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Utilization of a Selected Multiple Criteria Decision Analytic Framework to Aid Health Care Consumers in Making Educated, Objective Choices Between Health Care Delivery Alternatives

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UTILIZATION OF A SELECTED MULTIPLE CRITERIA DECISION ANALYTIC FRAMEWORK TO AID HEALTH CARE CONSUMERS IN MAKING EDUCATED, OBJECTIVE CHOICES BETWEEN HEALTH CARE DELIVERY ALTERNATIVES

by

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VITA

The author, Jill Ann Kammermeyer, is the daughter of John Louis Kammermeyer and L. Lorraine (Braun) Kammermeyer. She was born June 25, 1948, in Milwaukee, Wisconsin.

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1. Introduction

1.1 Purpose

It is the writer's belief that an integration of the writer's health care background and doctoral course work is a feasible, realistic, and desirable dissertation goal. The author has a basic interest in the transfer of existing methodologies to new application areas, which developed while studying in the major area, Research Methodology. Recent trends in health care delivery have manifested an area for novel applications. Course work, acquired through the Management Science Department of the School of Business, acquainted the author with Decision Analytic Methods that could readily be applied outside the business/industrial environment. The purpose of this dissertation is to utilize a selected decision analytic framework in the health care delivery environment, thereby extending an existing methodology to an original application area.

1.2 Problem Scope

The delivery of health care has been changing rapidly since the early 1970's. The preventative, prepayment mechanism is being made available to a population whose previous exposure was limited to an intervention, fee-for-service system. The initial impetus was the Presidential "Health Strategy" message of February, 1971; basically this involved an organized entity assuming the responsibility for the health of a population. This was followed by the Health Maintenance Act of 1973 (Public Law 93-222) and the Health Maintenance Organization Amendments of 1976 (Public Law 94-460).

Final regulations on the Employee Health Benefits Plan section of Public Law 93-222 were printed in the Federal Register on October 28, 1975. These regulations require each employer of 25 or more employees to provide the option for their employees to join a Health Maintenance Organization (hereafter referred to as HMO), if an HMO exists in the area, and if at least 25 of their employees reside within the service area of the HMO. This requirement is enforceable under the Fair Labor Standards Act and insures that employees have free choice of the methods of health care delivery offered by their employer. This is referred to as the "dual choice" option and is monitored

by the Department of Labor (Section 1310, HMO Act). The "dual choice" option refers to the employees' choice between an HMO and the Indemnity Health Plan.

Within this "dual choice" option for Health Care Delivery, Federal law regulates, health services provide and industries comply, but the ultimate decision regarding the alternatives rests with the health care consumer. This decision represents the first time that many health care consumers will be faced with a choice among alternatives of health care delivery systems. In the past, consumer health care decisions were made between alternatives within the traditional health care delivery system. These decisions were often difficult to make but did not involve a major change in mode of delivery.

The new decision facing the health care consumer is more complex because of the implications of choosing between alternative systems of health care delivery. No single standard and style of health care can be appropriate for all Americans. Hence this decision is complicated by the need to consider multiple objectives and multiple attributes of health care delivery systems. Because of the importance and long-term impact this decision could have, the decision process should be as educated and objective as possible.

Recent theoretical developments in Decision Theory, relating to the assessment of multi-dimensional utility functions, offer an objective technique useful for solving problems and making decisions involving multiple criteria. Uses of these techniques have appeared in the applications literature, mostly in business, industry, and government. The magnitude of decisions in these areas and their possible long-term impact on the organization have been the rationale for such a formally structured approach. Existing applications can be found in health care situations but none thus far concern themselves with aiding the health care consumer to make a choice between health care delivery alternatives. The specific multiple criteria decision analytic framework that is utilized in this research has not been applied in the health care environment up to this point.

1.3 Definition of Terms

Health Care Delivery System

The entire spectrum of activities focused on meeting the needs of the health care consumer, including the facilities, personnel, and the resources utilized (Shindell, et al., 1976).

Health Care Consumer

The functional unit that is seeking health care services. For the purpose of this study the health care consumer could be one person or any family constellation.

Health Maintenance Organization (HMO)

A legal entity which provides a prescribed range of health services, known as basic health services. These are provided to each individual who has enrolled in the organization in return for a prepaid, fixed, and uniform payment. These services may be provided to HMO members either directly or indirectly by the staff of the HMO or through medical groups or individual practice associations (Public Law 93-222).

Indemnity Health Plan

The range of traditional health insurance plans based on a fee-for-service mechanism paid by an insurance company for a loss insured under a policy (Haag, 1976).

Decision Theory

A collection of concepts, methods, models, and findings based on the idea of rational decision making (Lee, 1971).

Multiple Objective-Multiple Attribute Decision Analysis

A methodology, sometimes called Multiple Criteria Decision Analysis, which refers to the systematic solution, incorporating the preferences, and judgments of the decision maker, of complex problems involving multiple objectives and multiple attributes (MacCrimmon, 1973).

Objective*

For the purposes of this study an objective is defined as a perceptual dimension of health care that consumers consider when assessing a health care delivery alternative. (The concept of objectives is further discussed in Chapter 3, and specific objectives identified for this research are exhibited in Table 1.)

Attribute*

For the purposes of this study an attribute is considered to be a measurable performance characteristic of a health care delivery system (Hauser and Urban, 1977). These attributes taken as a total are thought to make up the multiple measurable factors of the health care delivery system. (The concept of attributes is further discussed in Chapter 3, and specific attributes identified for this

research are exhibited in Table 2.)

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*In multiple criteria decisions "there are no universal definitions of the terms objective, goals, attribute, measure of effectiveness, standard, and so on..." (Keeney and Raiffa, 1976).

1.4 Problem Statement

Contingent upon the development of qualified* Health Maintenance Organizations, every health care consumer will be faced with a "dual choice" option. This option refers to the health care consumer's choice between alternative health care delivery systems: the Health Maintenance Organization and the Indemnity Health Plan. This multiple criteria decision could be made simpler, more educated, and more objective with the utilization of a multiple criteria decision analytical framework. This is based on the researcher's belief that quantitative techniques can be integrated usefully into any substantial decision making process. An assessment tool was developed integrating the measurement constraints of the method and the objectives and attributes of the health care delivery system as defined for this study. Selected health care consumers utilized this tool to assess health care delivery alternatives.

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*"Qualified" as determined by the provisions of federal legislation and certified by the Department of Health, Education, and Welfare.

1.5 Significance of Research

1.5.1 Overview

The researcher proposes that this research can contribute in the area of research methodology and in the area of health care delivery. Further discussion and delineation of these broad areas follow.

1.5.2 Methodology

The primary academic orientation toward quantitative techniques has been in the development of new theory rather than in the effective application of existing theory into new areas. This trend is changing with the increased emphasis on applied research in many disciplines. Quantitative techniques must be able to consider the user or consumer, the person who ultimately makes the decision analyzed by an evaluative model. Therefore, the criteria expressed in the model must be harmonious with the consumer's objectives and attributes for the system.

This research utilizes a selected decision analytic framework to develop a tool for health care consumer decision making regarding health care delivery alternatives. The study is an attempt to practically apply an evaluative model to a health care consumer decision.

The research is concomitantly proposed on the basis of extending the utilization of an existing research methodology to a new application area. Success in the proposed research effectively introduces a new decision analytic framework into health care consumer decisions. Application in this original area could make a contribution to the development and refinement of the methodology itself.

1.5.3 Health Care Delivery

Three distinct groups within the health care delivery system could be affected positively by this research. These groups are the health care consumers, the health care providers and the HMO marketers.

The methodology utilized has the consumer make value tradeoffs and choose preferences between objectives and between attributes of the health care delivery system. Therefore, needs and priorities of individual health care consumers are identified. With added demographic information the consumer can also be placed in groups with similar situational needs. The methodology also has the health care consumer assess their satisfaction level with their current system of health care and a proposed system of health care.

The health care consumer benefits in several ways. First, utilizing the total assessment technique the health care consumer will be able to begin with a personal, sometimes anxiety producing, decision about health care and conclude with a rational decision. The health care consumer will be able to input subjective preferences into a framework that will provide an objective analysis of the decision. A second benefit would be the ranking and weighing of the health care system's objectives and attributes by the health care consumer for potential utilization by health care providers to improve health care in identified priority areas. This concept is discussed in more detail later in this section. Another major benefit is the practical application of this research for the health care consumer. With the Federal Government stressing the implementation of the HMO concept (viz., Joseph Califano, Secretary of Health, Education, and Welfare, requesting the top 500 business/industrial firms participation in a conference on HMO held in March, 1978), there will be more and more health care consumers faced with the "dual choice" option. This decision making framework could assist the health care consumer in making an objective, educated decision about an important health care issue.

The health care provider could also benefit from this health care delivery assessment by the health care consumer.

The immediate step of ranking and weighing objectives and attributes of the health care delivery system can assist the health care provider with identifying health care priorities and health education needs of individual consumers. With added demographic information health care consumers could be placed in groups for identification of common needs and priorities among health care consumers with similar functional needs and health care habits. Priorities of health care consumers could be examined for congruence with priorities of health care providers. Identified health education needs of health care consumers can aid the health educator in selecting areas of emphasis and/or importance for health instruction and health education programs. Anything that would benefit the health care provider would ultimately benefit the health care consumer.

The third group that could benefit from research of this kind is the HMO market group. The multidimensional view of the health care delivery structure and ranking of criteria could assist the HMO marketer in selecting areas for explanation to the health care consumer making the decision between alternatives. The areas for explanation would be those areas that were valued highly by the health care consumers via the multiple criteria decision making assessment framework.

1.6 Limitations of the Research

1.6.1 Overview

Limitations of this research fall in three areas. The areas are methodology, the nature of the decision and the sample.

1.6.2 Methodology

The methodology as a limitation can be thought of in two categories, the model and the questionnaire assessment. The model may be considered a limitation because it is new and under revision, and is further under theoretical study itself. Because of its limited application up until this point, problems with utilization in a new applications environment can occur. The methodology is also limited by the constraints upon which the model is built. This affects the extent to which the real health care delivery system can be represented on the assessment questionnaire within the model parameters.

The questionnaire is also limited to the extent that it represents the objectives and attributes of health care delivery by which the health care consumer would realistically assess alternatives of health care delivery. The assessment questionnaire's limitations extend to its construction based on the model specifications and the

directional clarity for the administration to the health care consumer.

1.6.3 Nature of the Decision

The nature of the decision as a limitation can be thought of in two categories, the decision area and the conditions under which the decision framework was administered. Health care issues are very personal and subjective in nature. Consequently, when decisions are made concerning health care they are sometimes anxiety producing and are usually made on past experiences, instead of current needs and priorities. Although the assessment provides for subjective input by the health care consumer, the nature of the decision area may not be conducive to the structure of the questionnaire and rational decision making.

The conditions under which the assessment questionnaire was administered can also be considered a limitation because of the nature of the decision. The health care consumers in this study were not actually faced with the "dual choice" option. The decision process was not one in which they would actually have to live with their decision. So the need to complete the assessment and the motivation behind completing it would not be expected to be as high as with someone actually faced with "living with" the consequences of the decision.

1.6.4 Sample

The sample limitations would fall into the areas of sample size and selection process. Justifications for the sample size and the non-random selection process are discussed in Chapter 3.

2. Review of the Literature

2.1 Overview

This chapter exposes the reader to the literature for the identified new methodology. The review is multifaceted. It contains a brief discussion of the evolution of Decision Theory. A review of a subset of Decision Theory, multiattribute utility theory, is the main focus of the chapter. This review provides the theory behind the development of multiattribute utility theory, and is intended to form a basis for the theorem of a multiattribute cardinal value function (Dyer and Sarin, 1977a, 1977b) which is the methodology utilized in this research. An example is provided for clarification. The final section shows applications of multiple criteria decision methods in health care areas and concludes with a rationale for this study.

Further elaboration provides perspective on and justification for the research based on an original application area for a multiple criteria analytic framework, multiattribute cardinal value function.

2.2 Evolution of Decision Theory

Decision Theory is a collection of concepts, methods, models, and findings rooted in the idea of rational decision making. Theorists and researchers from varied disciplines have contributed to the body of knowledge termed Decision Theory or Decision Analysis.

The collaborative works of von Neumann (a mathematician) and Morgenstern (an economist) introduced the concept of uncertainty (referring to the outcomes) into utility theory. This was a stimulus to the early development of Decision Theory (von Neumann and Morgenstern, 1947). It was later recognized that knowledge of the conditions of outcomes (i.e., uncertainty, risk, certainty) was but one problem facing the decision maker. The other problem was the complexity (multidimensionality) of the alternatives. Major contributions instrumental in development of normative decisions made under uncertainty were made by Luce and Raiffa (1957), Raiffa (1968), Fishburn (1966, 1967), and most recently Keeney and Raiffa (1976).

Currently, in the area of multicriteria decisions, the outcome condition of riskless (certainty) alternatives is being explored. This type of research originated in Operations Research with the problem of cost benefit analysis. Contributions have been made by a variety of

researchers in the riskless case. Extensive bibliographies can be found in MacCrimmon (1968) and Zelany (1973). Keeney and Raiffa (1976) also discuss the case of certainty with multiple criteria.

