# Medical Nutrition Therapy: Managing Disease with Individualized Dietary Recommendations and Intervention

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## Introduction

Hippocrates said, "Let food be thy medicine and medicine be thy food." This statement is the essence of medical nutrition therapy (MNT). MNT is nutritional diagnostic, therapeutic, and counseling services for the purpose of disease management, which are provided by a nutrition professional [1]. While dietary recommendations or clinical practice guidelines offer general healthy dietary strategies, MNT is a recognized and individualized therapeutic approach to treat disease, medical conditions, and associated symptoms with diet. MNT is similar to other therapeutic domains, e.g., physical, occupational, psychological, and speech therapies, which are medically recognized and deployed by trained experts. Food and nutrition professionals, including registered dietitian nutritionists (RDN, also known as registered dietitians), are the purveyors of MNT. For some patients, depending on the patient and his/her medical condition(s), broad recommendations such as the Dietary Guidelines for Americans (developed by the US Departments of Health and Human Services and Agriculture) [2] or those of the American Heart Association [3] may suffice. But when patients need or inquire about diet related to special concerns or risk factors, consultation with a RDN is appropriate. This consult is especially appropriate for patients with multifactorial conditions with variable expression and symptomology between patients.

The educational background of RDNs includes a minimum of (a) a bachelor's degree incorporating approved didactic programming, (b) a dietetic internship consisting of at least 1,200 h of supervised practice with a variety of patient populations, and (c) passage of a national registration exam. Most dietitians go on to receive advanced academic degrees and/or specialized training and certifications in their area

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of expertise, such as board certification as a specialist in renal nutrition or nutrition support. The Academy of Nutrition and Dietetics (AND or the "Academy"), the professional organization for RDNs, and its credentialing agency require that all RDNs be Master's prepared at a minimum; this will take effect in within several years. The Centers for Medicare and Medicaid Services acknowledge that physicians, nurse practitioners, and non-RDN nutrition professionals who meet certain professional requirements can provide MNT services.

The Institute of Medicine (IOM) issued a report in 1999 supporting the utilization of MNT to improve clinical outcomes and healthcare costs associated with older adults with diabetes. The IOM issued recommendations that individualized MNT, provided by a RDN, become a covered Medicare benefit for diabetes and other select conditions [3, 4]. Medicare will thus cover a limited number of hours of MNT for patients with diabetes, kidney disease, and/or those who have had a kidney transplant in the last 3 years [5]. Recently, the U.S. Preventive Services Task Force recommended that physicians refer patients to dietitians for "intensive behavioral counseling" for diet-related chronic disease [6]. The Patient Protection and Affordable Care Act, signed in 2010, requires health plans to cover certain preventive services (including counseling for obesity or to promote a healthy diet) without patient cost [7]. However, there is variable compliance among insurers with this requirement.

## What Is Medical Nutrition Therapy (MNT)?

MNT is a cost-effective treatment for the prevention and management of disease [8–10]. Dietitians thus strongly advocate for the expansion of insurance coverage for MNT for all health conditions that are influenced by diet. Research demonstrates that MNT provided by a dietitian to manage disease yields improvements in clinical outcomes and reductions in costs related to physician time, medication use, and hospital admission for individuals with chronic disease [10]. Multidisciplinary care that includes a dietitian is a cost-effective treatment for chronic kidney disease, for example, resulting in fewer hospitalizations and decreased need for renal replacement therapies, including hemodialysis, peritoneal dialysis, and transplant [11].

While patients may ask their primary care or other physicians for advice about diet, studies have shown that doctors are not always comfortable or confident in advising patients about making dietary changes [12, 13], specifically when it requires the need to individualize recommendations with respect to a patient's comorbid conditions, lifestyle, and other factors. Research confirms that patients perceive RDNs as most knowledgeable about nutrition and its relationship to disease [14]. MNT is a prescriptive treatment that requires an individualized assessment, diagnosis, intervention, and monitoring plan. When this process is performed by a RDN, it is referred to as the "nutrition care process" (NCP). Current evidence supports that MNT provided by a RDN is more cost-effective [3, 4, 8, 9, 11, 15] and elicits more positive outcomes than generic recommendations and general

