks during the period of neutropenia. A neutropenic diet is not necessary, but safe food counseling is recommended as a prudent precaution. Research has not demonstrated the effectiveness of low-microbial diets.

Fair, Conditional

ONC: Neutropenic Dietary Precautions for Adult Oncology Patients Undergoing Bone Marrow Transplant

If an adult oncology patient is undergoing bone marrow transplant, the RDN should provide dietary counseling on safe food handling and foods which may pose infectious risks during the period of neutropenia. A neutropenic diet is not necessary, but safe food counseling is recommended as a prudent precaution. There is conflicting research regarding the effectiveness of neutropenic diets in the bone marrow transplant population.

Weak, Conditional

ONC: Nutrition Monitoring and Evaluation of Adult Oncology Patients

ONC: Monitoring and Evaluation of Adult Oncology Patients

Following the nutrition intervention, to check progress, the RDN should monitor and evaluate the following components of adult oncology patients at each visit and compare to desired individual outcomes relevant to the nutrition diagnosis and intervention. This may include, but is not limited to:

Anthropometric Measurements

- Weight change
- BMI

Food/Nutrition-Related History

- Energy and protein intake
- Changes in food and fluid/beverage intake
- Adequacy and appropriateness of nutrient intake/nutrient administration
- Actual daily intake from EN and PN and other nutrient sources
- Changes in type, texture, or temperature of food and liquids
- Use of MFS
- Food avoidance and intolerances
- Meal/snack pattern changes
- Prescription medications, over-the-counter medications, herbal preparations and complementary alternative medicine products
- Factors affecting access to food
- Feeding method or need for placement (e.g., oral, enteral or parenteral)

Biochemical Data, Medical Tests and Procedures

- Biochemical indices
- Implications of diagnostic tests and therapeutic procedures

Nutrition-Focused Physical Findings

- Vital signs
- Loss of muscle mass
- Loss of subcutaneous fat
- Nutrition impact symptoms including but not limited to: nausea, vomiting, diarrhea, constipation, stomatitis, mucositis, alterations in taste and smell, and anxiety
- Presence of pressure ulcers or wounds
- Functional indicators (i.e., Karnofsky score, grip strength)
- Localized or generalized fluid accumulation

Client History

- Patient/family/client medical/health history:
    - Nutrition impact symptoms including but not limited to: dysphagia, depression and pain fatigue
    - Medical treatment/therapy
    - Other diseases, conditions and illnesses including cancer cachexia

Social History

- Psychological/socioeconomic issues (e.g., social support)

Monitoring and evaluation of the above factors is needed to correctly/effectively diagnose nutrition problems that should be the focus of further nutrition interventions. Inability to achieve optimal nutrient intake may contribute to poor outcomes.

Consensus, Imperative

ONC: Monitoring and Evaluating Adult Oncology Patients with Cancer Cachexia

As part of monitoring and evaluation, in patients with lung, pancreatic or head and neck and GI cancers, or those who are at high risk for weight loss or have experienced unintended weight loss, the RDN should monitor and evaluate nutrition impact symptoms, markers of inflammation (e.g., elevated CRP) and other signs of wasting, which may indicate pre-cachexia or cancer cachexia.

Consensus, Conditional

Recommendation Strength Rationale

- Consensus

Definitions:

Conditional vs Imperative Recommendations

Recommendations are categorized in terms of either *conditional* or *imperative* statements. While conditional statements clearly define a specific situation, imperative statements are broadly applicable to the target population and do not impose restraints on their application.

Conditional recommendations are presented in an if/then format, such that:

If CONDITION then ACTION(S) because REASON(S)

Fulfillment of the condition triggers one or more guideline-specified actions. In contrast, imperative recommendations include terms such as "require," "must," and "should," and do not contain conditional text that would limit their applicability to specified circumstances.

Conclusion Grading Table

Strength of Evidence Elements	**Grades**				
	I **Good/Strong**	**II** **Fair**	**III** **Limited**	**IV** **Expert Opinion Only**	**V** **Grade Not Assignable**
Quality • Scientific rigor/validity • Considers design and execution	Studies of strong design for question Free from design flaws, bias and execution problems	Studies of strong design for question with minor methodological concerns OR Only studies of weaker study design for question	Studies of weak design for answering the question OR Inconclusive findings due to design flaws, bias or execution problems	No studies available Conclusion based on usual practice, expert consensus, clinical experience, opinion, or extrapolation from basic research	No evidence that pertains to question being addressed
Consistency Of findings across studies	Findings generally consistent in direction and size of effect or degree of association, and statistical significance with minor exceptions at most	Inconsistency among results of studies with strong design OR Consistency with minor exceptions across studies of weaker designs	Unexplained inconsistency among results from different studies OR Single study unconfirmed by other studies	Conclusion supported solely by statements of informed nutrition or medical commentators	NA
Quantity • Number of studies • Number of subjects in studies	One to several good quality studies Large number of subjects studied Studies with negative results having sufficiently large sample size for adequate statistical power	Several studies by independent investigators Doubts about adequacy of sample size to avoid Type I and Type II	Limited number of studies Low number of subjects studied and/or inadequate sample size within studies	Unsubstantiated by published studies	Relevant studies have not been done

