

*Review* ■

## Patient Satisfaction and Normative Decision Theory

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**Abstract** This article explores the application of normative decision theory (NDT) to the challenge of facilitating and measuring patient satisfaction. Patient satisfaction is the appraisal, by an individual, of the extent to which the care provided has met that individual's expectations and preferences. Classic decision analysis provides a graphic and computational strategy to link patient preferences for outcomes to the treatment choices likely to produce the outcomes. Multiple criteria models enable the complex judgment task of measuring patient satisfaction to be decomposed into elemental factors that reflect patient preferences, thus facilitating evaluation of care in terms of factors relevant to the individual patient. Through the application of NDT models, it is possible to use patient preferences as a guide to the treatment planning and care monitoring process and to construct measures of patient satisfaction that are meaningful to the individual. Nursing informatics, with its foundations in both information management and decision sciences, provides the tools and data necessary to promote care provided in accord with patient preferences and to ensure appraisal of satisfaction that aptly captures the complex, multidimensional nature of patient preferences.

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While much of informatics is concerned with computer systems, formal languages, and data sets, the application of decision science to clinical and health services challenges also represents a valid focus for informatics practitioners. The purpose of this article is to examine how a key quality indicator, patient satisfaction, can be facilitated and measured using strategies from normative decision theory (NDT).

Existing approaches to patient satisfaction employ ill-defined concepts of satisfaction; additionally, psychometrically derived instruments applied at the end of the care process offer little help to ensure that the care provided is likely to be satisfying to a patient. Models arising from NDT offer some distinct advantages. First, NDT provides methods for constructing a measure of patient satisfaction built directly on an individual patient's values, desires, and expectations. Second, NDT serves as the foundation for compu-

tational strategies to explicitly link patient preferences for outcome states with choices for clinical treatments, thereby increasing the chance that the care received will be satisfying to patients. This paper begins by providing the background to conceptualizing patient satisfaction as an individual, human experience. Next, it illustrates how two models from NDT can be applied to the challenges of facilitating and assessing a patient's satisfaction with care. Implications for informatics are explored, and the article concludes with a summary of the use of NDT models in ensuring and assessing patient satisfaction.

This article explores patient satisfaction and NDT from the perspective of nursing informatics. However, many of the ideas presented have broad relevance to all health disciplines, and to all of health informatics. Unique to nursing is the responsibility that those dimensions of patient care specifically within the purview of nursing be represented in the application of NDT strategies to ensure and assess patient satisfaction.

### Background

#### Perspectives on Patient Satisfaction

Patient satisfaction is essentially a subjective judgment resulting from the appraisal of the health care experience, generally involving some implicit or ex-

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PLICIT comparison of the actual events with an individual's expectation. Patient satisfaction reflects the degree to which an individual's actual experience matches his or her preferences regarding the experience. Patient satisfaction is important not only as a summary judgment at the end of care, but also because it informs initial treatment planning decisions. To anchor the discussion of patient satisfaction as a human experience, consider the following three situations:

1. Miriam Richards is a 72-year-old woman who has been admitted to an extended care facility following discharge from a local hospital. Mrs. Richards is confused occasionally and wanders; the clinical staff are concerned that she is at risk for falling. Staff members are considering two methods to prevent falling: physical restraint and environmental manipulation. How should trade-offs among patient comfort, risks, and costs be identified and weighted?
2. Reginald Vargy is a 32-year-old man who is suffering from chronic schizophrenia. Several medications are available, but explicit trade-offs among side effects, toxicities, and efficacy must be considered. Other issues, such as symptom control and the challenge of functioning in a complex society, also enter the decision about drug therapy. If the one medication most likely to reduce symptoms also causes the most unpleasant side effects, is it possible to find a drug therapy regimen that Mr. Vargy will find satisfying?
3. Jennifer Little returned from her mother's funeral, mulling over the last three weeks of hospital care provided to her mother. While she had genuinely liked her mother's physician, and the nursing care provided had seemed acceptable, Ms. Little had a vague sense of dissatisfaction with the whole process. Maybe her dissatisfaction arose from her sadness at the final outcome, the death of her mother. Perhaps, instead, her dissatisfaction emerged from a sense of being overwhelmed at having to make very complex choices, such as turning off the respirator that provided the last bit of life support for her mother. In any event, Ms. Little mused, "The hospital gets paid regardless of what I think."