guidelines [16–18] for patient populations and disease states [19]. MNT is different from nutrition education. Nutrition education is the provision or reinforcement of basic nutrition-related knowledge. MNT is also different from general dietary recommendations, which may be developed for public policy/health purposes or as disease-specific guidelines and provided to anyone. While there is no governance over who can provide nutrition education or general dietary recommendations, legislation does exist to protect the delivery of MNT. For this reason, and because a RDN may not be available in all clinical areas, it is helpful to distinguish patients for whom dietary recommendations or nutrition education may be sufficient from those who need MNT.

## What Is the Nutrition Care Process (NCP)?

Because of the strong correlation between diet and health as well as gene expression and function, MNT provided by a RDN is a key component of medical management for many chronic and other conditions. Whether aimed at primary, secondary, or tertiary prevention, there is a role for MNT in many medical conditions and disease processes. NCP is the framework that guides the provision of MNT [1, 20]. The NCP has four steps, each of which will be described in detail: (1) nutrition assessment, (2) nutrition diagnosis, (3) nutrition intervention, and (4) nutrition monitoring and evaluation (Fig. 1.1). The NCP was originally developed by a workgroup of the Academy to standardize the care process related to MNT in order to provide a framework for outcomes research and also to standardize clinical care and management. Dietitians are encouraged to follow the NCP and its parallel standardized language, the International Dietetic and Nutrition Terminology (IDNT) [1]. The standardized language allows nutrition practitioners to document the impact of MNT in a clear and consistent manner across medical conditions and institutions. IDNT articulates all four steps of the NCP – from assessment to monitoring and evaluation – with codes similar to international classification of disease codes.

## Nutrition Assessment

Nutrition assessment is the collection, integration, and analysis of nutrition-related data in order to craft a nutrition diagnosis that calls for an individualized intervention. It is the first step of the NCP and involves collecting, verifying, interpreting, and documenting key data necessary to identify nutrition-related problems [20]. The NCP has five assessment domains: (1) food- and nutrition-related history; (2) anthropometric measurements; (3) biochemical data, medical tests, and procedures; (4) nutrition-focused physical findings; and (5) client history. These data are usually available in any healthcare setting, and sources include the patient and family interview; food, beverage, medication, and activity logs; medical record; referring provider(s); and nutrition-related physical assessment.

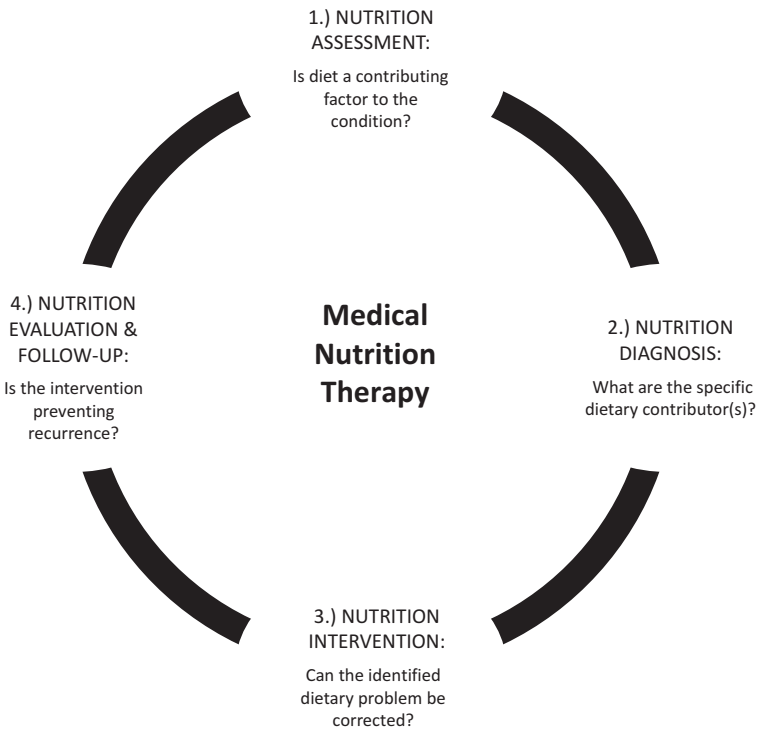


**Fig. 1.1** The nutrition care process involved in the practice of medical nutrition therapy by a registered dietitian nutritionist. The central question to be answered within each stage of the process is shown