Measurement theory has been an important factor in the evolution of multiple criteria decision analysis. The differentiation of attributes and objectives has been aided through the field of multidimensional scaling of similarities and preferences. Models and algorithms for portraying choices among multiattributed alternatives were contributed by Kruskal (1964), Messich (1965), and Torgerson (1952, 1960). Contributions in the area of conjoint measurement have been made by Luce (1966), Tversky (1967), Fishburn (1966, 1971), and Krantz, Luce, Suppes, and Tversky (1971). Advances in difference measurement (Krantz, et al., 1971) have also aided the development of Decision Theory.

The preceding has provided a succinct discussion of the evolution of multiple criteria decision theory. An excellent overview, with a delineation of the various methods and techniques, has been compiled by MacCrimmon (1973).

2.3 A Review of Multiattribute Utility Theory

As was mentioned earlier, decisions can be thought of in terms of the conditions of their outcomes (i.e., uncertainty, risk, certainty) and the dimensionality (complexity) of the alternatives. This discussion will restrict itself to the case of certainty because that is the condition of the outcome for the case under study. Certainty can be thought of as, when given alternatives, the outcome of each is known for sure. This section will progress from the single outcome case through the multidimensional case to be utilized for this research. First the normative evaluative type of model to be used in this study needs to be explained.

2.3.1 Normative Evaluative Model

Decision models can be classed as descriptive or normative. Descriptive models concern themselves with how decisions <u>are</u> made; there is no attempt to judge the goodness or badness of the decision. Normative models concern themselves with how decisions <u>should</u> be made, usually based on some set of assumptions or decision rules (Green and Wind, 1973). In a normative model an attempt is made to explore the preferences of the decision maker systematically and to illicit sufficient information to construct a utility or value function to use as a guide in making the

decision (Dyer and Sarin, 1977a).

The decision model to be utilized for this study can be considered a normative model. It may also be considered an evaluative model. The purpose of an evaluative model is to reflect the subjective judgments of the decision maker regarding the desirability of an outcome resulting from a decision.

There are two essential properties of an evaluative model. One is that it be a function of input regarding only the outcomes of the decision. The second property deals with preferences and can best be illustrated by an example. Suppose A is the set of objectives or outcomes. If a, b $\in$ A (a and b are elements of A), then a $\succ$ b (a is preferred to b) if and only if v (a) $>$ v (b) (value of a is greater than value of b). If the above two conditions are met, v is considered to be part of an evaluative model (Buffa and Dyer, 1977; Dyer, 1977b). This can be called either a utility function or a value function (Dyer, 1977b). For the purposes of this study the writer will refer to it as a value function. This is consistent with the trends in the literature and the distinction made by Keeney and Raiffa (1976). They describe a riskless preference representation function (a decision under certainty) as a <u>value function</u> and a risky preference representation as a <u>utility</u>

function.

2.3.2 Single Criterion Cases

For a single objective under certainty the simplest model would be the cardinal value function. This assumes that the preferences are connected and transitive. That is, for all a, b, and c $\in$ A either a $\succsim$ b (a is preferred to or equal to b) or b $\succsim$ a and if a $\succsim$ b and b $\succsim$ c, then a $\succsim$ c, respectively. This model has no strength of preference but merely provides an ordering (Buffa and Dyer, 1977; Dyer, 1977b). In addition to ordering outcomes, the cardinal value function assumes we can also order the relative desirability of different changes from one outcome to another, that is, a $\succsim$ b if and only if v (a) $\geq$ v (b) (value of a is greater than or equal to value of b) and (a, b) $\succsim$ (c, d) if and only if v (a) - v (b) $\geq$ v (c) - v (d) (Dyer, 1977b).

2.3.3 Multiple Criteria Case

2.3.3.1 Additive Model

The underlying rationale behind multiple criteria cases is that one can use single attribute techniques to estimate the value of each attribute and then add the values together to form the value of the alternative. The basic assumption of the additive model is that there is independence among the attributes. The additive form can

be expressed in the following manner. Let $x_i \in X_i$ be the outcome for attribute i; i = 1, ...m, then, $v(x_i,....,x_m) = v_1(x_1) + ... + v_m(x_m)$ (Dyer, 1977b; Keeney and Raiffa, 1976).

2.3.3.2 Ordinal Additive Value Function

The simplest additive model is the ordinal additive value function. This ordinal value function assumes preference independence. Preference independence can be defined by the following statement. X_i is <u>preference independent</u> of $X_{\bar{i}}$ (all the rest of criteria), denoted by (X_1, X_i), if preferences for outcomes which differ only in terms of the X_i outcome depend only on the X_i value and <u>not</u> on the common value of the $X_{\bar{i}}$ (Dyer, 1977b; Keeney and Raiffa, 1976). For $m \geq 3$, if $\succ$ is a weak order, and $(X_1, X_{\bar{i}})$ is preference independent of the other attributes for i = 2, ...,m, then there exists v such that $y \succ x$ if and only if $v_1(x_1) + ... + v_m(x_m) \leq v_1(y_1) + ... + v_m(y_m)$ (Dyer and Sarin, 1977a, 1977c). Two approaches described by Keeney and Raiffa (1976) for assessments of the ordinal additive function are the lock-step method and the mid-value splitting technique.

2.3.3.3 Cardinal Additive Value Function

With the addition of two more assumptions a cardinal additive value function can be explained (Dyer and Sarin,

1977a, 1977b). These assumptions are <u>difference consistency</u> and <u>difference independence</u>. Difference consistency is defined as follows: A set of preference independent attributes is <u>difference consistent</u> if and only if, for all $w_i x_i \in X_i$, $w_i w_{\bar{i}} \succsim x_i w_{\bar{i}}$ if and only if $w_i w_{\bar{i}}$, $w_i w_{\bar{i}} \succsim x_i w_{\bar{i}}$, $x_i w_{\bar{i}}$ for some $w_{\bar{i}} \in X_{\bar{i}}$, and for all i = (1, ... m) (Dyer and Sarin, 1977a, 1977b). Difference independence can be stated in the following manner. X_i is <u>difference independent</u> of $X_{\bar{i}}$ if rankings of preference differences between outcomes that differ only in terms of the X_i outcome depend only on the X_i values and not on the common value of the $X_{\bar{i}}$ (Dyer and Sarin, 1977a, 1977b). These assumptions of difference consistent and difference independent have led to the development of a theorem of measurable additive value theory credited to Dyer and Sarin (1977a, 1977b).

2.3.3.4 Theorem of the Measurable Additive Value Theory

If $m \geq 3$, the $X_1, \ldots, X_m$ are mutually preferentially independent, difference consistent, and X_i is difference independent of $X_{\bar{i}}$, then there exist functions v_1: X_i Re, i = 1, ..., m, such that for all $w_i, x_i, y_i, z_i \in X_i$,

i) if $wx, yz \in X^*$, then $wx \succcurlyeq yz$ if and only if

$$\sum_{i=1}^{m} v_i(w_i) - \sum_{i=1}^{m} v_i(x_i) \geq \sum_{i=1}^{m} v_i(y_i) - \sum_{i=1}^{m} v_i(z_i).$$

ii) $x \succcurlyeq y$ if and only if $\sum_{i=1}^{m} v_i(x_i) > \sum_{i=1}^{m} v_i(y_i)$.

iii) if v_i', i=1, ..., m are m other functions with the same property, then there exist constants $\alpha > 0$, $\beta_1, \ldots, \beta_m$ such that $v_i' = \alpha v_i + \beta_i$, i=1, ..., m

Results ii) and iii) are well-known, and follow immediately from the assumption that the attributes are mutually preference independent. The new result is i), which strengthens $v = \sum_{i=1}^{m} v_i$ from an ordinal to an interval scale of measurement (Dyer and Sarin, 1977a). The reader can find detailed proof of this theorem in Dyer and Sarin (1977b).

This theorem supports the use of an instrumentality matrix for decision making (Dyer, 1976, 1977b) which is discussed in the following section.

2.3.3.5 Instrumentality Matrix

Hierarchial additive weighting (MacCrimmon, 1973), sometimes called an Instrumentality Matrix (Dyer, 1976, 1977b), is the method appropriate for assessments made

based on the cardinal additive value function. This method recognizes that attributes may simply be means toward higher level objectives. It assigns values of preference or importance to the higher level objective and then the decision maker assesses the instrumentality of each of the attributes in attaining these higher level objectives. The linkage or instrumentality in the matrix can vary for each problem. It may deal with the influence on, contribution to, necessity for survival of, or order of importance of the attribute in relation to the objectives (MacCrimmon, 1973). These relationships of attributes to the objectives are necessary in order to determine calculated weights for the attributes, which can then be utilized to assess the alternatives.

2.4 Example of Assessment Technique

This example will be credited to Dyer (1976) but has been used by others in explaining the instrumentality matrix. Suppose you are buying a car. The objectives identified for this purchase are Economy (E), Prestige (P), and Dependability (D). The attributes identified for this purchase are Cost (C), Size (S), Acceleration (A), Repair Record (R), and Miles Per Gallon (M). The first step is to weight the objectives. The most important would receive a 10, the others are weighted relative to the most important. For example,

E	P	D
1	10	5

The second step is to rate the relative importance of each attribute in contributing to the accomplishment of each objective. The ratings are based on a 0-10 scale. For example,

	E	P	D
C	2	10	10
S	0	10	2
A	0	7	2
R	10	0	10
M	10	3	0

The third step is to normalize the columns of the matrix by adding all importance weights in one column and dividing each individual importance weight by the sum of the weights.

From this, the calculated attribute weights can be generated by multiplying each normalized importance weight by the assessed weight of the appropriate objective and adding across. For example,

	E	P	D	
Objective weights	1	10	5	
C	.1	.33	.42	5.55
S	0	.33	.08	3.7
A	0	.23	.08	2.7
R	.45	0	.42	3.0
M	.45	.1	0	1.45

Attribute Weights

The fourth step is to evaluate the alternatives based on the per cent satisfaction for each attribute for the specific alternative. For example,

Attribute	Mercedes Per Cent	Volkswagen Per Cent
C(cost)	20	100
S(size)	100	50
A(acceleration)	100	20
R(repair record)	80	80
M(MPG)	50	70

A fifth step is to multiply the calculated attribute weight by the per cent satisfaction and add the resulting scores across the attributes. For example,

		Mercedes		Volkswagen	
Attribute	Weight	Per Cent	Score	Per Cent	Score
C(cost)	5.55	20	1.1	100	5.5
S(size)	3.7	100	3.7	50	1.9
A(acceleration)	2.7	100	2.7	20	0.5
R(repair record)	3.0	80	2.4	80	2.4
M(MPG)	1.45	50	0.71	70	1.0
			10.61		11.3

A Volkswagen would be this consumer's choice because the alternative score across all attributes, based on the weights of the attributes (calculated from the instrumentality matrix) and the per cent satisfaction, is the larger for the Volkswagen.

2.5 Application of Multiple Criteria Decision Methods

Multiple criteria decision methods have been applied in many different areas, but until recently were confined to the business, industrial, or governmental environments. Various methods and techniques of multiple criteria decision analysis have recently appeared in the health care literature. Health care applications of multiple criteria decision analysis have been found for such problems as staffing allocation (Collins, Meisel, and Jain, 1972), treatment modalities (Krischer, 1976), (Giauques and Peebles, 1976), clinical judgment (Schwartz, Garry, Kassirer, and Essig, 1973), and health care marketing (Wind and Spitz, 1976). This list is not exhaustive but represents decision areas where the methodology has been applied in the past.

The specific methodology to be utilized in this research, the multi-attribute cardinal value function, has not been used in a health care application area. This mathematical model was recently justified by Dyer and Sarin (1977a, 1977b) and has been applied thus far in a confidential industrial setting. The researcher posits this model to be appropriate for application in the health care consumer decision involving alternatives of health care delivery. This position has been substantiated by personal communication with Dyer (1977c).

This health care consumer decision is both complex and unique. The complexity is due to the many attributes the decision maker must consider when choosing an alternative health care delivery system. Evaluative models may be used in aiding decision makers to objectively assess the multiple criteria in a structured manner (Buffa and Dyer, 1977).

In the health care delivery system with which most health care consumers are acquainted, the health care consumer has been dependent upon the health professional to assess the alternatives within the system. For all practical purposes, the health care consumer has not participated in the decision making (King, 1975). The uniqueness of the dual choice decision not only involves input from the health care consumer but also a possible choice to change their mechanism of health care delivery. Complexity is often associated with a significant change (Buffa and Dyer, 1977) and demands the considerations of subjective values (Kenney and Raiffa, 1976).

From a practical standpoint, the relative costs and benefits of one alternative versus another depend on the health care needs and characteristics of the health care consumer and how that individual consumer regards and values characteristics and performance measures of the health

care services (Tessler and Mechanic, 1975). This methodology purports to help the decision maker (in this study the health care consumer) make sense out of conflicting values by structuring objectives and attributes, in an attempt to arrive at a systematic and wise choice (Keeney and Raiffa, 1976).

3. Research Design

3.1 Overview

This chapter contains the factors that constitute the research design for this study. The sample is described in Section 3.2, with the rationale for the sampling technique discussed. Sections 3.3 and 3.4 contain information regarding the instrumentation, i.e., an assessment questionnaire. The basis for the development of the questionnaire, the origin of the objectives and attributes to be assessed in the context of the health care delivery system, the demographics and post assessment information, and the validation procedure for the questionnaire structure are discussed in Section 3.3. Steps taken in administration of the assessment questionnaire are found in Section 3.3. The final Section (3.4) displays the evaluative model used in the analysis.