Strength of Evidence Elements	I Good/Strong	II Fair	III Limited	IV Expert Opinion Only	V Grade Not Assignable
Clinical Impact • Importance of studied outcomes • Magnitude of effect	Studied outcome relates directly to the question Size of effect is clinically meaningful Significant (statistical) difference is large	Some doubt about the statistical or clinical significance of effect	Studied outcome is an intermediate outcome or surrogate for the true outcome of interest OR Size of effect is small or lacks statistical and/or clinical significance	Objective data unavailable	Indicates area for future research
Generalizability To population of interest	Studied population, intervention and outcomes are free from serious doubts about generalizability	Minor doubts about generalizability	Serious doubts about generalizability due to narrow or different study population, intervention or outcomes studied	Generalizability limited to scope of experience	NA

This grading system was based on the grading system from Greer, Mosser, Logan, & Wagstrom Halaas. A practical approach to evidence grading. Jt Comm J Qual Improv. 2000;26:700-712. In September 2004, The ADA Research Committee modified the grading system to this current version.

Criteria for Recommendation Rating

Statement Rating	Definition	Implication for Practice
Strong	A Strong recommendation means that the workgroup believes that the benefits of the recommended approach clearly exceed the harms (or that the harms clearly exceed the benefits in the case of a strong negative recommendation), and that the quality of the supporting evidence is excellent/good (grade I or II).* In some clearly identified circumstances, strong recommendations may be made based on lesser evidence when high-quality evidence is impossible to obtain and the anticipated benefits strongly outweigh the harms.	Practitioners should follow a Strong recommendation unless a clear and compelling rationale for an alternative approach is present.
Fair	A Fair recommendation means that the workgroup believes that the benefits exceed the harms (or that the harms clearly exceed the benefits in the case of a negative recommendation), but the quality of evidence is not as strong (grade II or III).* In some clearly identified circumstances, recommendations may be made based on lesser evidence when high-quality evidence is impossible to obtain and the anticipated benefits outweigh the harms.	Practitioners should generally follow a Fair recommendation but remain alert to new information and be sensitive to patient preferences.
Weak	A Weak recommendation means that the quality of evidence that exists is suspect or that well-done studies (grade I, II, or III)* show little clear advantage to one approach versus another.	Practitioners should be cautious in deciding whether to follow a recommendation classified as Weak, and should exercise judgment and be alert to emerging publications that report evidence. Patient preference should have a substantial influencing role.
Consensus	A Consensus recommendation means that Expert opinion (grade IV)* supports the guideline recommendation even though the available scientific evidence did not present consistent results, or controlled trials were lacking.	Practitioners should be flexible in deciding whether to follow a recommendation classified as Consensus, although they may set boundaries on alternatives. Patient preference should have a substantial influencing role.
Insufficient Evidence	An Insufficient Evidence recommendation means that there is both a lack of pertinent evidence (grade V)* and/or an unclear balance between benefits and harms.	Practitioners should feel little constraint in deciding whether to follow a recommendation labeled as Insufficient Evidence and should exercise judgment and be alert to emerging publications that report evidence that clarifies the balance of benefit versus harm. Patient preference should have a substantial influencing role.

*Conclusion statements are assigned a grade based on the strength of the evidence. Grade I is good; grade II, fair; grade III, limited; grade IV signifies expert opinion only and grade V indicates that a grade is not assignable because there is no evidence to support or refute the conclusion. The evidence and these grades are considered when assigning a rating (Strong, Fair, Weak, Consensus, Insufficient Evidence - see chart above) to a recommendation.

Adapted by the Academy of Nutrition and Dietetics (AND) from the American Academy of Pediatrics, Classifying Recommendations for Clinical Practice Guideline, Pediatrics. 2004;114;874-877. Revised by the AND Evidence-Based Practice Committee, Feb 2006.