The patient interview may be the best source of information related to the patient's food and nutrition history. The RDN assesses the patient's past and present food intake, factors that influence food intake (such as food security, access to cooking and food storage facilities, transportation, dentition, and cultural and religious observances), and food and nutrition knowledge. The RDN may collect dietary data from the patient via detailed, multiple-day diet records, a 24-h dietary recall (asking the patient to recall everything he/she ate or drank in the last 24 h), a brief diet history (querying about usual dietary patterns, food frequency, and food propensity), or a food screener or food frequency questionnaire (FFQ). While there are an abundance of validated FFQs available for use, their accuracy in assessing the intake of specific nutrients and dietary habits has been questioned [21]. FFQs and food screeners may be appropriate in identifying patients whose medical and nutritional needs are more complex and who would benefit from the involvement of a RDN to obtain and interpret their dietary intake and nutritional risk factors.

In addition to dietary assessment, the patient's past medical history, surgical history, social history, and readiness to change are assessed.

> Dietary assessment in patients with kidney stones, depending on the type of stone(s) he/she forms and on 24-h and other biological risk factors, might focus particularly on nutrients and other food-derived components that contribute to high urinary excretion of calcium and oxalate or on low urinary excretion of citrate, magnesium, and volume.

In addition to the patient's report, other critical data can be acquired from the patient's medical record and from the referring provider. Pertinent information from these sources may include the following: anthropometric data, past and present medications, biochemical data, medical test results, relevant procedures, and documentation from past providers related to the present medical diagnosis. With patient permission, a nutrition-related physical assessment can reveal signs and symptoms of deficiency or malnutrition [22]. By reviewing all of these sources, the patient's dietary intake and nutritional status can be adequately assessed.

## Nutrition Diagnosis

The second step of the NCP is the nutrition diagnosis: the identification and labeling of a nutrition-related problem that can be treated independently. The purpose of the nutrition diagnosis is to link the findings from diet assessment with the manifestations or exacerbation of a disease or medical condition. A nutrition diagnosis is not a medical diagnosis. A medical diagnosis, usually made by a MD or other advanced practice medical provider, identifies a diseased organ or body system or an aberrant metabolic process that can be treated and/or prevented. A medical diagnosis does not change until the disease has resolved. A nutrition diagnosis identifies an aberrant dietary practice or habit that is contributory to a patient's medical diagnosis. A nutrition diagnosis can change over time as the patient and/or his/her risk factors for disease progression or recurrence changes. Confirming the appropriate nutrition diagnosis is critical because it is the pathway to appropriate nutrition intervention and evaluation.

As earlier noted, the IDNT has terms for stating nutrition diagnoses related to food and/or nutrient intake, clinical diagnoses, and behavioral/environmental issues. The approved terminology supports identification of the three components of the nutrition diagnosis: problem, etiology, and signs and symptoms (PES) [20, 23, 24]. The "problem" is the diagnostic label that describes the patient's response to a nutrition-related practice or habit. The "etiology" is the cause or related factors contributing to the problem. An example of the wedding of the problem to a nutrition-related etiology is "overweight/obesity related to excessive energy intake." The "signs and symptoms" are the results or defining characteristics of the problem.

These are objective data that are observed by the clinician. Examples may include a patient's altered laboratory values, patient-reported information, and medical diagnosis. Upon diagnosing the problem, etiology, and signs and symptoms, the RDN can craft the PES statement. The final PES statement from the example above would be "Overweight/obesity related to excessive energy intake as evidenced by patient's 24-hour dietary recall and BMI of 42.0." The nutrition diagnosis is a pivotal step in the nutrition care process and guides the clinician to the appropriate intervention.