3.2 Sampling Technique

3.2.1 Population

The population to which this study could apply is health care consumers who are employed full time, are currently enrolled in an Indemnity Health Plan through a full-time employer, and have not been offered the "dual choice" option. The sampling technique utilized was not meant to be generalizable to this population, but rather, to where the assessment technique could be applied in the future.

3.2.2 Sample Rationale

The intensive case study sample method was used for this research. Use of this sample can be rationalized for a variety of reasons. Utilization of a random sampling technique, considering the potential number of health care consumers who would meet the above criteria, would be extremely difficult, if not impossible. Current federal interest in the HMO issue (i.e., Joseph Califano's conference on HMO's in Washington, D.C., March, 1978), caused the researcher to rule out employees presently faced with the "dual choice" option. A sample without prior knowledge of the HMO choice was also desirable.

The last and most important rationale for the intensive case study method is the underlying purpose of this

research. To reiterate, this research is proposed as an exploration of a new application area for an existing methodology. The intent of the research is to aid decision makers. For this reason alone, the proposed sample was utilized to demonstrate the application of the use of the assessment method and model in a health care consumer choice situation.

3.2.3 Sample Description

A Chicago metropolitan firm that had 20 full-time employees who were currently enrolled in an Indemnity Health Plan through their employer, and had not been offered the "dual choice" option, was used as the case study sample.

3.3 Instrumentation: Assessment Questionnaire

3.3.1 Development

This research required the development of an instrument to be utilized as a tool for the health care consumer to assess the alternatives of health care delivery. The purpose of the assessment questionnaire was for the decision maker to evaluate an alternative on the basis of how well each attribute satisfied a set of underlying objectives. The questionnaire development was based on enabling the health care consumer to objectively assess alternatives of health care delivery within the axioms of the normative evaluative model to be used for analysis. The alternatives of health care delivery were the health care consumer's current Health Indemnity Plan and a proposed HMO plan, hereafter referred to as PHMO, based on the benefit plan of a Chicago metropolitan area HMO (see Appendix A).

The following is a discussion of the origin of the attributes and objectives to be used for the assessment questionnaire. It is pointed out that the criteria (attributes and objectives) are simply the outcomes that are both affected by the choice of the alternative and affect the decision maker's preference for that alternative. The format and directions of the questionnaire were developed in accordance with the axioms and constraints of the model.

The development of a self-contained assessment questionnaire was done for a variety of reasons relating to the assessment situation. The assessment could not feasibly be conducted on a one-to-one basis, so the researcher would not be able to explain each step. The assessment is easier to do on one's own because of the nature of the decision. Finally, since the researcher could not be there to explore individual feelings with the participants, it would be more correct to assess across all objectives and attributes (Dyer, 1977c).

3.3.2 Objectives

As previously defined in Chapter 1, an objective is a perceptual dimension of health care that consumers consider when assessing the health care delivery system. For use in this assessment, the objectives of the health care delivery system are from the perceptual dimensions of health care delivery systems as discussed by Hauser and Urban (1977). Hauser and Urban (1977) feel that perceptual dimensions can function adequately to measure consumer importance. Their study concerned itself with consumer support for the design of an HMO. These four underlying dimensions were reduced from 16 attributes (discussed in Section 3.3.3) by principle component factor analysis across 234 individuals rating alternatives of a health care delivery system (Hauser and

Urban, 1977). Keeney and Raiffa (1976) suggest that each objective is impacted or has a relationship to a specific set of attributes and can be represented in a hierarchical structure. For this study the researcher has concluded that it would be best to assess all attributes across all objectives. This total assessment across all attributes was chosen because of the limited contact with the health care consumer while completing the assessment (Dyer, 1977c). This decision also was made because only 52 per cent of the variance was accounted for in the factor analysis, and with this full assessment each health care consumer will decide individually how much each attribute impacted each objective. The objectives used in this study are displayed in Table 1.

Table 1

Objectives - Perceptual Dimensions

1. Quality
2. Personalness
3. Convenience
4. Value

3.3.3 Attributes

An attribute was defined in Chapter 1 as a measurable performance characteristic of a health care delivery system. The attributes, as the objectives, were adapted from Hauser and Urban (1977). The attributes, as identified for this research, were based on 16 measurable performance characteristics that health care consumers had identified as relevant to their health care delivery decisions. Their performance characteristics were generated at focus group interviews. Focus group interviews entail bringing groups of 6-8 people together and encouraging them to express their feelings about a particular issue. A trained interviewer guides the discussion to insure that all relevant aspects of the issue are addressed. The advantage of conducting a focus group, rather than a series of individual interviews, is that the group environment allows individuals to hear and respond to the comments of others, thereby stimulating a richer, more insightful discussion of the topic than does interviewing people individually. The results of focus group interviews provide information about consumers' likes and dislikes with respect to the product or service, the characteristics of the product or service that are important to consumers, how consumers think about, communicate about and use the product or service (Hauser, 1977). This method was in accord with the suggestions of Keeney and

Raiffa (1976) for attribute selection. The attributes used in this study are displayed in Table 2.

Table 2

Attributes - Performance Measures

1. Availability of health care services.
2. Waiting time involved in services.
3. Competent care.
4. Convenience of service locations.
5. Price of services.
6. Personal approach to health care.
7. Availability of preventative care.
8. Selection of primary provider.
9. Treatment methods.
10. Privacy of medical records.
11. Continuity of care.
12. Quality of associated hospitals.
13. Use of allied health professionals.
14. Organized and complete medical care.
15. Amount of bureaucratic "red tape".
16. Competent physicians and specialists.

3.3.4 Demographics and Post Assessment Information

Demographics and patterns of health care usage were collected on the health care consumers who completed the questionnaire. These were to be used as descriptors so that comparisons among the respondents could possibly be made. Post assessment data were collected so that information regarding the usefulness of the assessment procedure could be tabulated and used for future development.

3.3.5 Validation

The questionnaire was piloted on individuals with expertise in specific areas. Each was asked to complete the assessment as a health care consumer and make comments based on their area of expertise. Two health care experts, two health care consumers, and one methodology expert completed the questionnaire and furnished criticisms of the questionnaire. The instrument was revised based on their critiques. The assessment questionnaire administered to the case study sample for this research can be found in Appendix C.

3.3.6 Administration

After discussion about the dissertation research with the president of the Chicago metropolitan area firm, he consented for the writer to solicit the employees for

distribution of the assessment questionnaire (Appendix B). The researcher distributed questionnaires and described the research to the twenty employees. Of the twenty possible participants, two changed job status, four chose not to complete the questionnaire, and fourteen questionnaires were returned with assessment information which was utilized for the data analysis described in Chapter 4.

3.4 Model Description

3.4.1 Value Model

Multiple criteria value models are mathematical models that can be used to transform a numerical description of objectives and attributes, into a single number: the value of that alternative.

The multiple criteria decision analytic framework utilized as the normative evaluative value model for this research is a multiattribute cardinal value function.

3.4.2 Value Model: Mathematical Notation

$$v(\cdot) = \sum_{i=1}^{m} v_i(\cdot)$$

where m = attributes 1,. . . . ., m

and $v_i(\cdot) \equiv \sum w_i' f_i(\cdot)$

where w_i' = relative weight of attribute i

$f_i(\cdot)$ = "unscaled value" of attribute i for a given alternative

and $w_i' \equiv \sum_{j=1}^{n} I_{ij} w_j$

where n = objectives 1,. . . . ., n

w_j = relative weight of objective j

I_{ij} = Instrumentality Matrix

O_1 . , ... , O_n

A_1

.

.

. I_{ij}

.

.

.

A_m

$$v_i(\cdot) = \left(\sum_{j=1}^{n} I_{ij}\, w_j \right) f_i(\cdot)$$

$$v(\cdot) = \sum_{i=1}^{m} \left(\sum_{j=1}^{n} I_{ij}\, w_j \right) f_i(\cdot)$$

This notation is consistent with that used by Dyer (1977a).

3.4.3 Value Model: Health Care Alternative

v(health care alternative) =

$$\sum_{i=1}^{16}\left(\sum_{i=1}^{4} I_{ij}\, w_j\right) f_i(\cdot)$$

where w_j = relative weight of the perceptual dimension j (objective j) that has been assessed by the health care consumer (Step 2: Questionnaire)

I_{ij} = the ijth element of the instrumentality matrix which has been assessed by the health care consumer on the attribute (performance characteristic) importance weight for an objective j (Step 3: Questionnaire)

f_i = per cent satisfaction of a performance characteristic i for a specific health care alternative (Steps 5 and 6: Questionnaire)

4. Results

4.1 Overview

This chapter contains the research findings of the health care consumers' subjective assessments of the objectives and attributes of the health care delivery alternatives as recorded on the questionnaire utilized for this research study. The raw data for the fourteen observations are displayed on Tables 3 through 16 in Section 4.2. The basic data analysis is presented in Section 4.3. The interpretation of the results of the analysis are exhibited and discussed in Section 4.4.

4.2 Data Record

Each of the following fourteen pages contains a table for the raw data from each observation as is needed to execute the mathematical value model for each health care consumer. These data were subjectively assessed by each health care consumer using the assessment questionnaire (Appendix C) for input into the evaluative model. It will be noted at this time that observations 12, 13, and 14 have no raw data for per cent satisfaction of PHMO. Respondent 12 expressed that an HMO would never be a choice because of the implications of "socialized medicine." Respondents 13 and 14 expressed a need for more objective data to assess the PHMO alternative; the information needed was exact location, specific hospitals, etc. Due to the nature of the researcher's agreement with the Chicago metropolitan area HMO, this information could not be divulged.

Table 3: OBSERVATION: 1: ASSESSED DATA

ATTRIBUTE WEIGHTS	OBJECTIVE WEIGHTS				SATISFACTION	
	Quality	Convenience	Value	Personalness	Current	PHMO
	10	6	4	8		
Availability of health care services.	8	8	8	0	100	100
Waiting time involved in services.	0	10	10	10	75	50
Competent care.	10	10	10	10	100	100
Convenience of service locations.	0	5	5	0	50	50
Price of services.	0	5	8	5	0	100
Personal approach to health care.	5	5	10	10	90	100
Availability of preventative care.	8	8	10	8	80	50
Selection of primary provider.	8	0	10	10	100	100
Treatment methods.	10	0	10	0	90	80
Privacy of medical records.	8	0	10	8	50	80
Continuity of care.	10	5	8	8	100	80
Quality of associated hospitals.	10	0	10	8	100	100
Use of allied health professionals.	10	0	8	5	100	100
Organized and complete medical care.	10	10	8	8	75	50
Amount of bureaucratic "red tape".	10	10	5	5	50	50
Competent physicians and specialists.	10	10	8	8	100	100

Table 4: OBSERVATION: 2: ASSESSED DATA

ATTRIBUTE WEIGHTS	OBJECTIVE WEIGHTS			SATISFACTION	
	Quality	Convenience	Value	Personalness	Current	PHMO
	10	4	8	6		
Availability of health care services.	4	6	0	0	10	100
Waiting time involved in services.	0	5	3	5	60	50
Competent care.	4	0	0	0	30	90
Convenience of service locations.	0	10	3	0	20	40
Price of services.	0	0	10	0	50	100
Personal approach to health care.	0	0	0	10	80	100
Availability of preventative care.	10	0	0	0	40	100
Selection of primary provider.	10	0	0	0	100	100
Treatment methods.	10	0	5	0	70	100
Privacy of medical records.	0	0	0	2	100	50
Continuity of care.	1	0	0	6	100	90
Quality of associated hospitals.	0	0	5	0	100	50
Use of allied health professionals.	4	0	5	0	50	60
Organized and complete medical care.	0	1	0	6	10	100
Amount of bureaucratic "red tape".	0	3	3	1	100	50
Competent physicians and specialists.	2	3	5	5	0	100

Table 5: OBSERVATION: 3: ASSESSED DATA

ATTRIBUTE WEIGHTS	OBJECTIVE WEIGHTS				SATISFACTION	
	Quality	Convenience	Value	Personalness	Current	PHMO
	10	7	10	2		
Availability of health care services.	9	9	9	2	80	90
Waiting time involved in services.	7	8	6	2	80	90
Competent care.	10	0	10	0	90	90
Convenience of service locations.	5	10	7	2	90	0
Price of services.	0	0	1	0	90	100
Personal approach to health care.	1	0	1	10	30	80
Availability of preventative care.	9	6	8	2	80	100
Selection of primary provider.	8	1	8	9	60	100
Treatment methods.	10	1	8	0	80	90
Privacy of medical records.	7	0	5	0	60	60
Continuity of care.	8	1	8	8	80	90
Quality of associated hospitals.	8	0	7	0	80	90
Use of allied health professionals.	5	0	7	0	70	90
Organized and complete medical care.	6	6	8	8	70	90
Amount of bureaucratic "red tape".	3	4	3	3	50	50
Competent physicians and specialists.	10	0	10	0	80	90

Table 6: OBSERVATION: 4: ASSESSED DATA

ATTRIBUTE WEIGHTS	OBJECTIVE WEIGHTS				SATISFACTION	
	Quality	Convenience	Value	Personalness	Current	PHMO
	10	9	9	8		
Availability of health care services.	10	10	10	10	100	98
Waiting time involved in services.	8	8	8	8	80	50
Competent care.	10	10	10	10	95	10
Convenience of service locations.	9	9	9	9	100	0
Price of services.	9	9	9	9	30	99
Personal approach to health care.	8	8	8	8	75	95
Availability of preventative care.	8	8	8	8	75	95
Selection of primary provider.	10	10	10	10	95	0
Treatment methods.	10	10	10	10	95	95
Privacy of medical records.	9	9	9	9	95	0
Continuity of care.	10	10	10	10	85	95
Quality of associated hospitals.	10	10	10	10	95	50
Use of allied health professionals.	10	10	10	10	95	0
Organized and complete medical care.	10	10	10	10	90	95
Amount of bureaucratic "red tape".	10	10	10	10	90	95
Competent physicians and specialists.	10	10	10	10	98	25