Clinical Algorithm(s)

The following algorithms are provided in the original guideline document:

- Oncology Guideline Nutrition Diagnosis
- Oncology Guideline Nutrition Intervention
- Oncology Guideline Nutrition Monitoring and Evaluation

Scope

Disease/Condition(s)

- Cancer and cancer cachexia
- Cancer-related malnutrition

Guideline Category

Assessment of Therapeutic Effectiveness

Diagnosis

Evaluation

Screening

Treatment

Clinical Specialty

Nutrition

Oncology

Radiation Oncology

Intended Users

Advanced Practice Nurses

Allied Health Personnel

Dietitians

Health Care Providers

Health Plans

Hospitals

Managed Care Organizations

Nurses

Physician Assistants

Physicians

Students

Guideline Objective(s)

Overall Objective

To provide medical nutrition therapy (MNT) guidelines aimed at managing symptoms, preventing weight loss, and maintaining optimal nutritional status during cancer treatment

Specific Objectives

- To define evidence-based recommendations for registered dietitian nutritionists (RDNs) that are carried out in collaboration with other healthcare providers
- To guide practice decisions that integrate medical, nutritional, and behavioral elements
- To reduce variations in practice among RDNs
- To promote self-management strategies that empower the patient to take responsibility for day-to-day management
- To enhance the quality of life for the patient, utilizing customized strategies based on the individual's preferences, lifestyle, and goals
- To develop guidelines for interventions that have measureable clinical outcomes
- To define the highest quality of care within cost constraints of the current healthcare environment

Target Population

Adult cancer patients who are receiving oncology treatment or care

Interventions and Practices Considered

1. Nutrition screening and referral
    - Screening for malnutrition risk on entry into oncology services and rescreening throughout treatment
    - Referral of at-risk patients to a registered dietitian nutritionist (RDN) for evaluation
    - Screening patients using a validated malnutrition screening tool
2. Nutrition assessment and diagnosis
    - Use of validated assessment tools for nutrition assessment
    - Assessment of food/nutrition-related history
    - Assessment of anthropomorphic measurements (height, weight, weight change, body mass index [BMI])
    - Assessment of biochemical data, medical tests, and procedures
    - Assessment of nutrition-focused physical findings and client history
    - Nutrition assessment for the stages of cancer cachexia
    - Use of clinical judgment in interpreting nutrition assessment data to diagnose malnutrition
3. Nutrition intervention
    - Provision of medical nutrition therapy (MNT) in patients undergoing chemotherapy or radiation treatment
    - Providing MNT as part of interdisciplinary multi-modal therapy
    - Prompt and aggressive intervention to address nutrition impact symptoms and preserve or prevent loss of lean body mass (LBM) and weight
    - Dietary and medical food supplements containing fish oil
    - Parenteral glutamine for prevention or treatment of oral mucositis (note: efficacy not established)
    - Parenteral glutamine in patients undergoing hematopoietic stem cell transplantation
    - Nutrition substances (vitamin E, calcium and magnesium infusions, acetyl-L-carnitine, glutamine, glutathione) to prevent or improve chemotherapy-induced peripheral neuropathy
    - Counseling on neutropenic dietary precautions

4. Nutrition monitoring and evaluation
    - Monitoring and evaluating
        - Anthropometric measurements
        - Food/nutrition-related history
        - Biochemical data, medical tests and procedures
        - Nutrition-focused physical finding
        - Patient/family/medical health history
        - Social history
    - Monitoring and evaluating nutrition impact symptoms, markers of inflammation (e.g., elevated C-reactive protein [CRP]) and other signs of wasting, which may indicate pre-cachexia or cancer cachexia

Major Outcomes Considered

- Sensitivity, specificity, validity and reliability of nutrition screening tools
- Rates of hospital admissions or re-admissions
- Length of hospital stay
- Body weight
- Quality of life
- Incidence of mucositis
- Bloodstream infections
- Mortality

Methodology

Methods Used to Collect/Select the Evidence

Hand-searches of Published Literature (Primary Sources)

Hand-searches of Published Literature (Secondary Sources)

Searches of Electronic Databases

Description of Methods Used to Collect/Select the Evidence

General Methods for Collecting/Selecting the Evidence

The following list provides an overview of the steps which the Academy evidence analysis team goes through to identify research through database searches.