These three vignettes illustrate various perspectives on patient satisfaction as a human experience. First, patient satisfaction is a concept with multiple referents. What aspect of care does the patient consider when appraising satisfaction—the choices available, the choices selected, the outcomes feasible, or the outcomes actually attained? Does considering a patient's values, preferences, and desires lead to care

that is satisfying to the patient? Second, patient satisfaction is a multidimensional concept resulting from the patient's understanding about, pleasure with, and acceptance of his or her own health state, the logistics of care, and the likelihood that treatment did or will result in desired outcomes. How should a patient's preferences for certain outcomes, such as avoidance of side effects, be weighted against other factors in the treatment decision, such as the clinical efficacy of a medication? Third, although the term patient generally addresses the identified ill person, others, such as family members, may also hold stakes in the satisfaction with the care. Finally, patient satisfaction has proven to be a volatile concept, as much influenced by environmental conditions as by the perceived distance from the event.<sup>1</sup>

The ideas presented here are premised on a key assumption: patient satisfaction is a human experience, appraised subjectively by an individual, regarding the extent to which care received has met certain expectations. The individual here is the identified patient. Underlying this assumption is a belief in the patient's basic right to participate in decisions about clinical care, and a recognition of the importance of patients as sources of information about their own values and preferences. This assumption and belief are fundamental to initiating an exploration of the application of decision theory to the challenges of measuring and ensuring patient satisfaction with care. Patient satisfaction is, in essence, a human judgment.

### Traditional Approaches to Constructing Measures of Patient Satisfaction

Patient satisfaction has emerged as an important indicator of the quality of care, and, as such, deserves attention from nursing informatics specialists. Since Donabedian's seminal work on quality in 1968,<sup>2</sup> researchers have sought numerical indicators for structure, process, and outcome variables. Sometimes the choice of outcome indicators has been based solely on the availability of quantifiable variables, such as mortality rates or readmissions. So-called soft outcome variables, such as patient satisfaction, have been either ignored<sup>3</sup> or compressed into single-item indicators.<sup>4</sup> Current approaches to measuring patient satisfaction rely on traditional psychometric approaches to instrument development. For example, the Picker-Commonwealth Patient Satisfaction Instrument<sup>5</sup> queries respondents about the extent to which their expectations of the providers of the care they received and certain activities of the care they experienced were satisfied. Respondents review each item and indicate on a Likert-type scale numbers that best represent their judgments. Some items prompt for eval-

uation of physician care, others for nursing care. Activity-referent items explore how adequately informed patients were, for example, to comprehend treatment decisions or to manage post-discharge activities. No individual names are used as referents, thus providers are not distinguished from each other. Moreover, no operational definition of the term satisfaction is provided.

Another approach to evaluating patient satisfaction can be found in the various instruments constructed by nurse researchers to examine patient satisfaction with that specific component of care provided by nurses. One example of these is the LaMonica et al.<sup>6</sup> 22-item instrument measuring the quality and acceptability of the nurse-patient relationship. This instrument targets exclusively the care provided to patients by nurses; this focus is both an asset and a limitation. Like other psychometrically produced instruments, it also queries patients about prespecified dimensions of care, and does not elicit the patient's views on elements deemed relevant to himself or herself.

The benefits of established instruments for measuring patient satisfaction arise from their generalizability. Because there is no specific referent for any instrument, each can be used to appraise the satisfaction of patients in many different acute-care settings. Widespread use of instruments such as the Picker-Commonwealth permits intra-agency and interagency comparisons of results. However, there are several limitations of the norm-based approach to measuring patient satisfaction. First, the items in the instruments are generally not sufficiently specific to capture the concerns of an individual patient. Second, the norm-based approach is more useful when attempting to evaluate the satisfaction with care as an aggregate characteristic of a group, rather than as an individual's appraisal of a personal experience. Third, and perhaps most important, imprecision in the conceptualization of patient satisfaction casts doubt on the validity of the instruments.