Table 7: OBSERVATION: 5: ASSESSED DATA

ATTRIBUTE WEIGHTS	OBJECTIVE WEIGHTS				SATISFACTION	
	Quality	Convenience	Value	Personalness	Current	PHMO
	5	10	8	5		
Availability of health care services.	5	10	5	0	100	20
Waiting time involved in services.	2	10	5	10	20	20
Competent care.	10	0	0	10	100	0
Convenience of service locations.	0	10	5	10	50	0
Price of services.	0	0	10	0	0	100
Personal approach to health care.	0	0	0	10	100	50
Availability of preventative care.	0	8	10	8	100	100
Selection of primary provider.	10	0	0	0	100	0
Treatment methods.	5	0	0	0	100	50
Privacy of medical records.	0	5	0	5	50	100
Continuity of care.	0	0	8	10	100	50
Quality of associated hospitals.	10	0	8	5	100	20
Use of allied health professionals.	8	0	0	5	100	20
Organized and complete medical care.	0	8	10	5	30	100
Amount of bureaucratic "red tape".	0	10	8	10	0	100
Competent physicians and specialists.	10	0	0	5	100	20

Table 8: OBSERVATION: 6: ASSESSED DATA

ATTRIBUTE WEIGHTS	OBJECTIVE WEIGHTS				SATISFACTION	
	Quality	Convenience	Value	Personalness	Current	PHMO
	10	6	2	8		
Availability of health care services.	7	6	7	1	100	100
Waiting time involved in services.	8	10	2	10	20	50
Competent care.	9	2	7	2	100	80
Convenience of service locations.	6	9	2	1	90	100
Price of services.	2	1	8	1	0	100
Personal approach to health care.	9	1	6	2	80	40
Availability of preventative care.	6	4	5	3	100	60
Selection of primary provider.	5	8	4	6	90	40
Treatment methods.	10	4	10	7	100	70
Privacy of medical records.	3	2	3	8	90	70
Continuity of care.	4	2	1	5	70	90
Quality of associated hospitals.	3	7	6	3	80	60
Use of allied health professionals.	5	1	2	1	10	90
Organized and complete medical care.	4	3	10	4	70	100
Amount of bureaucratic "red tape".	10	9	8	8	10	40
Competent physicians and specialists.	10	10	6	10	100	70

Table 9: OBSERVATION: 7: ASSESSED DATA

ATTRIBUTE WEIGHTS	OBJECTIVE WEIGHTS				SATISFACTION	
	Quality	Convenience	Value	Personalness	Current	PHMO
	10	2	7	5		
Availability of health care services.	5	10	3	5	70	100
Waiting time involved in services.	7	10	5	5	75	25
Competent care.	10	3	7	10	80	75
Convenience of service locations.	4	10	0	5	25	100
Price of services.	3	7	10	0	25	100
Personal approach to health care.	5	3	0	10	70	80
Availability of preventative care.	1	7	3	3	5	90
Selection of primary provider.	10	3	5	10	5	75
Treatment methods.	3	3	3	3	75	100
Privacy of medical records.	0	0	0	7	50	100
Continuity of care.	10	7	3	7	25	80
Quality of associated hospitals.	3	3	7	3	5	25
Use of allied health professionals.	5	7	3	5	5	100
Organized and complete medical care.	7	7	5	7	5	95
Amount of bureaucratic "red tape".	8	9	10	9	5	75
Competent physicians and specialists.	10	7	7	10	85	100

Table 10: OBSERVATION: 8: ASSESSED DATA

ATTRIBUTE WEIGHTS	OBJECTIVE WEIGHTS				SATISFACTION	
	Quality	Convenience	Value	Personalness	Current	PHMO
	9	4	7	2		
Availability of health care services.	10	10	8	8	95	95
Waiting time involved in services.	5	10	4	4	5	50
Competent care.	10	10	10	10	90	60
Convenience of service locations.	3	8	6	8	85	80
Price of services.	2	4	10	4	70	100
Personal approach to health care.	5	10	8	10	60	60
Availability of preventative care.	8	8	10	8	50	100
Selection of primary provider.	8	10	8	10	60	60
Treatment methods.	5	8	10	8	85	80
Privacy of medical records.	4	6	6	10	95	95
Continuity of care.	8	10	8	10	80	90
Quality of associated hospitals.	10	8	8	4	90	90
Use of allied health professionals.	6	8	6	8	90	85
Organized and complete medical care.	5	10	8	4	80	80
Amount of bureaucratic "red tape".	6	8	8	1	35	70
Competent physicians and specialists.	10	10	8	8	90	80

Table 11: OBSERVATION: 9: ASSESSED DATA

ATTRIBUTE WEIGHTS	OBJECTIVE WEIGHTS				SATISFACTION	
	Quality	Convenience	Value	Personalness	Current	PHMO
	10	5	5	5		
Availability of health care services.	10	10	5	7	60	90
Waiting time involved in services.	8	8	2	7	80	75
Competent care.	10	2	2	2	80	80
Convenience of service locations.	8	10	2	6	85	70
Price of services.	5	2	10	2	75	90
Personal approach to health care.	7	9	2	8	75	50
Availability of preventative care.	9	9	4	6	95	100
Selection of primary provider.	10	2	2	10	100	75
Treatment methods.	10	2	2	2	95	85
Privacy of medical records.	5	2	2	10	80	75
Continuity of care.	9	8	2	10	95	80
Quality of associated hospitals.	10	10	4	2	95	95
Use of allied health professionals.	9	2	2	2	90	90
Organized and complete medical care.	7	8	4	10	60	100
Amount of bureaucratic "red tape".	5	8	2	6	80	95
Competent physicians and specialists.	10	2	2	2	90	90

Table 12: OBSERVATION: 10: ASSESSED DATA

ATTRIBUTE WEIGHTS	OBJECTIVE WEIGHTS				SATISFACTION	
	Quality	Convenience	Value	Personalness	Current	PHMO
	9	6	8	4		
Availability of health care services.	9	8	8	7	90	90
Waiting time involved in services.	7	9	6	6	40	70
Competent care.	10	10	9	10	95	80
Convenience of service locations.	5	7	6	8	80	80
Price of services.	5	6	9	7	80	95
Personal approach to health care.	5	7	7	8	65	65
Availability of preventative care.	7	7	8	7	60	80
Selection of primary provider.	8	8	8	8	70	70
Treatment methods.	5	6	8	7	85	85
Privacy of medical records.	4	5	6	7	90	90
Continuity of care.	7	8	7	8	95	80
Quality of associated hospitals.	9	7	8	6	75	75
Use of allied health professionals.	6	7	7	7	80	80
Organized and complete medical care.	6	8	7	6	60	75
Amount of bureaucratic "red tape".	7	7	7	3	75	75
Competent physicians and specialists.	9	9	8	7	85	80

Table 13: OBSERVATION: 11: ASSESSED DATA

ATTRIBUTE WEIGHTS	OBJECTIVE WEIGHTS				SATISFACTION	
	Quality	Convenience	Value	Personalness	Current	PHMO
	9	3	5	7		
Availability of health care services.	7	10	4	2	100	80
Waiting time involved in services.	8	7	8	8	20	40
Competent care.	10	3	6	5	100	60
Convenience of service locations.	4	10	5	5	75	25
Price of services.	5	5	5	5	0	100
Personal approach to health care.	7	5	5	10	90	50
Availability of preventative care.	6	5	4	5	60	100
Selection of primary provider.	9	3	5	10	90	20
Treatment methods.	6	5	6	2	100	60
Privacy of medical records.	2	2	2	7	60	90
Continuity of care.	8	7	5	8	90	90
Quality of associated hospitals.	5	4	8	3	90	40
Use of allied health professionals.	6	5	5	5	20	100
Organized and complete medical care.	5	7	7	7	50	100
Amount of bureaucratic "red tape".	6	8	7	5	0	60
Competent physicians and specialists.	8	5	7	6	100	50

Table 14: OBSERVATION: 12: ASSESSED DATA

ATTRIBUTE WEIGHTS	OBJECTIVE WEIGHTS				SATISFACTION	
	Quality	Convenience	Value	Personalness	Current	PHMO
	8	7	10	5		
Availability of health care services.	7	7	8	7	90	
Waiting time involved in services.	9	7	8	8	80	
Competent care.	10	10	10	9	100	
Convenience of service locations.	7	6	7	8	80	
Price of services.	8	7	8	10	90	
Personal approach to health care.	5	5	6	5	70	
Availability of preventative care.	6	6	6	6	70	
Selection of primary provider.	7	6	7	7	80	
Treatment methods.	5	5	6	5	90	
Privacy of medical records.	5	5	5	5	80	
Continuity of care.	6	7	6	6	70	
Quality of associated hospitals.	8	6	6	7	60	
Use of allied health professionals.	6	6	7	6	70	
Organized and complete medical care.	7	7	7	8	70	
Amount of bureaucratic "red tape".	7	6	6	6	80	
Competent physicians and specialists.	8	8	8	7	80	

Table 15: OBSERVATION: 13: ASSESSED DATA

ATTRIBUTE WEIGHTS	OBJECTIVE WEIGHTS				SATISFACTION	
	Quality	Convenience	Value	Personalness	Current	PHMO
	8	4	3	10		
Availability of health care services.	8	10	6	0	40	
Waiting time involved in services.	6	10	10	7	25	
Competent care.	10	3	6	0	100	
Convenience of service locations.	4	10	9	6	78	
Price of services.	6	8	9	1	0	
Personal approach to health care.	10	8	10	10	50	
Availability of preventative care.	10	4	6	8	90	
Selection of primary provider.	8	4	6	10	95	
Treatment methods.	10	7	9	0	100	
Privacy of medical records.	4	4	4	7	100	
Continuity of care.	9	8	8	10	90	
Quality of associated hospitals.	8	5	9	4	100	
Use of allied health professionals.	7	2	7	4	100	
Organized and complete medical care.	4	7	9	8	20	
Amount of bureaucratic "red tape".	4	7	4	0	100	
Competent physicians and specialists.	9	3	8	3	100	

Table 16: OBSERVATION: 14: ASSESSED DATA

ATTRIBUTE WEIGHTS	OBJECTIVE WEIGHTS				SATISFACTION	
	Quality	Convenience	Value	Personalness	Current	PHMO
	10	8	4	5		
Availability of health care services.	6	10	5	5	80	
Waiting time involved in services.	6	9	5	5	40	
Competent care.	10	2	10	9	80	
Convenience of service locations.	6	10	5	6	60	
Price of services.	8	10	5	4	0	
Personal approach to health care.	5	5	6	10	20	
Availability of preventative care.	5	6	8	5	0	
Selection of primary provider.	4	5	5	9	20	
Treatment methods.	10	5	10	5	90	
Privacy of medical records.	0	2	0	5	0	
Continuity of care.	5	9	9	8	60	
Quality of associated hospitals.	8	9	8	5	90	
Use of allied health professionals.	9	5	10	5	90	
Organized and complete medical care.	6	9	4	9	20	
Amount of bureaucratic "red tape".	5	9	2	4	20	
Competent physicians and specialists.	10	5	10	5	90	

4.3 Data Analysis

4.3.1 Overview

The following section contains the analysis of the assessments made by the health care consumers. The reader is reminded that the health care consumer has provided a numerical description of health care delivery within the multiple criteria decision analytic framework provided on the assessment questionnaire. Through transformation of this assessment by the mathematical, evaluative model the researcher arrived at a single number, score, that describes an alternative for that health care consumer. Examination of intermediate steps in the calculation provides information that is insightful for analysis, and provides added awareness and regard for further applications of the model in the health care environment.

The mean and standard deviation for the assessed perceptual dimension (objective) weights and the calculated performance measure (attribute) weights are displayed on Tables 17 and 18, respectively. Illustrations (graphs) immediately following each table display the array of the respondents' assessments, for the objectives in Illustration 1 and the attributes in Illustration 2. Summary statistics for the per cent satisfaction levels of the health care consumers' current health plan (Table 19) and the PHMO

(Table 20) are also exhibited. The calculated alternative scores for the current health plan and the PHMO are presented for each respondent on Table 21. A summary of the case study sample's responses for the demographic information (Table 22) and the post assessment information (Table 23) are provided.

4.3.2 Summary of Data

4.3.2.1 Objective Weights

The objectives are the perceptual dimensions of health care delivery. The objective weights are directly assessed by the health care consumer. Table 17 provides a summary of the objective weights for all respondents in this research, and Illustration 1 displays the objective weights graphically. As can be seen over all respondents, quality of health care was assessed to be the most important objective of the four. Value, convenience, and personalness follow in order.