An example of a PES statement (nutrition diagnosis) related to the risk for kidney stone recurrence might be "High oxalate absorption related to low calcium intake as evidenced by findings from dietary assessment of the patient's diet and high urinary oxalate excretion."

## Nutrition Intervention

An intervention is a purposeful series of events aimed at addressing a problem. Nutrition interventions are designed with the primary intent of improving or correcting the problem declared in the diagnostic PES statement. This third step of the NCP includes the selection, planning, and implementation of specific actions to address the problem or nutrition diagnosis. The nutrition intervention typically includes strategies by which patients may achieve the goals of the intervention and, in that sense, provides the foundation for measuring and evaluating nutrition-related outcomes over time. The patient and his/her family are always at the center of successful nutrition interventions. In designing and implementing the nutrition intervention, the RDN collaborates with the patient, the patient's family, and/or other members of the healthcare team as needed to ameliorate the nutrition-related problem or signs and symptoms that result from the problem.

A common nutrition intervention in patients with stones is to increase fruit and vegetable intake. This might especially be relevant for patients with suboptimal urinary citrate excretion as fruits and vegetables provide bicarbonate precursors that can promote higher urinary citrate excretion. It could also be part of the intervention to reduce oxalate absorption and urinary excretion as fruits and vegetables provide substrate (prebiotics) for the growth and colonization of gastrointestinal tract bacteria favoring oxalate degradation.

The nutrition intervention includes the identification and implementation of the appropriate therapeutic approach. The MNT appropriate for the primary problem, or diagnosis, is determined by using evidence-based nutrition guidelines, relevant research, and current clinical guidelines. The Academy created and manages an Evidence Analysis Library (EAL) [10] and three nutrition care manuals, each

containing the most up-to-date information regarding nutrition-related diseases and conditions. The Academy's EAL is available for use at www.andeal.org. The nutrition care manuals are updated regularly and contain content for normal nutrition as well as for acute and chronic diseases states for adult and pediatric populations. The third nutrition care manual is specific to sports nutrition.

The implementation of the intervention may include patient education materials (nutrition education), strategies and ideas for how to make the recommended changes, and tools for implementing and complying with the intervention. The development of the intervention is grounded in behavior change theory (nutrition counseling) as deemed appropriate for each patient [25–30]. It is thus highly individualized per patient factors, such as motivation and enthusiasm to change, educational needs, and learning style. Productive nutrition education delivery is patient and family centered as the success of the intervention hinges on the involvement of the patient in his/her own care [25–28]. In an effort to enhance the patient's involvement or compliance with the intervention, two counseling approaches used by RDNs are cognitive behavioral therapy and motivational interviewing. Cognitive behavioral therapy is counseling that is focused on identifying the mental and emotional relationships between thoughts, feelings, and behaviors that are related to a specific dietary practice or habit [29, 30]. Motivational interviewing is a nonjudgmental and non-confrontational counseling approach that is aimed at increasing patients' awareness of the necessity for specific changes while guiding them through the stages of change [30].

For the intervention described earlier – increasing fruit and vegetable intake – patient education materials might include information about how to prepare and store fresh fruits and vegetables. Tools to aid in the implementation might include schedules or plans for including more fruits and vegetables within the day.

Documentation of the nutrition intervention – its effects on the patient as well as on his/her disease process – is an ongoing process, especially if the patient is seen in follow-up on a regular or serial basis and if modifications to the initial MNT are needed. Documentation of MNT includes date and time of intervention; treatment goals, patient-stated goals, and expected outcomes; patient receptivity and readiness to change; resources utilized; and recommended interventions and/or topics of education for further follow-up.

## Nutrition Monitoring and Evaluation

The results of the nutrition intervention on the targeted problem(s) must be evaluated for its effectiveness. If the intervention was ineffective in managing the problem intended, the reasons for its failure should be evaluated and corrected. Thus, the

fourth and final step of the nutrition care process is monitoring and evaluation. Monitoring is the review and measurement of the patient's nutritional status and response to MNT over time, whereas evaluation is the comparison of present findings to previous. This step has three interrelated processes: (1) monitor progress (monitoring), (2) measure outcomes (reassessment), and (3) evaluate outcomes (evaluation) [23, 24].