Patient satisfaction is a complex, multidimensional judgment resulting from an individual's appraisal of experiences and a comparison of experiences with expectations. Therefore, to criticize a widely accepted instrument for lack of conceptual clarity may be fallacious, because it may be impossible to arrive at a uniform definition of patient satisfaction. Instead of assuming consensus on the meaning of the term, it may be more useful to employ a strategy that supports personalistic interpretations of the concept of patient satisfaction. Such strategies include Cantril's Ladder, j-scaling, the methods of personal ranking, and the construction of models based on NDT.

### Decision Science and NDT

Decision science is a loosely structured field claiming roots in economics, psychology, mathematics, and probability. Generally two divisions of decision theory are recognized: behavioral and normative. Behavioral decision theory, the descriptive wing, provides evidence that human information-processing skills deteriorate when faced with complex tasks, such as making judgments in value-laden situations characterized by uncertainty.<sup>7</sup> NDT, sometimes labeled decision theoretic or prescriptive, proposes ways to compensate for the limitations of human information processing.<sup>8,9</sup> Decision theoretic approaches to choice posit that normative models compensate for the fallibilities of human judgment in two ways: 1) they provide ways to break complex problems down into component parts, thereby reducing cognitive workloads; and 2) they link choices to norms external to decision problems, thereby ensuring rational (e.g., internally consistent) choices.<sup>10</sup> Decision theoretic models provide structures for constructing personal models of decisions; these models reflect the key decision maker's perspectives, values, and understanding of the situation. The two most common mathematical formulations in NDT are the probability models (commonly referred to as "classic decision analysis," "decision tree analysis," "belief networks," and "influence diagrams") and the multiple criteria models.

Decision theoretic approaches begin with a person's understanding of a decision situation, which forms the basis on which a model of the problem can be built. The normative principles of decision theory provide the mathematical rules necessary to build and solve the model. Components of the model, representing different aspects of the situation, can be manipulated, enabling the individual to examine the impacts of various scenarios. Because the models reflect the individual's own understanding of a situation, the very process of building the model is perceived to be beneficial for the insight it engenders.<sup>11</sup> The analysis of the model following the normative rules set forth from the theory, however, provides a powerful aid in recommending choices appropriate to a patient's value structure and in examining how variations in patients' preferences and understanding of a decision situation may alter the recommendation of the desired course of action.

Decision theoretic techniques are particularly useful in health care decision making, where decision situations are characterized by risk, uncertainty, and the need to make choices simultaneously satisfying multiple criteria. Clinical decisions, such as opting for surgery over medical interventions, are difficult

because many times recognition of the appropriate choice depends in part on the resolution of some future, uncertain, event, such as the occurrence of side effects or the likelihood of treatment efficacy. Clinical decisions are further complicated because choices sometimes require trade-offs between important attributes of solutions, such as cost and efficacy. Clinical decisions also evoke intense personal reactions within both patients and nurses, such as the fear of death or the desire to reduce suffering; these personal situations lack a language for expression, much less strategies for resolution.

Normative decision theory has relevance to the problem of assessing and promoting patient satisfaction in three major ways: 1) NDT models provide structures through which patients may understand and clarify decision problems, and make choices in accord with personal values (and rationales); 2) through their applications in clinical settings, NDT models provide ways for clinicians to explicitly consider a patient's values and preferences in the process of making treatment recommendations,<sup>12</sup> thus increasing the likelihood that the patient will be satisfied with care; and 3) NDT models support the construction of indices that provide a way to integrate the multiple dimensions of patient satisfaction into a single, integrated judgment. The next section demonstrates the application of NDT to patient satisfaction.

## Modeling Patient Satisfaction with NDT

### Classic Decision Analysis

Decision analysis involves conceptualizing decision problems with five major elements: alternatives, events, probabilities of events, outcomes, and values associated with the outcomes. Alternatives, events, and outcomes generally depict the scientific or clinical view of the patient's treatment options and health states. Likelihoods of events are obtained from the literature or the experts. The valuing of outcomes occurs in one of two ways: reliance on strict numerics, such as money or time, or quantified in terms of the relative desirability of each outcome to the patient. Weinstein et al.<sup>13</sup> have described decision analysis techniques.