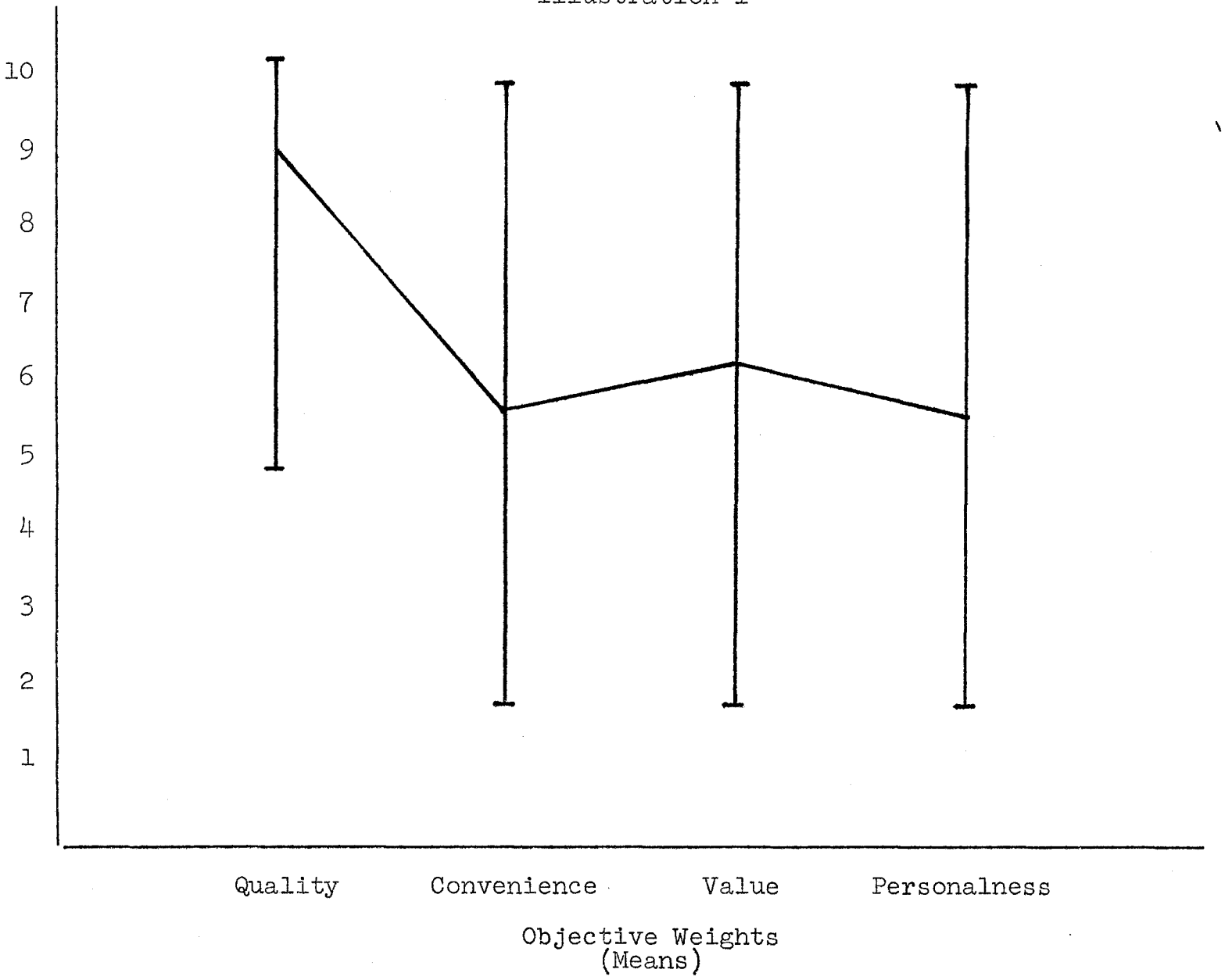
Table 17

Means and Standard Deviations of
Assessed Objective Weights

(N=14)

OBJECTIVE	OBJECTIVE WEIGHTS	
	Mean	Standard Deviation
Quality	9.2	1.4
Convenience	5.8	2.3
Value	6.4	2.6
Personalness	5.7	2.3

Illustration 1



4.3.2.2 Calculated Attribute Weights

The attributes are the performance measures of health care delivery. The attribute weights are calculated through the instrumentality matrix framework. Table 18 provides a summary of the calculated attribute weights for all respondents in this research, and Illustration 2 displays the attribute weights graphically. The two most important attributes were waiting time involved in services (2) and competent physicians and specialists (16). Privacy of medical records (10) was assessed to be the least important. A ranking of the attributes in order of importance weight is provided in the table.

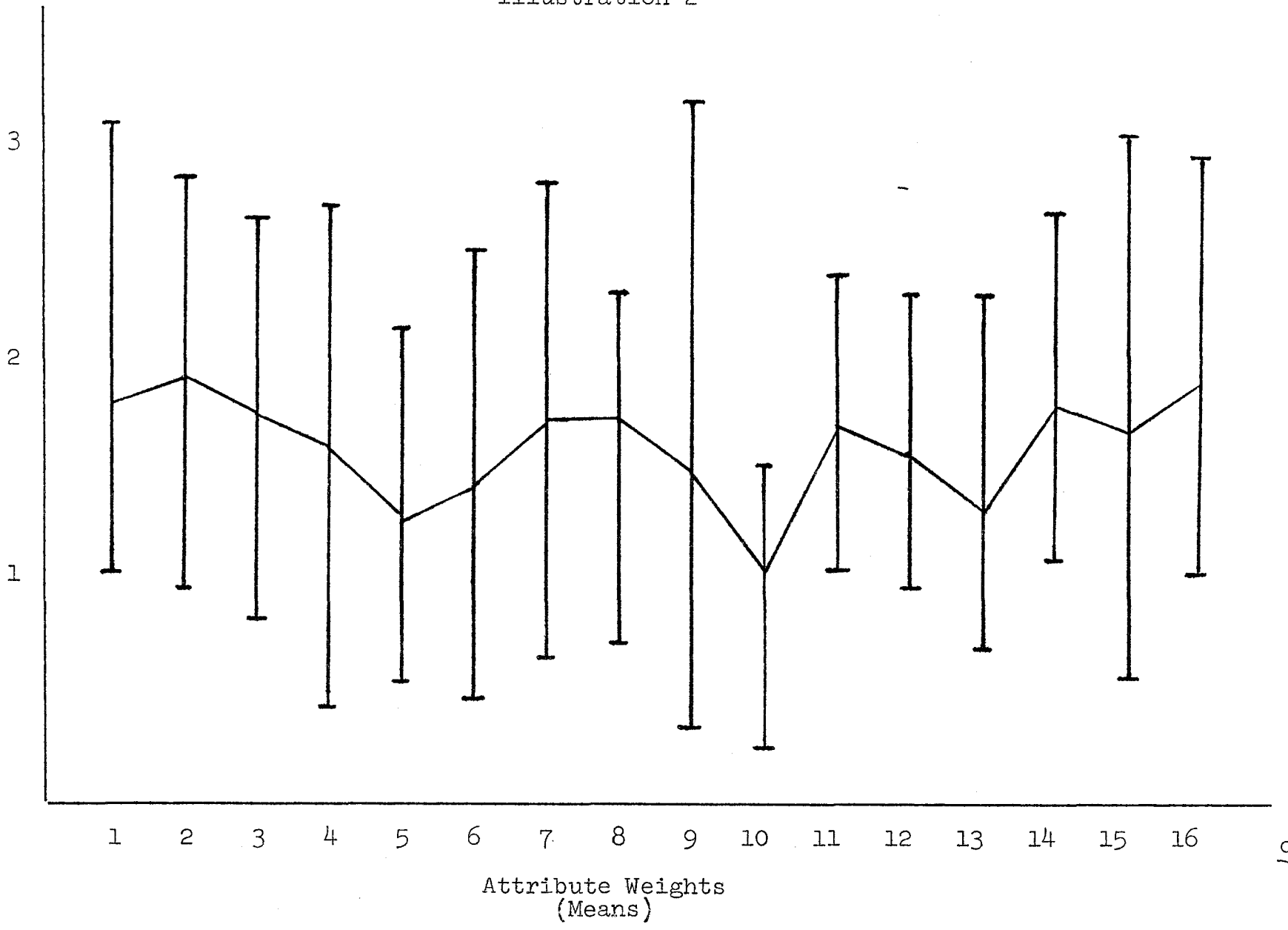
Table 18

Means, Standard Deviations, and Importance Rank of Calculated Attribute Weights

(N=14)

ATTRIBUTES	ATTRIBUTE WEIGHTS		
	Mean	S.D.	Rank
Availability of health care services.	1.87	0.57	4
Waiting time involved in services.	1.99	0.50	2
Competent care.	1.83	0.60	5
Convenience of service locations.	1.67	0.65	10
Price of services.	1.36	0.62	15
Personal approach to health care.	1.50	0.51	13
Availability of preventative care.	1.82	0.56	7
Selection of primary provider.	1.83	0.39	5
Treatment methods.	1.57	0.72	12
Privacy of medical records.	1.12	0.51	16
Continuity of care.	1.80	0.37	8
Quality of associated hospitals.	1.64	0.38	11
Use of allied health professionals.	1.42	0.44	14
Organized and complete medical care.	1.88	0.50	3
Amount of bureaucratic "red tape".	1.77	0.69	9
Competent physicians and specialists.	2.00	0.57	1

Illustration 2



4.3.2.3 Current Plan--Per Cent Satisfaction

The per cent satisfaction refers to each health care consumer's satisfaction with a health care delivery alternative. Table 19 displays the per cent satisfaction for the sample's current plan based on the raw data. Although all health care consumers evaluated their satisfaction over different plans specific to their own experience, this comparison may give some indication of what is satisfactory about the "current" health care system. Within this case study sample, it appears that the most satisfaction with the current plan is the treatment methods (9) and the least satisfaction is the price of service (5).

4.3.2.4 PHMO--Per Cent Satisfaction

This refers to the health care consumer's per cent satisfaction with the PHMO, described for use in the questionnaire. Table 20 displays the per cent satisfaction for the PHMO based on the raw data. The most satisfying attribute of the PHMO for this case study sample was the price (5); this also had the least amount of difference between judges. The least satisfying were the waiting time involved (2) and the convenience of services (4).

Table 19

Summary Statistics for Per Cent Satisfaction with Current Plan (Raw Data)

(N=14)

ATTRIBUTES	PER CENT SATISFACTION		
	Median	Mean	S.D.
Availability of health care services.	90	79.6	26.9
Waiting time involved in services.	60	50	28.4
Competent care.	95	80.6	18.7
Convenience of service locations.	80	69.1	24.6
Price of services.	27.5	36.4	37.8
Personal approach to health care.	72.5	68.2	22.4
Availability of preventative care.	72.5	62.1	35.4
Selection of primary provider.	90	76.1	30.6
Treatment methods.	90	89.6	9.7
Privacy of medical records.	80	71.4	28.2
Continuity of care.	85	81.4	20.6
Quality of associated hospitals.	90	82.9	25.3
Use of allied health professionals.	90	69.3	34.4
Organized and complete medical care.	70	50.7	28.2
Amount of bureaucratic "red tape".	50	49.6	38.0
Competent physicians and specialists.	90	85.6	25.8

Table 20

Summary Statistics for Per Cent Satisfaction with PHMO (Raw Data)

(N=11)

ATTRIBUTES	PER CENT SATISFACTION		
	Median	Mean	S.D.
Availability of health care services.	95	87.6	23.3
Waiting time involved in services.	50	51.8	20.5
Competent care.	80	65.9	32.5
Convenience of service locations.	50	49.6	39.3
Price of services.	100	98.6	3.2
Personal approach to health care.	65	70.0	22.0
Availability of preventative care.	100	86.9	17.6
Selection of primary provider.	70	58.2	38.1
Treatment methods.	85	81.4	16.0
Privacy of medical records.	80	73.6	29.3
Continuity of care.	90	83.2	12.3
Quality of associated hospitals.	60	63.2	28.6
Use of allied health professionals.	90	74.1	34.0
Organized and complete medical care.	100	89.6	15.7
Amount of bureaucratic "red tape".	70	69.1	21.0
Competent physicians and specialists.	90	73.2	29.2

4.3.2.5 Scores for Alternative Health Care Plans

The scores for alternative health care plans from the health care consumer assessment, as calculated with the evaluative model, are displayed for each respondent in Table 21. For this case study sample (N=14), 5 respondents had higher alternative scores for the PHMO, and 9 had higher alternative scores for their current plan. Omitting those health care consumers who did not assess the per cent satisfaction of the PHMO, for reasons already described (N=11), 5 respondents had higher alternative scores for the PHMO, and 6 had higher alternative scores for their current plan.

Table 21

Calculated Scores for Each Alternative

(N=14)

OBSERVATION	SCORE	
	Current Plan	PHMO
1	23.2	22.6
2	14.9	23.4
3	22.0	23.2
4	31.6	20.1
5	17.6	14.1
6	18.4	17.5
7	9.3	19.3
8	16.3	17.5
9	20.7	21.0
10	21.8	21.4
11	15.8	15.4
12	23.9	0.0
13	18.2	0.0
14	14.2	0.0

4.3.2.6 Demographic and Post Assessment Information

Table 22 contains a summary of the demographic information on the case study sample. Table 23 contains a summary of the post assessment information from the respondents. The relationship of the post assessment information to the assessment questionnaire results are discussed in Section 4.4.

Table 22
Summary

Demographic Information

1. Are you married? 3 NO 11 YES (if no children go on to Question 2.)
   1a. Children? 12 NO 2 YES
   1b. Are you/is your wife pregnant? 1 YES
   13 NO

2. How many times have you, your spouse, and children (living at home) visited a medical doctor in the last year?
   2 once, 6 2-3 times, 2 4-5 times,
   2 6-12 times, 2 12-24 times.