1. Plan the search strategy to identify the current best evidence relevant to the question. The plan for identification and inclusion of articles and reports should be systematic and reproducible, not haphazard. Write out the original search strategy and document adjustments to the strategy if they occur. Allow for several iterations of searches.
    - List inclusion and exclusion criteria. The work group will define the inclusion and exclusion criteria. These criteria will be used in defining the search strategy and for filtering the identified research reports. The Academy uses only peer-reviewed research; that is, articles accepted for evidence analysis must be peer-reviewed and published in a juried publication. Additionally, the Academy only uses human subjects in its research and does not include animal studies in its evidence analysis.
    - Identify search words. During the process of considering outcomes, interventions, nutrition diagnoses, and assessments, the work group may have identified a number of specific terms or factors that were important, but were not included in the actual question. These terms can be used as additional search terms to help identify relevant pieces of research. Both text word search and keyword search using Medical Subject Headings (MeSH) definitions may be used.
    - Identify databases to search. PubMed, Medline, CINAHL, EMBASE, Cochrane, Agricola, DARE, TRIP, AHRQ and ERIC are some common databases for clinical nutritional research. Note that search terms can vary depending on the database.
2. Conduct the search. Depending on the number and type of sources found in the initial search, adjustments might have to be made in the

search strategy and to inclusion/exclusion criteria, and additional searches run. Changes to the search plan should be recorded for future reference. Document the number of sources identified in each search.

3. Review titles and abstracts. At this point, a filtering procedure is used to determine whether a research article matches the inclusion criteria and is relevant to the work group's questions. Typically, the lead analyst, along with a member of the expert workgroup, first reviews the citations and abstracts to filter out reports that are not applicable to the question. If a determination cannot be made based on the citation and abstract, then the full text of the article is obtained for review.
4. Gather all remaining articles and reports. Obtain paper or electronic copies of research articles that remain on the list following the citation and abstract review. If there are less than six citations, it could mean that the search was too specific to identify relevant research or that research has not been done on this topic. A broadened search should be tried. When there is a long list of citations, ascertain whether it includes articles that are tangential to the question or address the question in only a general way. In this case a more focused search strategy may be necessary.

Specific Methods for This Guideline

The recommendations in the guideline were based on a systematic review of the literature. Searches of PubMed and CINAHL databases were performed on the following topics for adult oncology patients:

- Nutrition status and outcomes
- Malnutrition screening tools
- Medical nutrition therapy (MNT) in patients undergoing chemotherapy or radiation treatment
- Nutrition assessment tools
- Fish oil, weight and lean body mass

Each evidence analysis topic has a link to supporting evidence, where the Search Plan and Results can be found. Here, the reader can view when the search plan was performed, inclusion and exclusion criteria, search terms, databases that were searched and the excluded articles.

Number of Source Documents

The total number of supporting documents for all of the reviewed topics is below:

- Recommendations: 22
- Conclusion Statements: 16
- Evidence Summaries: 16
- Article Worksheets: 95

Methods Used to Assess the Quality and Strength of the Evidence

Weighting According to a Rating Scheme (Scheme Given)

Rating Scheme for the Strength of the Evidence

Conclusion Grading Table

Strength of Evidence Elements	**Grades**				
	I Good/Strong	**II Fair**	**III Limited**	**IV Expert Opinion Only**	**V Grade Not Assignable**
Quality • Scientific rigor/validity • Considers design and execution	Studies of strong design for question Free from design flaws, bias and execution problems	Studies of strong design for question with minor methodological concerns OR	Studies of weak design for answering the question OR Inconclusive findings due to design flaws,	No studies available Conclusion based on usual practice, expert consensus, clinical experience, opinion, or extrapolation from basic research	No evidence that pertains to question being addressed

Strength of Evidence Elements	Grades				
	I Good/Strong	II Fair	III Limited	IV Expert Opinion Only	V Grade Not Assignable
Consistency Of findings across studies	Findings generally consistent in direction and size of effect or degree of association, and statistical significance with minor exceptions at most	Inconsistency among results of studies with strong design OR Consistency with minor exceptions across studies of weaker designs	Unexplained inconsistency among results from different studies OR Single study unconfirmed by other studies	Conclusion supported solely by statements of informed nutrition or medical commentators	NA
Quantity • Number of studies • Number of subjects in studies	One to several good quality studies Large number of subjects studied Studies with negative results having sufficiently large sample size for adequate statistical power	Several studies by independent investigators Doubts about adequacy of sample size to avoid Type I and Type II error	Limited number of studies Low number of subjects studied and/or inadequate sample size within studies	Unsubstantiated by published studies	Relevant studies have not been done
Clinical Impact • Importance of studied outcomes • Magnitude of effect	Studied outcome relates directly to the question Size of effect is clinically meaningful Significant (statistical) difference is large	Some doubt about the statistical or clinical significance of effect	Studied outcome is an intermediate outcome or surrogate for the true outcome of interest OR Size of effect is small or lacks statistical and/or clinical significance	Objective data unavailable	Indicates area for future research
Generalizability To population of interest	Studied population, intervention and outcomes are free from serious doubts about generalizability	Minor doubts about generalizability	Serious doubts about generalizability due to narrow or different study population, intervention or outcomes studied	Generalizability limited to scope of experience	NA

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Methods Used to Analyze the Evidence

Systematic Review with Evidence Tables

Description of the Methods Used to Analyze the Evidence

Step 1: Formulate Evidence Analysis Question

Specify a question in a defined area of practice or state a tentative conclusion or recommendation that is being considered. Include the patient type and special needs of the target population involved, the alternatives under consideration, and the outcomes of interest (PICO format).