Belief networks<sup>14</sup> and influence diagrams<sup>15</sup> represent extensions of decision theory applied to judgment and choice under uncertainty. As in classic decision analysis, probability theory guides the computation that leads to recommended choices of action. Although the representations supported by belief networks and influence diagrams are appealing, their widespread use in assessing and ensuring patient

satisfaction seems unlikely due to difficulties in obtaining reasonable estimates for the large number of probabilities necessary to instantiate the networks.

Classic decision analysis is generally employed to resolve complex clinical choices in medical therapies.<sup>16</sup> Recent initiatives demonstrate how to capture patient preferences and use those preferences for guiding care. The SUPPORT study,<sup>17</sup> an outgrowth of the work of Knaus et al.,<sup>3</sup> employs techniques from NDT to help patients and clinicians determine patients' preferences for life-sustaining interventions in the contexts of predicted health outcomes. Kasper et al.<sup>18</sup> have established strategies to aid the exploration of the multiple dimensions of men's preferences for treatments for prostate cancers. Within nursing, Corcoran<sup>19</sup> has advocated the use of formal decision models to help patients make informed choices about pain management options, and Mion et al.<sup>20</sup> have used a decision analysis model to demonstrate how the optimal clinical management strategy varies with patients' preferences for outcome states. Decision analysis has also been used to study various nursing care problems, always from the perspective of the nurse as decision maker,<sup>21-23</sup> and only recently with an attempt to include patient preferences for outcomes in the models.<sup>19,20</sup> Decision tree analysis is a special technique for use in certain circumstances; in a series of articles<sup>24,25</sup> Baumann et al. posit that the natures of some clinical nursing arenas, such as critical care units, may preclude the use of decision analysis.

To illustrate the explicit incorporation of patient preferences for outcome states into a decision analysis, let us return to the first vignette describing the clinical dilemma of the patient at risk for falling. With 5% of all elders in nursing homes, reducing patients' risks of falling represents a familiar challenge to nurses in long-term care. Physical restraints and environmental manipulation (in the forms of moving a patient's bed closer to high activity areas or increasing surveillance) are the strategies most commonly used to reduce risks of falling. Despite physical restraint use, some patients still fall, and may experience life-threatening injuries. Yet, environmental manipulation, demonstrated to be as effective as physical restraints in reducing falls, brings with it demands for increased staff and tolerance of risk. What should a nurse do to ensure that the strategy selected is likely to be both effective for maintaining safety and satisfying to the patient?

Decision tree analysis provides one feasible approach to analyzing this problem. Mion et al.<sup>20</sup> document the development of a decision tree model of falls prevention, in which the two alternative strategies