3. Have you or your spouse or children (living at home) been hospitalized in the last year?
   11 NO, go on to Question 4.
   3 YES, total number of days you and members of your family spent in the hospital last year.
   1 one day, 0 2-3 days, 1 4-5 days,
   1 6-7 days.

4. When did you last visit the dentist?
   4 last month, 3 6 months ago, 5 6-12 months ago, 1 12-24 months ago, 1 more than 24 months ago.

5. During the last year how many days were you unable to work due to medical problems?
   5 none, 6 1-3 days, 3 4-7 days.

6. Are you currently being treated by a doctor for a continuing illness?
   11 NO
   3 YES, how many times do you see him?
   1 about once a week, 2 less than once a week.

7. How would you rate your overall health?
   12 extremely good, 2 good.

8. If you are married, rate your spouse's health.
   8 extremely good, 3 good.

9. If you have children, how would you rate your children's overall health?
   1 extremely good, 1 good.

Table 23
Summary

Post Assessment Information

1. Are you currently enrolled in your employer's health insurance plan?
   0 NO 14 YES

2. In completing this assessment did you consider factors about health care delivery that you had not considered before?
   4 NO 10 YES

3. Do you feel this questionnaire helped you to be more objective in your assessment?
   5 NO 9 YES

4. At this time do you feel more educated (informed) about your current health plan?
   10 NO 4 YES
   about the PHMO?
   1 NO 13 YES

5. Would you select to join PHMO?
   5 NO 5 YES 4 NOT SURE

6. Would you have joined an HMO before filling out this survey?
   11 NO 2 YES 1 NOT SURE

4.4 Data Interpretation

4.4.1 Overview

To recapitulate from Chapter 1, the purpose of this research was three-fold. First, it was to extend an existing methodology into a new environment by practically applying a specific multiple criteria decision analytic framework, i.e., a normative, evaluative model, to a health care consumer decision. Second, the evaluative model, or value model, is normative focusing on how decisions <u>should</u> be made, not with how they <u>are</u> made. Last, this multiple criteria decision analytic method was intended to aid decision makers by providing a framework for a more objective and a more educated decision process. The data interpretation is organized and discussed keeping these three purposes of the research in mind. Some data interpretation is also provided to acquaint the reader with the implications and potential uses of this multiple criteria decision analytic framework, beyond the purposes of this research study.

4.4.2 Practical Application of an Existing Methodology

Based on the fact that data were able to be gathered from health care consumers via the assessment questionnaire, the researcher feels that this study was a successful extension of a select multiple criteria decision analytic framework into a new environment. Each health care consumer was

able to subjectively assess choices and preference trade-offs within the framework provided. These assessments were input for the mathematical, evaluative model, and the output were calculated scores for each of the health care delivery alternatives.

4.4.3 Normative, Evaluative Model

The axioms and constraints of the model utilized in this research are not intended to be descriptive or predictive but rather to reveal how decisions should be made. A limitation of this study, previously identified, concerns itself with the nature of the decision. This health care decision is an emotional issue of health care, but the health care consumers utilized for this research were not actually faced with the "dual choice" option.

Post assessment information was collected on the respondents probable choice of health care alternative for two timeframes. One, their choice of alternative before exposure to the PHMO, and the second, their choice of alternative after exposure to the PHMO via information provided in the assessment questionnaire. Questions 5 and 6 of Table 23 summarize these results. Table 24 gives individual responses to these questions along with a comparison of the calculated scores for each alternative. Six of the respondents (2, 3, 6, 11, 13, 14) changed their response

after completion of the assessment questionnaire. A comparison of these six with their responses of the rationality of the decision are discussed in section 4.4.4.

Because the respondents were not actually faced with the "dual choice" option, the researcher was unable to compare an actual decision with the model results. The comparison provided in Table 24 gives the indication of what respondents said they would choose versus what they should choose based on the alternative scores calculated with the evaluative model.

Table 24

Comparison of Calculated Health Care Alternative Scores and Stated Choices on Post Assessment Information

(N=14)

OBSERVATION	SCORE		POST ASSESSMENT	
	Current	PHMO	Select PHMO?	Select HMO before this questionnaire?
1	23.2	22.6	Yes	Yes
2	14.9	23.4	Yes	No
3	22.0	23.2	Not Sure	No
4	31.6	20.1	No	No
5	17.6	14.1	No	No
6	18.4	17.5	Yes	No
7	9.3	19.3	Yes	Yes
8	16.3	17.5	No	No
9	20.7	21.0	Not Sure	Not Sure
10	21.8	21.4	No	No
11	15.8	15.4	Yes	No
12	23.9	0.0	No	No
13	18.2	0.0	Not Sure	No
14	14.2	0.0	Not Sure	No

4.4.4 Aid Decision Makers

This multiple criteria decision analytic framework was intended to aid decision makers by providing a framework for a more objective, educated decision. Post assessment information from each respondent was collected concerning these premises.

A summary of the responses to these questions can be found in Table 23, questions 2, 3, and 4. Seventy-one per cent of the respondents said they considered additional factors in health care delivery while utilizing the assessment questionnaire. Sixty-four per cent of the respondents said they felt the decision process to be more objective with this assessment procedure. Ninety-three per cent responded that they felt more informed about the PHMO which aided in their decision process. From these results it can be concluded that health care consumers in this case study sample were aided in making a more objective, educated decision. Of the six health care consumers who did change their choice of alternative after filling out the assessment questionnaire, five thought they had considered more factors, five felt their decision was made more objective, and six felt they were more educated about the PHMO. A display of the alternative scores and the responses to questions on this issue is displayed for each respondent in Table 25.

Table 25

Comparison of Calculated Health Care Alternatives Scores and Select Post Assessment Information

(N=14)

OBSERVATION	SCORE		POST ASSESSMENT			
			When completing the questionnaire did you:			
			Consider new factors?	Be more objective?	Become more educated on:	
	Current	PHMO			Current Plan?	PHMO?
1	23.2	22.6	No	No	No	No
2	14.9	23.4	Yes	Yes	No	Yes
3	22.0	23.2	Yes	Yes	No	Yes
4	31.6	20.1	No	No	No	Yes
5	17.6	14.1	Yes	No	No	Yes
6	18.4	17.5	Yes	No	Yes	Yes
7	9.3	19.3	Yes	Yes	No	Yes
8	16.3	17.5	Yes	Yes	No	Yes
9	20.7	21.0	Yes	Yes	Yes	Yes
10	21.8	21.4	Yes	Yes	No	Yes
11	15.8	15.4	Yes	Yes	Yes	Yes
12	23.9	0.0	Yes	No	No	Yes
13	18.2	0.0	No	Yes	No	Yes
14	14.2	0.0	Yes	Yes	Yes	Yes

4.4.5 Examples of Further Applications of the Research

4.4.5.1 Overview

Further applications of this research are limited only by the questions the researcher posed for answer. This section gives varied types of analysis of the data, in identification of health care delivery priorities based on demographic information and evaluation of health care consumer satisfaction of a health care delivery alternative.

4.4.5.2 Identification of Health Care Delivery Priorities

Health care consumers can be divided into groups based on many different criteria. The case study sample can also be divided into groups for possible identification of health care and health education needs. A common grouping is marital status. Table 26 provides the ranking order of importance of attribute weights for each of three groups, unmarried, married without children, and married with children. From this type of analysis, needs and priorities of groups of health care consumers can be identified.

As can be seen, the unmarried group ranks competent physicians and specialists (16) as most important. The married without children group ranks availability of preventative care (7) and waiting time involved in services (2) as the most important. Availability of health care services

(1), competent care (3), and competent physicians and specialists (16) are the most important attributes for the married with children group.

Table 26

Comparison of Health Care Delivery Priorities
by Demographic Group

ATTRIBUTES	RANK		
	Single	Married Without Children	Married With Children
	(N=3)	(N=9)	(N=2)
Availability of health care services.	4	4	1
Waiting time involved in services.	2	1	15
Competent care.	6	7	1
Convenience of service locations.	8	7	12
Price of services.	16	13	15
Personal approach to health care.	13	11	8
Availability of preventative care.	11	1	4
Selection of primary provider.	4	7	7
Treatment methods.	8	13	12
Privacy of medical records.	13	16	4
Continuity of care.	8	4	4
Quality of associated hospitals.	12	7	8
Use of allied health professionals.	13	13	8
Organized and complete medical care.	6	3	8
Amount of bureaucratic "red tape".	3	11	8
Competent physicians and specialists.	1	4	1

4.4.5.3 Alternative Evaluation

An ideal way of evaluating any system would be for the users or consumers to evaluate their level of satisfaction with it. This multiple criteria decision analytic framework provides a basis to accomplish a health care consumer evaluation of alternatives. Tables 19 and 20 present the per cent satisfaction levels directly assessed by the case study sample. Table 27 provides a comparison of the raw data and calculated data of these performance measures by ranking them in order of satisfaction, making it apparent which items or attributes are satisfying in each of the alternatives. This ranking of the performance measures is done with direct, subjectively assessed weights of health care consumers and calculated weights derived from the instrumentality matrix and the interaction of the weights of the attributes and the weights of the objectives.

Table 27

Comparison of Rankings of Per Cent Satisfaction of Alternatives by Attribute

Current vs. PHMO
(N=14) (N=11)

ATTRIBUTES	RANK			
	Raw		Calculated	
	Current	PHMO	Current	PHMO
Availability of health care services.	6	3	3	2
Waiting time involved in services.	14	15	10	11
Competent care.	5	12	1	9
Convenience of service locations.	10	16	9	16
Price of services.	16	1	16	4
Personal approach to health care.	11	10	10	11
Availability of preventative care.	12	4	7	4
Selection of primary provider.	7	14	4	9
Treatment methods.	1	6	4	7
Privacy of medical records.	8	8	14	15
Continuity of care.	4	5	7	4
Quality of associated hospitals.	3	13	4	11
Use of allied health professionals.	9	7	10	14
Organized and complete medical care.	13	2	10	1
Amount of bureaucratic "red tape".	15	11	15	7
Competent physicians and specialists.	2	9	2	2

5. Discussion

5.1 Overview

This Chapter contains a comprehensive review of the research as completed for the research proposition. Section 5.2 gives a brief summary of the conclusions for the data analysis results.

Implications of the completed research are discussed in Section 5.3. Further applications areas are suggested in Section 5.4. Section 5.5 deals with recommendations.

5.2 Summary and Conclusions

5.2.1 Overview

The results of this research are summarized based on the original proposed impact areas. These are the extension of an existing methodology into a new application environment and the premise of aiding decision makers. Additional results appropriate to health care delivery systems are also discussed.

5.2.2 Extension of Methodology

An existing multiple objective-multiple attribute decision analytic framework was successfully applied in a new application environment. This new application area was the health care delivery environment. A tool for health care consumer decision making regarding health care delivery alternatives was developed within the framework of the multiple criteria decision analytic model chosen for this study.

A multiple objective-multiple attribute model of health care delivery was structured based on previous health care alternative research with health care consumer input (Hauser and Urban, 1977). The model represents the essential performance measures of health care delivery and

the perceptual dimensions of the health care consumer regarding health care delivery. Instrumentation representing the multiple criteria decision analytic framework, based on the mathematical model of Dyer and Sarin (1977), was administered in a field environment using a case study sample. Consumer assessments showed decision rationalization by preference tradeoffs within the objectives and attributes. This research effectively introduced a new multiple criteria decision analytic framework into a health care consumer decision.

5.2.3 Aiding Decision Makers

This research was proposed on the basis of aiding health care consumer decision makers by allowing subjective preferences to be input for a model that manipulates the information to be an objective decision outcome. The concern of the researcher was whether the framework did help the decision maker. The researcher has concluded that health care consumers in this case study sample were aided in their decision process by utilization of the multiple criteria decision analytic framework provided on the assessment questionnaire. The post-assessment information collected from the health care consumers concluded that this multiple criteria decision analytic framework provided more structure and more information for the decision process.

Based on post-assessment information collected, 71 per cent of the respondents felt they had considered new factors, 64 per cent felt that they had been more objective in their decision process, and 93 per cent felt their decision had been more educated with utilization of the decision analytic framework. The researcher concludes that an emotional, sometimes anxiety-producing decision was made more objective and more educated by this instrumentation procedure provided in this multiple criteria decision analytic framework.

5.2.4 Additional Results

The health care delivery environment had additional results beyond the original premise of this research. Through this framework perceptual dimensions (objectives) of health care delivery were able to be ranked by each consumer with regard to the relative importance of each objective in a health care delivery system. The weight of each performance measure (attribute) of health care delivery was assessed with regard to its relative impact on each perceptual dimension. This multiple criteria decision analytic framework provides an objective tool for identifying and measuring consumer needs and priorities of health care delivery.

Health care consumers were able to provide information with regard to their level of satisfaction with alternative systems of health care delivery. Two alternatives of health care delivery, the consumer's current health plan and a proposed HMO, were evaluated for satisfaction levels by health care consumers for input into the evaluative model. It was shown that it was possible to evaluate overall measures of satisfaction by demographic clusterings.

5.3 Implications

5.3.1 Overview

The implications of this research are discussed in different areas. These areas are methodology, "dual choice" option, health care consumers, and alternative health care delivery systems.