Step 2: Gather and Classify Evidence

Conduct a systematic search of the literature to find evidence related to the question, gather studies and reports, and classify them by type of evidence. Classes differentiate primary reports of new data according to study design, and distinguish them from secondary reports that include systematic and/or narrative review.

Step 3: Critically Appraise Each Article

Review each article for relevance to the question and use the checklist of questions to evaluate the research design and implementation. Abstract key information from the report.

Step 4: Summarize Evidence

Synthesize the reports into an overview table and summarize the research relevant to the question.

Step 5: Write and Grade the Conclusion Statement

Develop a concise conclusion statement (the answer to the question). Assign a grade to indicate the overall strength or weakness of evidence informing the conclusion statement (see the "Rating Scheme for the Strength of the Evidence" field).

Methods Used to Formulate the Recommendations

Expert Consensus

Description of Methods Used to Formulate the Recommendations

Development of Evidence-Based Nutrition Practice Guidelines

The expert work group, which includes practitioners and researchers with a depth of experience in the specific field of interest, develops the disease-specific guideline. The guideline development involves the following steps:

1. Review the Conclusion Statements: The work group meets to review the materials resulting from the evidence analysis, which may include conclusion statements, evidence summaries, and evidence worksheets.
2. Formulate Recommendations for the Guideline Integrating Conclusions from Evidence Analysis: The work group uses an expert consensus method to formulate the guideline recommendations and complete the various sections on the recommendation page. These include:
    - Recommendation(s): This is a course of action for the practitioner. The recommendation is written using two brief and separate statements. The first statement is "what" the dietitian should do or not do. The second statement describes the "why" of the recommendation. More than one recommendation may be formulated depending on a particular topic and the supporting conclusion statements.
    - Rating: The rating for the recommendation is based on the strength of the supporting evidence. The grade of the supporting conclusion statement(s) will help determine this rating (see the "Rating Scheme for the Strength of the Recommendations" field).
    - Label of Conditional or Imperative: Each recommendation will have a label of "conditional" or "imperative." Conditional statements clearly define a specific situation, while imperative statements are broadly applicable to the target population without restraints on their pertinence.
    - Risks and Harms of Implementing the Recommendations: Includes any potential risks, anticipated harms or adverse consequences associated with applying the recommendation(s) to the target population.
    - Conditions of Application: Includes any organizational barriers or changes that would need to be made within an organization to apply the recommendation in daily practice. Also includes any conditions which may limit the application of the recommendation(s). For instance, application may be limited to only people in an inpatient setting, or not applicable for pregnant women. Facilitators for the application of the guideline may also be listed here. Conditional recommendations will always have conditions specified. Imperative recommendations may have some general conditions for application.
    - Potential Costs Associated with Application: Includes any costs that may be associated with the application of this recommendation such as specialized staff, new equipment or treatments.
    - Recommendation Narrative: Provides a brief description of the evidence that supports this recommendation.
    - Recommendation Strength Rationale: Provides a brief list of the evidence strength and methodological issues that determined the recommendation strength.

- Minority Opinions: If the expert work group cannot reach consensus on the recommendation, the minority opinions may be listed here.
- Supporting Evidence: Provides links to the conclusions statements, evidence summaries and worksheets related to the formulation of this recommendation(s).