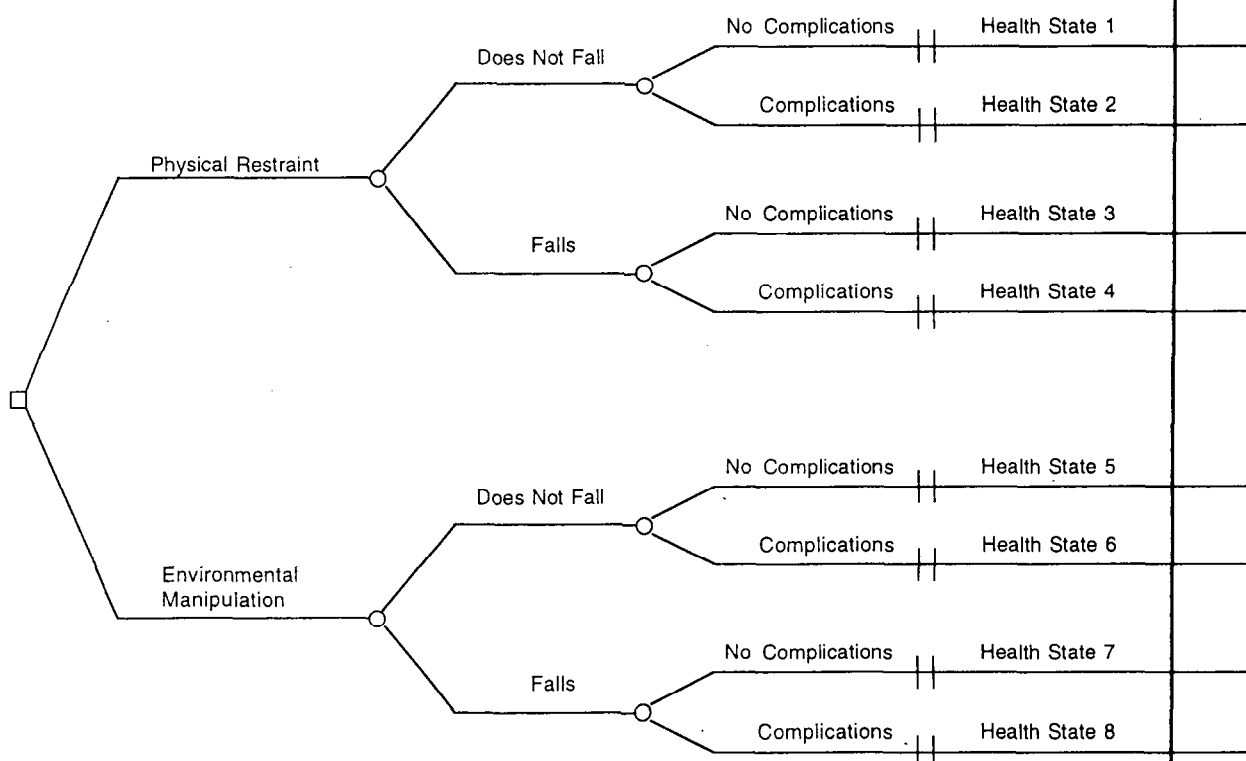
of physical restraints and environmental manipulation are evaluated. The decision tree serves to make a schematic or physical representation of the problem, explicitly naming all alternatives, events, and outcomes. The desirability of each outcome is expressed as a number indicating the extent to which the patient involved in the situation prefers each of the possible outcomes. The probabilities of events are obtained from the literature and the experts. Choice recommendations for each individual are then determined by repeated application of expected value computation. Thus, the selection of strategies to prevent falls can be made in a manner congruent with experts' appraisals of the likelihoods of all events and the patient's preferences for selected outcomes, thereby increasing the likelihood of care occurring in a manner that is both safe and satisfying to the patient.

Figure 1 depicts a simplified decision tree for the problem of selecting strategies to manage risks of falls. The two alternative strategies, physical restraint and environmental manipulation, are followed by the two events, the event of actually falling and the event of developing complications from the specific alternative intervention selected (for example, while in cloth restraints, a patient falls anyway and suffers a fractured hip; conversely, a "close visual watch" strategy may prevent a patient from falling but may result in a loss of dignity and privacy). This simplified

tree concludes with eight unique health states, each differentiated by the extent of disability present and by the unique pathway traversed to reach the state.

Mion envisioned that an individual patient could attach values to each of the eight terminal health states, and that these values would subsequently be used in the computational analysis that led to the determination of the strategy with the highest expected value for that patient. In this manner, the results of the decision analysis would be anchored in the patient's own preference structure, and decisions about care options could be made in a manner likely to promote patient satisfaction. Other ways in which decision tree analysis could be used to facilitate care that is satisfying to a specific patient include employing the patient's own words for the alternatives and events perceived relevant to the patient in the situation at hand. Such tailoring, however, makes obtaining probabilities for events difficult.

Because decision analysis models make explicit the choices, consequences, and outcomes likely to occur in a decision situation, these models can also serve as points of discussion between patient and clinician and between patient and family. Adequate information about treatment is a key component of patient satisfaction.<sup>5</sup> In the process of building the decision tree, treatment options, likely consequences, and ex-



**Figure 1** Simplified decision tree for selecting strategies to manage the risks of falls.

pected outcomes are stated in terms comprehensible to the patient. The diagram itself provides a graphic representation of the situation, which exists as a tangible focus for discussion among the clinical care team, the patient, and involved others. The models serve additional purposes as well, that is, as planning guides and "gold standards" against which actual behaviors can be examined, thereby providing guidance throughout the care process for decisions likely to be congruent with the patient's preferences for outcomes. In essence, the use of classic decision analysis to lay out treatment options and consequences and explicitly represent the patient's valuing of various outcome states alters the timing of the clinical decision-making process in two ways: 1) the analysis is conducted in anticipation of treatment choices, and 2) the analysis serves as an enduring representation of the patient's preferences that can be consulted throughout the course of treatment. While classic decision analysis helps to link patient preferences for outcomes with treatment choices, it is the task of other NDT models, the multiple criteria models, to facilitate more precise representations of patient satisfaction.