5.3.2 Methodology

An existing multiple criteria-multiple decision analytic framework was extended to a new environment. The methodology utilized would be appropriate for any non-trivial, multi-dimensional decision. The application areas are endless considering the complexity of decisions in areas such as education, government, and organizational or personal planning. Many complex decisions in these suggested areas are based on subjective assessments that have not been structured to produce an objective, educated decision. This multiple criteria decision analytic framework provides this needed structure. A health care application has been demonstrated in the research. Possible educational applications are discussed in Section 5.4.

5.3.3 "Dual Choice" Option

The "dual choice" option provides the health care consumer with a decision regarding health care alternatives. This "dual choice" option is becoming wide spread because of the current federal interest in HMO programs. For this reason a range of commercial organizations would find this research practical for their position in compliance with Public Law 93-222 and Public Law 94-460. This framework would provide the company with needed assistance in formulating the "dual choice" option for their employees. Health benefit packages are cost factors to employers, so it would be in their best interest not only to meet their employee needs but to evaluate which plan gives them more for the money. This framework also allows identification of a cost effective program for a particular group of employees. This would be an appropriate way to disseminate HMO information to the employees in an objective, educated manner. Besides benefiting the employer, the employee would also be provided with a basis for an objective, educated decision.

5.3.4 Health Care Consumer

The basic implication of this research is for the health care consumer. The health care consumer is able to provide subjective, emotion-laden information and receive, through the use of the evaluative model, meaningful,

rational output for use in decision making. With the rise of consumer action groups this framework provides a method for systematically evaluating health care and allowing for consumer subjective input.

5.3.5 Health Care Delivery Systems

There are also implications in this type of research for health care delivery. Utilization of this multiple criteria decision analytic framework provides a health care entity with an educational, marketing, and evaluative tool for its range of services. The tool could be administered to a prospective group of health care consumers to inform them of an entity's benefits and, in turn, could be used by the marketer to identify which benefits (attributes) were important and to stress their availability within the particular entity. It could be used as an evaluative tool for their services, if the per cent satisfaction of enrollees were analyzed on a systematic basis.

5.4 Further Applications

5.4.1 Overview

This section provides suggestions for further applications in the health care environment and in the educational environment.

5.4.2 Health Care Environment

The researcher feels that this model would be helpful in the complex process of improving performance of health care delivery. As the model is defined now, it represents the attributes and the objectives of general health care delivery structured as a system. The instrumentality provides a mechanism for assessing the effectiveness/importance of attributes satisfying the objectives and assessing the overall satisfaction levels of a health care delivery plan. Through the use of the multiple criteria framework, performance measures can be assessed by consumers and by health care providers. If the importance of attributes are perceived differently by each group, congruence of the views could be worked on to lead to improved services and to improved reception of services by the consumer.

5.4.3 Educational Environment

As positioned in the health care delivery area of this research, there are also multiple parties to the educational delivery system: the education provider (teaching and administrative staff, i.e., the educators), the education marketer (the board of education), and the education consumer (the families of the community). The objectives, attributes, and instrumentality framework would all pertain in systematically defining offerings and programs within the educational environment.

Objectives of the educational delivery system can be mutually determined (or are determinable) and, hence, can provide the impetus to the provider, the marketer, and the consumer toward achieving the identified desired goals. The attributes are the basic, generic components of educational programs that are readily definable. The educational area is ripe with measurement and instrumentation of new or revised programs achieving delineated objectives. Consequently the concept of an instrumentality matrix structuring the components of educational programs, in achieving educational objectives, appears straight-forward and appropriate. This decision analytic framework would permit a researcher an opportunity to coalesce a significant body of knowledge and prior educational research in aiding the

educator and eventually the educational consumer.

An example of an application of this structure within the educational environment would be with the "unit school district" concept. The prior existence of primary and secondary school districts in a community was considered to be inefficient in terms of the resulting educational program (sequencing and achievement levels, for example). The reduced control, from two school districts (and boards) to one, evidently was considered to be an acceptable tradeoff to constituents (the consumers) to achieve educational improvements; elections were required to institute this change in the community. While the achievement of a unified educational program has been the goal of unit school districts, no concrete analysis of the resulting situation has been initiated. A structured analysis of the kind suggested by this research would lead to a basic, fundamental measurement of the actual achievement of this multi-dimensional problem.

As is underlying in the health care delivery area, there is a cost to the consumer for educational services delivered. The health care area has both episodic and continuing features, with the cost estimatable on a population experience base; costs are captured feature by feature. The relatively continuing nature of educational programs tends away from cost review of components and toward primary

regard for overall budgetary limits. The costing of specific programs within the overall educational program would be an expected result of applying this structural framework. Considerable economies would result to the education marketer once educators are forced to represent delivery of program components against educational objectives within such a structured framework.

Delivery of educational programs to the consumer (the families of the community) can also be characterized in terms of periodic "sales" efforts for new or to be discontinued programs. The time and resources available are constraints, and individual programs tend to be positioned on a benefit-resource basis. Judgements by the education marketer reflect support of the community for added resources or redeployed resources. The claque of supporters of a program can unduly influence the education delivered to the community. Consequently, the educational marketer can benefit from the decision analytic framework by allowing the educational consumer to input subjective information and aid in deciding and in communicating the relevance of the programs to the overall educational objectives.

It is suggested that the community educational environment could gain substantively from an application of this decision analytic framework. The innovation level, the

implementation anxieties, and the economic pressures can all benefit from the decision process described above.

5.5 Recommendations

This study was conducted in the field environment with a case study; yet its greatest limitation was the fact that the health care consumer was not actually faced with the "dual choice" option. The researcher's major recommendation concerns this issue, viz., the writer suggests this assessment instrument should be administered to health care consumers who were actually faced with the "dual choice" option of a specified Health Maintenance Organization. The scores calculated from their assessment questionnaires could be utilized to compare with their actual choice of health care delivery system. The HMO could use the results to find out which attributes of the HMO were the "selling" points of their plan for certain consumer groups. Since this methodology was piloted and proven applicable in this environment, the researcher feels that implementing it in the actual decision situation would be appropriate.

As has been discussed previously, both the consumer/employee and the employer are faced with significant changes to their choices and requirements, due to federal law and federal attention. The information and the process on which the medium and smaller firms/organizations will base their decisions (i.e., positioning of HMO offerings to their employees, judgements regarding the benefit and its cost

within the firm's benefits package) will deteriorate markedly as size and resource of a firm decrease. This research, properly communicated and disseminated, can have broad impact in such firms, offering a research and analysis capability normally affordable only by large organizations. Early publication in a business-related journal would suit such a goal.

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APPENDIX A

APPENDIX A

CONTENT OF LETTER TO CHICAGO METROPOLITAN AREA HMO

This letter is to validate our conversation of early December regarding the use of _____ as an exemplification of an HMO for my doctoral research. To recapitulate, the research concerns itself with an application of a Multiple Criteria Decision Method in a health care consumer area. The specific decision under study for this research is the choice between a current health indemnity plan and a proposed HMO.

As discussed, the description of the HMO will be an adaptation of your brochure. In the text of the description Proposed Health Maintenance Organization (PHMO) will be used in place of _____ and the location will be cited as the north Chicago metropolitan area.

After official acceptance of my dissertation by the University I will be pleased to share my findings with you and/or your staff. As I mentioned, besides being a tool to aid decision makers I feel there are both HMO marketing and health education implications within the framework.

If you have any questions, please feel free to call me. Your cooperation and assistance in this research is greatly appreciated. Thank you.

APPENDIX B

APPENDIX B

CONTENT OF LETTER TO CHICAGO METROPOLITAN AREA FIRM

This is to formally confirm our discussions regarding the participation of the employees of the _____ in the collection of data for my doctoral research. The research concerns itself with the development of a tool to aid health care consumers, specifically those currently employed, in making a choice between a health indemnity plan (traditional insurance) and a Health Maintenance Organization (HMO).

I plan to arrive at your agency in the morning on Monday, January 23, to distribute the questionnaires to your employees. I will remain as long as is necessary to answer questions. Included in each questionnaire packet is an introductory letter with a brief explanation of the research. The questionnaire is self contained with detailed instructions and can be completed at the convenience of each person. I have requested that they return the completed survey to you by Friday, January 27. I plan to pick them up that afternoon.

Sampling with a case study for this type of research is consistent with good research practice. Your cooperation and assistance in this research is greatly appreciated. If you have any questions, please feel free to call. Thank you.

APPENDIX C

January 23, 1978

Dear Health Care Consumer:

Improved health care is a concern for all of us. Today many changes are taking place within the health care system in an attempt to provide just that. One of these innovations is a pre-paid health care plan commonly referred to as a Health Maintenance Organization (HMO). Not all health care consumers understand the HMO plans fully, yet many are faced with the decision of choosing between this, and their current fee-for-service health indemnity plan, since the passage of Public Law 93-222.

As partial fulfillment of the requirements for the PhD, I am undertaking research in an attempt to develop a tool to aid health care consumers in making an objective, informed decision between these options. You are being requested to participate in this process by providing the input on the enclosed survey. There are no right or wrong answers. Your subjective judgments based on your past experience and your situational needs are the essential ingredients of this endeavor.

This research is not being conducted with the intent of promoting either method of health care delivery, but rather is seeking the development of a tool that will aid decision makers facing these alternatives. The questionnaire deals with weighing the importance of various health care system components and assessing the extent to which you feel your present health care system and the proposed HMO possess important characteristics of health care delivery systems.

The initial questions deal with some demographic characteristics which are important for future development of this tool. Do not put your name on the survey unless you would like specific feedback regarding your response.

I hope you will find the time within the next five days to complete the survey. It should take between 35-45 minutes. Please return this to _____ by Friday, whether or not you decide to participate.

I would like to take this opportunity to thank you for your time and thoughts in filling out this survey. It is greatly appreciated.

Sincerely,

J. A. Kammermeyer

JAK/jto

STEP 1

DEMOGRAPHIC INFORMATION

1. Are you married? ____ NO ____ YES (if no children, go on to Question 2.)
   1a. How many children? _____ Ages: ____, ____, ____, ____, ____, ...
   1b. Are you/is your wife pregnant? ____ YES ____ NO

2. How many times have you, your spouse, and children (living at home) visited a medical doctor in the last year?
   ____ once, ____ 2-3 times, ____ 4-5 times, ____ 6-12 times, ____ 12-24 times, ____ 24-50 times, ____ more than 50 times.

3. Have you or your spouse or children (living at home) been hospitalized in the last year?
   ____ NO, go on to Question 4.
   ____ YES, total number of days you and members of your family spent in the hospital last year.
   ____ one day, ____ 2-3 days, ____ 4-5 days, ____ 6-7 days, ____ 7-14 days, ____ 21-50 days, ____ greater than 50 days.

4. When did you last visit the dentist?
   ____ last month, ____ 6 months ago, ____ 6-12 months ago, ____ 12-24 months ago, ____ more than 24 months ago.

5. During the last year how many days were you unable to work due to medical problems?
   ____ none, ____ 1-3 days, ____ 4-7 days, ____ 7-14 days, ____ 14-21 days, ____ more than 21 days.

6. Are you currently being treated by a doctor for a continuing illness?
   ____ NO
   ____ YES, how many times do you see him?
   ____ about once a week, ____ less than once a week, ____ more than once a week.

7. How would you rate your overall health?
   ____ extremely good, ____ good, ____ OK, ____ not so good, ____ poor

8. If you are married, rate your spouse's health.
   ____ extremely good, ____ good, ____ OK, ____ not so good, ____ poor

9. If you have children, how would you rate your children's overall health?
   ____ extremely good, ____ good, ____ OK, ____ not so good, ____ poor

Please read carefully this attachment before going on to Step 3. Your subjective judgments based on the identified range are fundamental to the completion and success of this research.

Perceptual dimensions of health care are simply those components as perceived through the "eyes" of the health care consumer. These dimensions are defined by each health care consumer for his or her self. These dimensions are:

1. Quality
2. Convenience
3. Value
4. Personalness

These can also be assessed by utilizing the consumer satisfaction levels.

Please take the time to review the 2-page attachment before completeing this survey.

STEP 2

UNDERSTANDING THE DIMENSIONS AND CHARACTERISTICS OF HEALTH CARE DELIVERY SYSTEMS.

A health care delivery system is thought of as the entire spectrum of activities focused on meeting the needs of health care consumer, including the facilities, the personnel, and the resources utilized. A health care consumer can be one person or more than one person depending upon the functional situation in which one is involved; that is, single, married, with or without dependents.

For the purpose of this study the health care consumer will be your particular functional unit regarding responsibilities of health care. The demographic questions in Step 1 that you have answered, describe, to some extent, your health care consumer status. The health care delivery system explained for assessment in this survey is based on the integration of soon to be described performance characteristics and consumer perceptual dimensions of health care service.

The performance characteristics are measurable factors of health care. The characteristics are:

1. Availability of health care services.
2. Waiting time involved in services.
3. Competent care.
4. Convenience of service locations.
5. Price of services.
6. Personal approach to health care.
7. Availability of preventative care.
8. Selection of primary physician.
9. Treatment methods.
10. Privacy of medical records.
11. Continuity of care.
12. Quality of associated hospitals.
13. Use of allied health professionals.
14. Organized and complete health care.
15. Amount of bureaucratic red tape.
16. Competent physicians and specialists.

These performance characteristics can best be described by the extent to which the consumer perceives them to be present in a health care delivery system. The 2-page attachment at the end of the survey, "Consumer Satisfaction Levels," contains the performance characteristics and the identified range of satisfaction levels of each. Simply, for the health care consumer, the low level of the range is synonymous with a 0 per cent satisfaction and the high level of the range with a 100 per cent satisfaction.