3. References Not Graded in the Academy's Evidence Analysis Process: Recommendations are based on the summarized evidence from the analysis. Sources that are not analyzed during the evidence analysis process may be used to support and formulate the recommendation or to support information under other categories on the recommendation page, if the workgroup deems necessary. References must be credible resources (e.g., consensus reports, other guidelines, position papers, standards of practice, articles from peer-reviewed journals, nationally recognized documents or websites). If recommendations are based solely on these types of references, they will be rated as "consensus." Occasionally recommendations will include references that were not reviewed during the evidence analysis process but are relevant to the recommendation, risks and harms of implementing the recommendation, conditions of application, or potential costs associated with application. These references will be listed on the recommendation page under "References Not Graded in the Academy's Evidence Analysis Process."
4. Develop a Clinical Algorithm for The Guidelineâ€‹: The workgroup develops a clinical algorithm based on Academy's Nutrition Care Process, to display how each recommendation can be used within the treatment process and how they relate to the Nutrition Assessment, Diagnosis, Intervention and Monitoring and Evaluation.
5. Complete the Writing of the Guideline: Each disease-specific guideline has a similar format which incorporates the Introduction (includes: Scope of the Guideline, Statement of Intent, Guideline Methods, Implementation, Benefits and Risks/Harms of Implementation), Background Information and any necessary Appendices. The work group develops these features.
6. Criteria Used in Guideline Development: The criteria used in determining the format and process for development of Academy's guidelines are based on the following tools and criteria for evidence-based guidelines:
   - Guideline Elements Model (GEM) which has been incorporated by the American Society for Testing and Materials (ASTM) as a Standard Specification for clinical practice guidelines.
   - Appraisal for Guidelines Research and Evaluation (AGREE) Instrument
   - National Guideline Clearinghouse www.guideline.gov .

Rating Scheme for the Strength of the Recommendations

Criteria for Recommendation Rating

Statement Rating	Definition	Implication for Practice
Strong	A Strong recommendation means that the workgroup believes that the benefits of the recommended approach clearly exceed the harms (or that the harms clearly exceed the benefits in the case of a strong negative recommendation), and that the quality of the supporting evidence is excellent/good (grade I or II).* In some clearly identified circumstances, strong recommendations may be made based on lesser evidence when high-quality evidence is impossible to obtain and the anticipated benefits strongly outweigh the harms.	Practitioners should follow a Strong recommendation unless a clear and compelling rationale for an alternative approach is present.
Fair	A Fair recommendation means that the workgroup believes that the benefits exceed the harms (or that the harms clearly exceed the benefits in the case of a negative recommendation), but the quality of evidence is not as strong (grade II or III).* In some clearly identified circumstances, recommendations may be made based on lesser evidence when high-quality evidence is impossible to obtain and the anticipated benefits outweigh the harms.	Practitioners should generally follow a Fair recommendation but remain alert to new information and be sensitive to patient preferences.
Weak	A Weak recommendation means that the quality of evidence that exists is suspect or that well-done studies (grade I, II, or III)* show little clear advantage to one approach versus another.	Practitioners should be cautious in deciding whether to follow a recommendation classified as Weak, and should exercise judgment and be alert to emerging publications that report evidence. Patient preference should have a substantial influencing role.
Consensus	A Consensus recommendation means that Expert opinion (grade IV)* supports the guideline recommendation even though the available scientific	Practitioners should be flexible in deciding whether to follow a recommendation

Statement Rating	Definition	Implication for Practice
	evidence did not present consistent results, or controlled trials were lacking.	classified as Consensus, although they may set boundaries on alternatives. Patient preference should have a substantial influencing role.
Insufficient Evidence	An Insufficient Evidence recommendation means that there is both a lack of pertinent evidence (grade V)* and/or an unclear balance between benefits and harms.	Practitioners should feel little constraint in deciding whether to follow a recommendation labeled as Insufficient Evidence and should exercise judgment and be alert to emerging publications that report evidence that clarifies the balance of benefit versus harm. Patient preference should have a substantial influencing role.

*Conclusion statements are assigned a grade based on the strength of the evidence. Grade I is good; grade II, fair; grade III, limited; grade IV signifies expert opinion only and grade V indicates that a grade is not assignable because there is no evidence to support or refute the conclusion. The evidence and these grades are considered when assigning a rating (Strong, Fair, Weak, Consensus, Insufficient Evidence - see chart above) to a recommendation.

Adapted by the Academy of Nutrition and Dietetics (AND) from the American Academy of Pediatrics, Classifying Recommendations for Clinical Practice Guideline, Pediatrics. 2004;114;874-877. Revised by the AND Evidence-Based Practice Committee, Feb 2006.

Cost Analysis

The guideline developers reviewed a published cost analysis.

Method of Guideline Validation

External Peer Review

Internal Peer Review

Description of Method of Guideline Validation

Each guideline is reviewed internally and externally using the Appraisal for Guidelines Research and Evaluation (AGREE) Instrument as the evaluation tool. The external reviewers consist of an interdisciplinary group of individuals (may include dietitians, doctors, psychologists, nurses, etc.). The guideline is adjusted by consensus of the expert panel and approved by Academy's Evidence-Based Practice Committee prior to publication on the Evidence Analysis Library (EAL).