### Multiple Criteria Models

Another class of decision theoretic models, the multiple criteria (multiattribute) models, is useful for synthesizing many assessments into a single judgment. The multiple criteria models aid in complex evaluations where the desirability of the entities rests on the extent to which an entity simultaneously satisfies several criteria. Formulations of the multiple criteria models are proposed as multiattribute utility theory (MAUT),<sup>9,10</sup> multiattribute value models,<sup>26</sup> or several unweighted functions, notably that advanced by Saaty<sup>27,28</sup> as the analytic hierarchy process. Multiple criteria models have been used to construct indices of abstract concepts, such as the adequacy of medical services for various communities,<sup>29</sup> as well as for appraising concrete options, such as enrollees' choices of HMO plans,<sup>30</sup> and public health policy choices.<sup>31</sup>

Multiple criteria models offer two main aids in the challenge of evaluating patient satisfaction with care. First, constructed properly, these models result in indices that provide single scores to describe the complex, multidimensional construct known as patient satisfaction. These scores can then be employed in analyzing the relationship between the structural and procedural aspects of care, as well as care outcomes. When certain assumptions are satisfied in the model-building process, the indices result in interval-level metrics. Second, certain multiple criteria models provide ways to represent the values and perspectives

of family members and significant others regarding their satisfaction with care received by the identified patient.

### *Assessing Patient Satisfaction Using Multiple Criteria Models*

To aptly capture an individual's unique perspective on satisfaction, one must attend to both the criteria of patient satisfaction deemed relevant by the individual and the relative importance that the individual places on each of these criteria. To build a multiple criteria model for an individual patient is labor-intensive, involving an extensive elicitation process first to determine whether a model can be used to represent the person's view of satisfaction, then to decompose the abstract concept of patient satisfaction into its component criteria, and assign numeric weights to the component criteria. The aggregation rules employed (generally an additive or a multiplicative function) derive directly from the characteristics of the patient's concept of satisfaction. MAUT provides a way to convert the subjective appraisals of individuals to common metrics, the real numbers. Therefore, the multiple criteria modeling approach to quantifying patient satisfaction holds great promise for establishing individually indexed "scores" for use in quality appraisal.

Construction of a stable, numeric index resulting in an interval-level measure of a patient's satisfaction with care generally requires the assistance of an analyst skilled in decision modeling. The analyst uses interactive techniques to probe the individual's conceptualization of the problem (satisfaction with clinical care), to define the attributes or factors relevant to the individual, and to establish assessment and weighting schemes for use in evaluating specific care experiences. The role of the analyst here is to ensure that the mathematical model of patient satisfaction conforms to the real-world nature of the patient's preference structure. This approach to assessing patient satisfaction ensures that those factors deemed most relevant by the individual to the issue of satisfaction with care will be considered and is superior to norm-based approaches because of its tailoring to individual consideration.

The general principles of NDT and multiattribute modeling, taken from von Winterfeldt and Edwards,<sup>10</sup> form the core of interview strategies in which the patient is first encouraged to describe the characteristics of a care experience. Early in the care process, the nurse encourages verbal descriptions of important aspects of the care experience and avoids or discourages appraisal or evaluative comments. Next, factors are isolated from the descriptions, and an

interactive dialogue ensues to ensure identification of the factors. Experts recommend elicitation of at least five, but no more than ten, factors.<sup>32</sup> The nurse works with the patient to identify ways to appraise each of these factors. Sometimes the appraisal process results in assigning a number to each level of the factor (e.g., for the factor "had my opinions considered," comments of "never," "sometimes," "often," or "always" would receive numeric values of 0, 0.33, 0.66, or 1); at other times, a direct numeric expression is possible (e.g., the number of times the physician visited). This process of isolating each factor and considering its measurement independent of any other factor reduces the cognitive burden on the patient. The patient is then helped to select the factor considered least important to the overall outcome (care satisfaction). Assigning this factor a value of 10, the nurse next helps the patient assign a weight to each of the remaining factors that is a multiple of 10, such that the multiple indicates how much more important than the index factor is each of the remaining factors. This procedure constructs a model specific to the patient's view of satisfaction with care and becomes the basis on which to evaluate subsequent care experiences.