Key sources of data for monitoring and evaluation are similar to that of nutrition assessment and include patient and family interview; food, beverage, medication, and activity logs (or diet assessment by other means); medical record and notes about disease process; documentation from follow-up visits; and nutrition-related physical assessment. Measureable outcomes should be directly related to the patient's diagnosis and goals for MNT. Examples may be changes in the patient's nutrition or health status, increases in food-related knowledge, or cost-related outcomes such as medication changes, decreased length of stay in a hospital, or fewer hospitalizations or procedures.

Based on the findings of this final step in the nutrition care process, the RDN will determine the patient's need for continuing care. Depending on the patient and his/her progress, MNT and nutritional counseling may continue to be provided. Alternatively, the patient may be transitioned to another setting or healthcare provider or discharged from MNT altogether.

Documentation of the monitoring and evaluation step is critical not only to communicate the effect of MNT but also to a clinical nutrition program's quality control and quality improvement initiatives (also known as outcomes management system). As the provision of healthcare is increasingly driven by the need to demonstrate "best practices" and comparative effectiveness, the outcomes management system of a clinical nutrition program provides a means to evaluate the effectiveness of the entire nutritional care process within an institution, with specific attention paid to measurable outcomes and the processes by which they were achieved [20].

Evaluation of the nutrition intervention for patients with stones may reveal the need for modification. For example, a patient whose high urinary oxalate excretion is not corrected by reducing intake of high-oxalate foods may require additional – or a completely alternative – approach. This could include intake of calcium-containing foods or beverages with meals to reduce oxalate absorption and/or higher intake of fermented foods (probiotics) to enhance oxalate degradation by gastrointestinal tract bacteria.

## How Can I Collaborate with a Dietitian?

Collaboration involves the cooperation of parties to produce an outcome. Healthcare collaboration includes the exchange of ideas, strategies, and goals while also distributing responsibilities within the provider team to advance the health and well-being of a patient. In conditions with dietary modulators, RDNs can provide expertise

about physiology and nutritional biochemistry related to the disease process and about dietary changes that could address it. The National Kidney Disease Education Program (NKDEP) supports physician collaboration with a RDN and the utilization of MNT to improve the prevention and management of kidney disease. While physicians initiate the discussion of the need for therapeutic dietary changes, a RDN provides the MNT, which results in cost-savings, enhanced physician efficiency, and positive outcomes. Medicare and most health insurance companies with a physician referral cover MNT services for diabetes and kidney disease. Eligible patients can receive up to 3 h of MNT in the first year and 2 h in the following years. NKDEP referral forms can be found at http://nkdep.nih.gov/resources/kidney-diet-referral-form-mnt-508.pdf. An example of a referral form that could be used to refer patients with stones to a RDN is provided (Fig. 1.2).

In many cases, insurers will allow for MNT for other services, including kidney stones, and this may be especially true when RDNs are integrated into a multidisciplinary care team or are otherwise made available to patients at the time of their clinic appointment with the physician. Currently, many RDNs are joining multidisciplinary teams in patient-centered medical homes and primary care offices [31–33]. If a RDN is not available on a team, one can usually be accessed within the physician's hospital or healthcare system. All hospitals and long-term care facilities, for example, have RDNs; their availability to specific physicians, clinics, or patient populations can usually be requested of the facility's clinical nutrition manager. Most health maintenance organizations and outpatient clinics now make RDNs available for patient appointments that may be scheduled either by patients themselves or by the referring providers. Additionally, the Academy provides a national directory of RDNs, and this may be a resource for some.

Urologists wanting to refer patients to a RDN for dietary intervention to reduce stone recurrence risk might first look for one available within the hospital or clinic in which they see patients. If one is not available, then a referral to an outside RDN, perhaps in a private practice setting or within the patient's healthcare maintenance organization, might be in order. The referral might (a) provide a brief history of the patient's stone-related history and relevant risk parameters, (b) request a dietary assessment to identify any factors that contribute to the observed risk factors, (c) request the design of an intervention to address the contributing dietary factor(s), and (d) provide a way for the RDN to communicate his/her findings to the referring physician.