Evidence Supporting the Recommendations

Type of Evidence Supporting the Recommendations

The type of supporting evidence is identified and graded for each recommendation (see the "Major Recommendations" field).

The guideline contains conclusion statements that are supported by evidence summaries and evidence worksheets. These resources summarize the important studies (randomized controlled trials [RCTs], clinical studies, observational studies, cohort and case-control studies) pertaining to the conclusion statement and provide the study details.

Benefits/Harms of Implementing the Guideline Recommendations

Potential Benefits

- The primary goal of implementing these recommendations includes improving the percentage of individuals who are able to meet their nutritional needs, reducing incidence of treatment interruptions, and positively impacting the patient's treatment and clinical outcomes.

- Identification of malnutrition using standardized language within the nutrition care process may lead to reimbursement for registered dietitian nutritionists (RDNs).

Potential Harms

Overall Risk/Harm Considerations

Safety issues should be considered for each form of treatment recommended.

When using these treatment recommendations.

- Review the patient's age, socioeconomic status, cultural issues and other health conditions.
- Consider a referral to social services to assist patients with financial arrangements if economic issues are a concern.
- Use clinical judgment when evaluating patients with co-morbid conditions or those receiving palliative care. Such conditions may include: cancer cachexia, renal dysfunction, diabetes, food allergies, pregnancy, human immunodeficiency virus/acquired immunodeficiency syndrome (HIV/AIDS), psychiatric disorders, metabolic diseases and hepatic encephalopathy or end-stage chronic kidney disease.

Recommendation-Specific Risks/Harms

Nutrition Assessment for the Stages of Cancer Cachexia

Failure to assess for the stages of cancer cachexia may lead to lack of nutrition intervention and increased risk of mortality.

Diagnosis of Malnutrition

Failure to make a malnutrition diagnosis may lead to lack of nutrition intervention and increased risk of mortality.

Fish Oil

Patients who are intolerant or allergic to fish should be cautioned about the potential for allergic reactions to fish oil. The registered dietitian nutritionist (RDN) should evaluate for potential drug interactions.

Glutamine

- Risks associated with parenteral glutamine administration are similar to those of parenteral nutrition (i.e., increased risk of infection).
- Use caution when considering provision of parenteral glutamine to oncology patients who have hepatic failure or insufficiency. Recommend monitoring liver function tests.

Nutrition Substances

As with all supplements, there is a potential for interaction with treatment that is unknown.

See also "Factors to Consider When Exploring Treatment Options" in the original guideline document under "Benefits and Risks/Harms of Implementation."

Qualifying Statements

Qualifying Statements

- This nutrition practice guideline is meant to serve as a general framework for handling clients with particular health problems. The independent skill and judgment of the health care provider must always dictate treatment decisions.
- While the evidence-based nutrition practice guidelines represent a statement of best practice based on the latest available evidence at the time of publishing, they are not intended to overrule professional judgment. Rather, they may be viewed as a relative constraint on individual clinician discretion in a particular clinical circumstance. These nutrition practice guidelines are provided with the express understanding that they do not establish or specify particular standards of care, whether legal, medical or other.
- This guideline recognizes the role of patient preferences for possible outcomes of care, when the appropriateness of a clinical intervention involves a substantial element of personal choice or values. With regard to types of evidence that are associated with particular outcomes,

two major classes have been described. Patient-oriented evidence that matters (POEM) deals with outcomes of importance to patients, such as changes in morbidity, mortality or quality of life. Disease-oriented evidence (DOE) deals with surrogate end-points, such as changes in laboratory values or other measures of response. Although the results of DOE sometimes parallel the results of POEM, they do not always correspond. When possible, the Academy of Nutrition and Dietetics recommends using POEM-type evidence rather than DOE. When DOE is the only guidance available, the guideline indicates that key clinical recommendations lack the support of outcomes evidence.

- New research may warrant a revision to a specific question or recommendation prior to the full project or guideline revision. Once identified, information is gathered, and the Evidence Analysis Library (EAL) oversight committee will make a decision on the appropriate action.
- The articles evaluated for the Academy's analysis in this edition were not concentrated on one particular type of cancer or therapy treatment. It is acknowledged that this is a departure from the first edition of the Oncology guideline, which presented evidence-based interventions for oncology patients with specific types of cancers and treatments. This change in organization highlights specific key topics where the stronger bodies of evidence exist.
- Clinical judgment is critical. Careful consideration should be given to the application of these guidelines for patients receiving hospice, palliative care, or those with significant medical co-morbidities. Advance directives may also indicate if treatment is desired or not.