The actual care experiences can be evaluated against the newly constructed model in a formal or an informal manner. The difference between the formal and informal manners rests in the extent to which the appraisal is conducted in a structured procedure. First, the factors of the model are recalled. Next, selecting one factor at a time, evidence is sought to characterize the care experience. For example, if the factor is "respect and dignity displayed," the patient may be encouraged to describe specific encounters or experiences. For each factor, a numeric value is assigned denoting the extent to which the characteristic expressed by the factor was achieved in the patient's actual experience. To compute a summary score, the value on each factor is multiplied by the weight of the factor to construct; all products are then added to compute a final score. Following NDT, higher scores indicate care provided in greater accord with the patient's preferences, and therefore one would expect a match between the computed value and the extent to which a patient experiences satisfaction with the care. However, computation of a final score is not always necessary to make multiple criteria modeling useful for exploring patient satisfaction with care; sometimes building the model and evaluating its components is sufficient to arrive at a global, holistic judgment of the patient's satisfaction with care.

Community health nursing provides a scenario that illustrates how an individual clinician could use the

multiple criteria models to design care that is likely to be satisfying to a patient. A community health nurse is caring for a patient in pain. On the first visit the nurse and the patient establish that what would make the patient feel most satisfied with her care includes comfort, clear cognition, feeling understood, and adequate appetite. The nurse and the patient together explore the relative importance of these criteria, establishing that adequate appetite is least important (weight of 10), comfort is five times more important than appetite (weight of 50), clear cognition is twice as important as appetite (weight of 20), and feeling understood is five times more important than adequate appetite. This process develops the basic frame that will guide the implementation and evaluation of the patient's care over the subsequent weeks.

At each weekly visit the nurse evaluates the patient's clinical status, explores issues of home management and daily living, and evaluates how satisfied the patient is with the care provided. To conduct the satisfaction evaluation, the nurse uses a simple rating technique, a visual analog scale, evaluating each criterion individually with the patient. The nurse presents the patient with four cards, each marked with the name of one of the criteria and a 10-mm line anchored on one end with the words "worst possible" and on the other with "best possible." The patient is instructed to mark the point on the line between the two anchors that indicates the extent to which the care process of the previous week was satisfying. The nurse may then choose to compute a "satisfaction score," multiplying the weight of each factor with the value inputted from the marked visual analog scale.

This example raises many important and yet-to-be explored issues in the use of multiple criteria models for assessing and ensuring patient satisfaction. First, effective use of the strategies requires basic training of clinicians in the analysis strategy. Second, the strategy itself takes time to implement, time that may not be feasible in eras of fiscal constraint. Third, beyond heuristics, it is not clear what impact on interpretation of the score occurs when model criteria change from time to time, or between patients. Finally, the theoretical work supporting aggregating scores resulting from different model structures has yet to be refined. Nonetheless, the issues raised here call for exploration and further testing of this approach to measuring and ensuring patient satisfaction.

Some argue that patient preferences for various aspects of care are unstable<sup>1</sup> and perhaps even unrelated to the patient's final appraisal of satisfaction

with the whole process of care.<sup>33</sup> This variability suggests that the multiple criteria approach may need to be applied repeatedly to construct different models throughout the course of care. However, findings of instability or inconsistencies of satisfaction may be attributable to the impoverished way in which patients' ideas of satisfaction with care have been measured, and not to the underlying concept itself.

Under some circumstances, such as those when patient satisfaction is defined as an organizational goal,<sup>33</sup> it is necessary to describe the extent to which a group of individuals is satisfied with care. Such assessment is in conflict with the fundamental nature of the concept of patient satisfaction as a subjective judgment by an individual. Furthermore, with the philosophy of continuous quality improvement, retrospective appraisals by individuals of experiences that have evolved over time lack meaning and ease of interpretation. It is possible that extensions of multiple criteria models could provide a measurement scheme that supports aggregating the judgments of numerous individuals, with the added flexibility of allowing each individual respondent to employ unique referents to the concept of patient satisfaction.