## Conclusion

The MNT provided by RDNs can identify nutrition-related problems that may be prevented or treated independently via nutrition intervention. MNT involves a four-step process that includes assessment, diagnosis, intervention, and monitoring and

**SAVE THIS FORM TO YOUR COMPUTER BEFORE ENTERING DATA. Complete as much of the form as you are able.** Also, to comply with the Health Insurance Portability and Accountability Act of 2002, please protect the personal health information contained in the completed form.

## KIDNEY STONE COUNSELING REFERRAL FORM – FOR MEDICAL NUTRITION THERAPY

**NAME OF PATIENT** _____ **DATE OF BIRTH** _____ **MEDICAL RECORD NUMBER** *(IF APPLICABLE)* _____

**LAST APPOINTMENT DATE** _____ **WEIGHT** _____ **HEIGHT** _____ **DOES THE PATIENT CURRENTLY HAVE STONES?** _____

**DID YOU PRESCRIBE ANY MEDICATIONS TO PREVENT STONES? - LIST**

**DID YOU RECOMMEND ANY DIETARY CHANGES TO PREVENT STONES? - LIST**

**REASON FOR YOUR REFERRAL:** ***Medical nutrition therapy for prevention of kidney stone recurrence***. Please detail any specific concerns or questions:

**NUMBER OF PRIOR STONE EVENTS** _____ **YEAR OF (OR AGE AT) FIRST STONE EVENT** _____ **FAMILY HISTORY FOR STONES** *(LIST RELATIONS)* _____

**PRIOR SURGERIES FOR STONES, IF ANY, AND YEAR(S)** _____ **PRIOR PASSAGES OF STONES, IF ANY, AND YEAR(S)** _____

**PRIOR STONE COMPOSITION RESULTS** *(LIST PERCENTAGE(S) OF EACH COMPONENT & YEAR OF ANALYSIS, IF AVAILABLE)*

CaOx monohydrate (whewellite):_____
CaOx dihydrate (weddellite):_____
CaPhos carbonate (carbonate apatite):_____
Calcium hydroxyl phosphate (hydroxyapatite):_____
CaPhos dihydrate (brushite): _____
Cystine: _____
Tricalcium phosphate (whitlockite):_____
Uric acid (urate):_____
Sodium urate monohydrate):_____
Ammonium urate:_____
Silica:_____
Xanthine:_____

**24-H URINE RESULTS** *(FOR MOST RECENT ANALYSES; GIVE DATES AND AMOUNTS OF EACH COMPONENT)*

**Date 1:** _____ Ca (mg) _____ Ox (mg) _____ Cit (mg) _____ Uric acid (mg) _____ Phos (mg) _____ Vol (L) _____ pH _____
Mg (mg) _____ $Na^+$ (mEq) _____ $K^+$ (mEq) _____ $SO_4$ (mmol) _____ $NH_4$ (mmol) _____ UUN (g) _____ Creatinine (mg) _____

**Date 2:** _____ Ca (mg) _____ Ox (mg) _____ Cit (mg) _____ Uric acid (mg) _____ Phos (mg) _____ Vol (L) _____ pH _____
Mg (mg) _____ $Na^+$ (mEq) _____ $K^+$ (mEq) _____ $SO_4$ (mmol) _____ $NH_4$ (mmol) _____ UUN (g) _____ Creatinine (mg) _____

**Date 3:** _____ Ca (mg) _____ Ox (mg) _____ Cit (mg) _____ Uric acid (mg) _____ Phos (mg) _____ Vol (L) _____ pH _____
Mg (mg) _____ $Na^+$ (mEq) _____ $K^+$ (mEq) _____ $SO_4$ (mmol) _____ $NH_4$ (mmol) _____ UUN (g) _____ Creatinine (mg) _____

**LIST PATIENT'S CURRENT MEDICATIONS**: _____

**LIST COMORBIDITIES, MEDICAL CONCERNS**: _____

**REFERRING PROVIDER** _____ **NPI #** _____

**SIGNATURE** _____ **DATE** _____

**PHONE** _____ **FAX** _____ **EMAIL** _____

**Fig. 1.2** NIDDK's referral form for dietary counseling or medical nutrition therapy

evaluation of a patient's nutrition-related disease or condition. By utilizing the IDNT, the standardized language created by the Academy, the professional organization for dietitians, and tools within a clinical nutrition program's outcomes management system, RDNs can provide, measure, and evaluate evidence-based nutrition care and thus significantly contribute to patients' health and well-being.