Implementation of the Guideline

Description of Implementation Strategy

Implementation of the Guideline

The publication of this guideline is an integral part of the plans for disseminating the Academy of Nutrition and Dietetics evidence-based recommendations on oncology nutrition to all dietetics practitioners engaged in, teaching about or researching oncology nutrition as quickly as possible. National implementation workshops at various sites around the country and during the Academy Food Nutrition Conference Expo (FNCE) are planned. Additionally, there are recommended dissemination and adoption strategies for local use of the Academy Oncology Evidence-Based Nutrition Practice Guideline.

The guideline development team recommended multi-faceted strategies to disseminate the guideline and encourage its implementation. Management support and learning through social influence are likely to be effective in implementing guidelines in dietetic practice. However, additional interventions may be needed to achieve real change in practice routines.

Implementation of the Oncology guideline will be achieved by announcement at professional events, presentations and training. Some strategies include:

- National and local events: State dietetic association meetings and media coverage will help launch the guideline
- Local feedback adaptation: Presentation by members of the work group at peer review meetings and opportunities for continuing education units (CEUs) for courses completed
- Education initiatives: The guideline and supplementary resources will be freely available for use in the education and training of dietetic interns and students in approved Accreditation Council for Education in Nutrition and Dietetics (ACEND) programs.
- Champions: Local champions will be identified and expert members of the recommendation team will prepare articles for publications. Resources will be provided that include PowerPoint presentations, full guidelines and pre-prepared case studies.
- Practical tools: Some of the tools that will be developed to help implement the guideline include specially designed resources such as clinical algorithms, a toolkit, and a slide presentation.

Specific distribution strategies include:

Publication in full: The guideline will be available electronically at the Academy Evidence Analysis Library Web site and will be announced to all the dietetic practice groups. The Academy Evidence Analysis Library will also provide downloadable supporting information.

Implementation Tools

Clinical Algorithm

Quick Reference Guides/Physician Guides

For information about availability, see the *Availability of Companion Documents* and *Patient Resources* fields below.

Institute of Medicine (IOM) National Healthcare Quality Report Categories

IOM Care Need

End of Life Care

Getting Better

Living with Illness

IOM Domain

Effectiveness

Patient-centeredness

Identifying Information and Availability

Bibliographic Source(s)

Academy of Nutrition and Dietetics. Oncology evidence-based nutrition practice guideline. Chicago (IL): Academy of Nutrition and Dietetics; 2013. Various p.

Adaptation

Not applicable: The guideline was not adapted from another source.

Date Released

2007 Oct (revised 2013)

Guideline Developer(s)

Academy of Nutrition and Dietetics - Professional Association

Source(s) of Funding

Academy of Nutrition and Dietetics

Guideline Committee

Oncology Evidence-Based Nutrition Practice Guideline Workgroup

Composition of Group That Authored the Guideline

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Financial Disclosures/Conflicts of Interest

In the interest of full disclosure, the Academy has adopted the policy of revealing relationships workgroup members have with companies that sell products or services that are relevant to this topic. Workgroup members are required to disclose potential conflicts of interest by completing the Academy Conflict of Interest Form. It should not be assumed that these financial interests will have an adverse impact on the content, but they are noted here to fully inform readers.

- Laura Elliott: Grants/Research Support from American Cancer Society.
- Maureen Huhmann: Employment: Nestle Nutrition, Publications: ASPEN Guidelines for the use of Enteral and Parenteral Nutrition in Cancer (2009).
- Rhone Levin: Consultancy: Critical Care Systems Infusion, Honorarium: previous Oncology DPG funding, Membership: Oncology DPG.
- Anne Voss: Employment: Abbott Nutrition, Grants/research Support: European Union Palliative Care Research Consortium, Membership: American Cancer Society

Guideline Status

This is the current release of the guideline.

This guideline updates a previous version: American Dietetic Association (ADA). Oncology evidence-based nutrition practice guideline. Chicago (IL): American Dietetic Association (ADA); 2007 Oct. Various p. [46 references]

This guideline meets NGC's 2013 (revised) inclusion criteria.

Guideline Availability

Electronic copies: Available to members from the Academy of Nutrition and Dietetics Web site .

Availability of Companion Documents

The following are available:

- Oncology evidence-based nutrition practice guideline. Executive summary of recommendations. Chicago (IL): Academy of Nutrition and Dietetics; 2013. Electronic copies: Available from the Academy of Nutrition and Dietetics (AND) Web site .

Patient Resources

None available

NGC Status

This NGC summary was completed by ECRI Institute on November 7, 2008. The information was verified by the guideline developer on December 9, 2008. This summary was updated by ECRI Institute on January 15, 2015.

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