Employing multiple criteria modeling techniques to explore an individual's satisfaction with care (rather than to construct a precise metric for it) does not require a skilled analyst; rather, a nursing informatics specialist can work directly with a series of patients and build tools that can guide the use of multiple criteria modeling in general practice.

#### *Using Multiple Criteria Models to Represent Several Constituencies*

In many patient care situations, family members and friends also hold opinions about the extent to which they are satisfied with care. Current approaches to measuring patient satisfaction focus solely on the opinions of identified patients. When patients agree to the participation of others in the evaluation of their care, multiple criteria modeling strategies can ensure that the factors considered relevant to all are included in the model. As a result of supporting various weighting schemes, such as proportionate weights based on a particular stakeholder's proximity to the patient, these strategies provide additional ways to ensure the representation of all persons involved.

The MAUT modeling approach has been employed by Bosworth et al.<sup>34</sup> to facilitate communication and conflict resolution among family members. The model was first constructed through a consensus process, incorporating all factors representing any involved person's understanding of the decision problem. Next, all the constituents assigned their own weights to the

factors in the model. The model provided recommendations of courses of action that reflected each individual's weights and preferences. Finally, a composite model was constructed in which factor weights were assigned through a consensus process. Such a strategy could be employed by patients and their family caregivers, or by family members attempting to make choices for persons unable to speak for themselves.

In the third vignette presented above, a daughter's vague dissatisfaction with care was identified. Left unexplored, this dissatisfaction could grow to a point of lack of acceptance and anger about aspects of her mother's care. Evidence presented by Kahneman et al.<sup>7</sup> indicates that this diffuse sense of dissatisfaction is likely to be a response to one or two salient events, those most likely to be recalled by the family member. Employing a model early in care permits involved family members and patients to envision and explore numerous scenarios of care. Through these explorations, families begin to clarify what points are essential to their satisfaction with care, and which are peripheral. The models, then, serve as guidelines against which satisfaction with care is judged.

There are also nonfamily coparticipants in an individual's relationship with a health care delivery system. Other constituencies may include payers, insurance companies, and block purchasers of patient care (e.g., employers). The presence of these many constituencies in part leads to a shifting in the determination of patient satisfaction away from the actual clinical encounter. The multiple criteria strategy could be used as a consensus-building technique during a pretreatment authorization review. However, the techniques described here are useful only in so far as the rights of various constituencies to have a say about appraisal of satisfaction are acknowledged and respected.

#### **Implications of These Models for Informatics**

Normative decision theory forms a foundational base on which informatics applications can be built. NDT models are labor-intensive to build and require specialized data not generally collected in contemporary information systems. Informatics professionals have two important roles vis-à-vis the application of NDT to the challenge of assessing and ensuring patient satisfaction. First, informatics professionals can construct the tools necessary to facilitate the application of NDT in practice. Second, mindful of the special data needs required to instantiate NDT models, informatics professionals can ensure that the data necessary for the application of these models are available and accessible.



## Conclusion

Two types of normative decision models, decision analytic and multiple criteria models, can help ensure that patient preferences are incorporated into treatment choice and are adequately reflected in measures of patient satisfaction. Classic decision analysis models provide explicit strategies for linking patient preferences for outcomes with clinical choice options. Multiple criteria models provide ways to express the complex, multidimensional phenomena labeled patient satisfaction in an organized manner. Informatics specialists have important roles in the design of systems that facilitate the application of NDT during the course of routine practice, and in the development and maintenance of data necessary to instantiate the models.

A model is useful because it provides a benchmark, made under circumstances of lower stress, against which actions and outcomes during high-stress periods can be examined. The decision theoretic approach, then, helps change the point of decision making about certain critical events, moving the decision to a period away from time constraints. The models simply provide guides for thinking; care decisions can change, but having a guidepost allows for evaluation in an explicit manner of the effect on patient satisfaction resulting from departures from original treatment plans.

Normative decision theory also provides computational strategies to assign numeric scores to subjective judgments of such abstractions as patient preferences and patient satisfaction. These numeric scores, from properly constructed models, can be used in subsequent analyses requiring interval-level data. More importantly, these strategies provide nursing informatics specialists and nurses themselves with the models, language, and techniques to further guarantee the consideration of patients' individual preferences in the ensurance and assessment of patient satisfaction with care.

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