**SAVE THIS FORM TO YOUR COMPUTER BEFORE ENTERING DATA. Complete as much of the form as you are able.** Also, to comply with the Health Insurance Portability and Accountability Act of 2002, please protect the personal health information contained in the completed form.

## RATIONALE FOR DATA INCLUSION

The following information explains why it is important to include data for the referral to a Registered Dietitian Nutritionist for medical nutrition therapy. While you may not be able to provide all the information requested, any data you are able to provide will be useful.

| | |
|---|---|
| REASON FOR REFERRAL TO DIETITIAN FOR MEDICAL NUTRITION THERAPY | Can list specific concerns, underlying diseases or conditions that are thought to contribute to stone formation, information about length and/or aggressiveness of patient's stone history, etc. |
| NEW Rx PRESCRIPTIONS | Important for interpreting results of 24-h urine collections and other parameters from before any new medications were being used by the patient |
| NEW DIETARY CHANGES | Important for distinguishing between prior dietary habits (and over-the-counter supplement use) and those only recently implemented. Also important when evaluating patients' knowledge and understanding of impact of diet on stones. |
| STONE EVENTS & FAMILY HISTORY | The number of prior stone events, surgeries, and existence of family medical history related to stones can help to assess severity and aggressiveness of stone disease and may inform nutritional prioritization. |
| STONE COMPOSITION | If available, stone composition is important in guiding the prioritization of medical nutrition therapy for stone prevention. |
| 24-HOUR URINE RESULTS | Provides important data to assess risk and points the way for specific lines of investigation during diet assessment. The date of the collection reveals its proximity to prior stone event(s) and to initiation of any new therapies. The 24-h urine creatinine measure is important in assessing accurateness of the time period during which the urine was collected. |
| CURRENT MEDICATIONS | Certain medications - such as antibiotics and carbonic anhydrase inhibitors - can promote stone formation. Dietary strategies to compensate for these effects and for others can be implemented. Other medications have interactions with dietary components and are thus crucial in assessing nutritional status as well as effects on stone promoters and inhibitors. |
| COMORBIDITIES | Important to assess contributing or co-mingling factors that affect stone formation and growth. Also important for integrating dietary recommendations with those received and in place for other conditions. |
| ADDITIONAL INFORMATION & COMPLICATING FACTORS | Certain laboratory measures may be useful, such as vitamin D status, parathyroid hormone, and serum calcium, potassium, and phosphorus. Other complicating factors, such as prior bowel or bariatric surgery, short bowel, or neurogenic bladder, are also important to note as they may have implications for the nutrition therapy regimen. |

For more information about DIET AND STONES, visit the AMERICAN UROLOGICAL ASSOCIATION (AUA) website at: **https://www.auanet.org/education/guidelines/management-kidney-stones.cfm**. There you may read an abstract of the guidelines, view the individual guideline statements, and download the unabridged version of the guideline.

Also refer to the AUA PATIENT GUIDE TO KIDNEY STONES. This may be downloaded and provided to patients. Visit **http://www.urologyhealth.org/educational-materials/kidney-stones-a-patient-guide**. Additional stone materials are available for download at **http://www.urologyhealth.org/educational-materials?filters=769**. These additional materials include the following factsheets: "Diagnosing and Treating Kidney Stones," "Kidney Stones-What You Should Know," and "Preventing Kidney Stones."

Registered dietitian nutritionists may also wish to review the chapter on diet and kidney stones in the Nutrition Care Manual of the ACADEMY OF NUTRITION AND DIETETICS. Patient educational materials are also available there.

**Fig. 1.2** (continued)

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