STEP 3
WEIGHING THE DIMENSIONS

The four perceptual dimensions need to be weighed on the basis of relative importance of these dimensions in an optimal health care delivery system. An optimal health care delivery system is defined to be a system where the consumer is satisfied 100 per cent of the time for all 16 of the characteristics identified. Assign a 10 to the dimension(s) that you feel is (are) most important. The remaining dimensions are weighted relative to the dimension identified as the most important, with a range of 0-10. For example, a 5 is given to a dimension which is one-half as important as the identified most important. Remember, your subjective input, based on your current health care needs and past health care experiences, is the salient point of this survey. Review the high level of the 16 characteristics as necessary for weighing the relative importance of these dimensions. Now weigh the dimensions.

DIMENSION	RELATIVE WEIGHT
Quality	
Convenience	
Value	
Personalness	

STEP 4
WEIGHING THE CHARACTERISTICS

The 16 characteristics were integrated in your assessment of the perceptual dimensions for Step 3. Now these 16 characteristics need to be weighed based on their relative contribution to each of the dimensions. This weight should be based on a change from 0 per cent to 100 per cent satisfaction on each of the characteristics. An assessment is to be made for each of the 16 characteristics for each of the 4 dimensions. To complete this assessment ask yourself, "If a characteristic changed from its low level to its high level (as defined in the attachment), what would be the relative importance of its change on the dimension under consideration?"

The following directions refer to each of the four dimensions. Each dimension is to be assessed independently, page by page. Rate the characteristics according to their relative contribution to each dimension. The rating scale, just as in Step 3, is from 0-10. Assign a characteristic a rating of 0 if a change from the low level to the high level does not contribute to the dimension; 0 does not have to be a rating. Those characteristics that you feel contribute the most if a change occurred should receive a rating of 10. There must be at least one 10 and there can be more than one. Then assign values to the other characteristics which reflect their contribution relative to the characteristic or characteristics which received a 10. A rating of 5 would mean that a characteristic has a potential impact on the dimension that is roughly one-half of the potential impact of the characteristic(s) which received a 10.

Proceed with this assessment for Step 4 on the next four pages.

"If a characteristic changed from its worst level (0 per cent satisfaction) to its best level (100 per cent satisfaction), what would be the relative impact of its change on the QUALITY of health care?"

	CHARACTERISTIC	RELATIVE WEIGHT
1.	Availability of health care services.	
2.	Waiting time involved in services.	
3.	Competent care.	
4.	Convenience of service locations.	
5.	Price of services.	
6.	Personal approach to health care.	
7.	Availability of preventative care.	
8.	Selection of primary physician.	
9.	Treatment method.	
10.	Privacy of medical records.	
11.	Continuity of care.	
12.	Quality of associated hospitals.	
13.	Use of allied health professionals.	
14.	Organized and complete health care.	
15.	Amount of bureaucratic red tape.	
16.	Competent physicians and specialists.	

"If a characteristic changed from its worst level (0 per cent satisfaction) to its best level (100 per cent satisfaction), what would be the relative impact of its change on the CONVENIENCE of health care?"

	CHARACTERISTIC	RELATIVE WEIGHT
1.	Availability of health care services.	
2.	Waiting time involved in services.	
3.	Competent care.	
4.	Convenience of service locations.	
5.	Price of services.	
6.	Personal approach to health care.	
7.	Availability of preventative care.	
8.	Selection of primary physician.	
9.	Treatment methods.	
10.	Privacy of medical records.	
11.	Continuity of care.	
12.	Quality of associated hospitals.	
13.	Use of allied health professionals.	
14.	Organized and complete health care.	
15.	Amount of bureaucratic red tape.	
16.	Competent physicians and specialists.	

"If a characteristic changed from its worst level (0 per cent satisfaction) to its best level (100 per cent satisfaction), what would be the relative impact of its change on the VALUE of health care?"

	CHARACTERISTIC	RELATIVE WEIGHT
1.	Availability of health care services.	
2.	Waiting time involved in services.	
3.	Competent care.	
4.	Convenience of service locations.	
5.	Price of services.	
6.	Personal approach to health care.	
7.	Availability of preventative care.	
8.	Selection of primary physician.	
9.	Treatment methods.	
10.	Privacy of medical records.	
11.	Continuity of care.	
12.	Quality of associated hospitals.	
13.	Use of allied health professionals.	
14.	Organized and complete health care.	
15.	Amount of bureaucratic red tape.	
16.	Competent physicians and specialists.	

"If a characteristic changed from its worst level (0 per cent satisfaction) to its best level (100 per cent satisfaction), what would be the relative impact of its change on the PERSONALNESS of health care?"

	CHARACTERISTIC	RELATIVE WEIGHT
1.	Availability of health care services.	
2.	Waiting time involved in services.	
3.	Competent care.	
4.	Convenience of service locations.	
5.	Price of services.	
6.	Personal approach to health care.	
7.	Availability of preventative care.	
8.	Selection of primary physician.	
9.	Treatment methods.	
10.	Privacy of medical records.	
11.	Continuity of care.	
12.	Quality of associated hospitals.	
13.	Use of allied health professionals.	
14.	Organized and complete health care.	
15.	Amount of bureaucratic red tape.	
16.	Competent physicians and specialists.	

STEP 5
ASSESSING THE SATISFACTION LEVEL OF YOUR PRESENT HEALTH CARE DELIVERY SYSTEM

Each health care consumer is unique, due to functional situation needs and experiences within health care delivery. Considering your specific needs and experiences rate the per cent satisfaction for your current method of health care delivery. Utilize as a frame of reference the range that has previously been identified. Specifically, for each characteristic ask yourself, "Based on the 0 per cent and 100 per cent satisfaction levels defined in the attachment, assign the percentage to which you perceive each of the characteristics to be present in your current health care delivery system." Your ratings could all feasibly be 100 per cent, all 0 per cent, or any combination of values between 0-100 per cent, depending upon your current health care delivery system.

"Based on the 0 per cent and 100 per cent satisfaction levels defined in the attachment, assign the percentage to which you perceive each of the characteristics to be present in your current health care delivery system."

	CHARACTERISTIC	% SATISFACTION
1.	Availability of health care services.	
2.	Waiting time involved in services.	
3.	Assurance of competent care.	
4.	Convenience of service locations.	
5.	Price of services.	
6.	Personal approach to health care.	
7.	Availability of preventative care.	
8.	Selection of primary physician.	
9.	Modern treatment methods.	
10.	Privacy of medical records.	
11.	Continuity of care.	
12.	Quality of associated hospitals.	
13.	Use of allied health professionals.	
14.	Organized and complete medical care.	
15.	Amount of bureaucratic red tape.	
16.	Competent physicians and specialists.	

STEP 6
ASSESSING THE SATISFACTION LEVEL OF A PROPOSED HEALTH MAINTENANCE ORGANIZATION

This procedure is identical to Step 5, except that your per cent satisfaction will be assessed on the following description of a Proposed Health Maintenance Organization (PHMO). This description is not meant to promote an HMO by the researcher. This HMO exists and is based on the literature in use for their subscribers. Please read the following before completing the assessment for Step 6.

DESCRIPTION OF THE PROPOSED HEALTH MAINTENANCE ORGANIZATION:

ELIGIBILITY

You can join PHMO through your place of employment. More than 100 employers offer our choice between PHMO and their existing conventional group hospitalization plan. Your employer will make the same contribution toward whichever plan you choose. Family membership in the plan covers the subscriber, spouse, and unmarried, dependent children up to age 23.

If you live in the north Chicago metropolitan area, you live in the PHMO service area. Traveling time between these communities and the Health Center makes PHMO membership a reasonable and convenient choice. PHMO opened its Health Center in May, 1975.

BENEFITS

PHMO offers you a different kind of health plan that provides and pays for almost all medical care. In addition to paying for care when you are seriously ill, PHMO provides preventive care and routine care, the kinds of things most of us worry about having to pay for out of pocket.

At no extra charge, PHMO gives you things like annual physical check-ups for all members of the family, doctor's office visits, vision and hearing screening, well child care, immunizations and inoculations, lab tests and X-rays, throat cultures and allergy shots. Now you never have to postpone these things because we include them in your care. To keep you in better health.

At the same time, PHMO hospitalization benefit covers unlimited days of medical and surgical care and pays 100 per cent of the fees of physicians, surgeons, and consulting specialists. In addition, we provide mental health services, emergency care, extended care, and home health services.

THE HEALTH CENTER

If you become a member of PHMO, you'll receive most of your care at a modern, attractive health center, conveniently located in the north Chicago metropolitan area. There's parking nearby in several municipal parking lots, and you'll find the center easy to reach by bus, the El, or Chicago and North Western trains.

The well-equipped center, with its own lab and X-ray facilities, is open Thursday evenings and Saturday mornings in addition to regular weekday hours.

OUR STAFF

As a PHMO member, you'll select your personal physician from our group of primary care doctors who also are specialists in internal medicine, family practice, pediatrics and obstetrics/gynecology. All are on the staff of a University Hospital and on the faculty of a Medical School. You'll make appointments to see your primary care doctor, who will be responsible for coordinating all your care.

If you need diagnosis or treatment that is beyond primary care--for example, surgery or orthopedic surgery--you'll be referred by your primary care doctor to a specialist who will provide the care you need. PHMO's referral specialists also are members of the University Hospital staff.

You may also be served by one of PHMO's nurse practitioners, key members of our health team. They are registered nurses with advanced training that enables them to provide well care and routine care. You may see a nurse practitioner for follow-up treatment, or, if you choose, for a check-up. Or you may take some of your health questions to a nurse practitioner, who can provide answers and counseling.

HOSPITALIZATION

If you need to be hospitalized, your PHMO doctor will admit you to the University Hospital, a teaching hospital that is part of the University Medical Center. PHMO's benefits cover all the costs for whatever kind of room your medical condition requires: semiprivate, private, intensive care, or another kind of special care unit.

If you need specialized treatment that is not generally performed at the University Hospital, your doctor will arrange to admit you to a hospital that provides this treatment.

EMERGENCIES

PHMO members who have emergency medical problems after regular Health Center hours have "round the clock" access to physicians. There is always a doctor on call in each of the three primary care specialties: internal medicine, pediatrics, and obstetrics/gynecology.

If you have a medical emergency, you'll call PHMO. The doctor you speak to will assess the condition and may direct you to go to the hospital emergency room, or ask you to come to the Health Center, or give other instructions. The important thing is that you can count on having emergency care available 24 hours a day, seven days a week.

There will be times when you can't call, because you're far away from PHMO. Then you'll appreciate PHMO's coverage for emergency care--anywhere in the world--through the plan's association with an insurance company. After a $10 co-payment that you pay, the plan pays 100 per cent of the usual and customary fees for both the hospital and the doctor.

SUMMARY OF THE COMPREHENSIVE PHMO HEALTH PROGRAM

Benefits provided under the direction or with the approval of a PHMO physician.

CARE IN THE HEALTH CENTER	COVERAGE
Physical check-ups	In full, annually
Office visits	In full
Lab tests, X-rays	In full
Diagnosis and treatment of illness or injury	In full
Inoculations, immunizations	In full
Minor surgical procedures	In full
Well care, children and adults	In full
Family planning services	In full
CARE IN THE HOSPITAL	
Unlimited days--semiprivate room, intensive care, or special unit	In full
Operating room, recovery room	In full
Radiology, physical therapy	In full
X-ray, lab, medicine and drugs	In full
Blood, through members' cooperative replacement plan	In full
SURGERY	
Surgeon, anesthesiologist, consultation	In full
MATERNITY CARE	
Delivery, prenatal and postnatal care	In full after member pays $100
MENTAL HEALTH	
Short-term therapy in the health center	Up to 20 visits, member pays $5 per visit
In hospital	30 days per confinement
Day hospital program	In full, unlimited days
EMERGENCY CARE	
PHMO physicians on call 24 hours a day, seven days a week	
Emergency room visit	In full after member pays $10
OTHER SERVICES	
Ambulance	In full
Extended care (skilled nursing)	In full
Home health services	In full
Treatment for alcoholism and drug addiction	In full

"Based on the 0 per cent and 100 per cent satisfaction levels defined in the attachment, assign the percentage to which you perceive each of the characteristics to be present in the proposed HMO?"

	CHARACTERISTIC	% SATISFACTION
1.	Availability of health care services.	
2.	Waiting time involved in services.	
3.	Assurance of competent care.	
4.	Convenience of service locations.	
5.	Price of services.	
6.	Personal approach to health care.	
7.	Availability of preventative care.	
8.	Selection of primary physician.	
9.	Modern treatment methods.	
10.	Privacy of medical records.	
11.	Continuity of care.	
12.	Quality of associated hospitals.	
13.	Use of allied health professionals.	
14.	Organized and complete medical care.	
15.	Amount of bureaucratic red tape.	
16.	Competent Physicians and specialists.	

STEP 7
POST ASSESSMENT INFORMATION

1) Are you currently enrolled in your employer's health insurance plan?
___NO ___YES

2) In completing this assessment did you consider factors about health care delivery that you had not considered before?
___NO ___YES

3) Do you feel this questionnaire helped you to be more objective in your assessment?
___NO ___YES

4) At this time do you feel more educated (informed) about your current health plan?
___NO ___YES
about the PHMO?
___NO ___YES

5) Would you select to join PHMO?
___NO ___YES

6) Would you have joined an HMO before filling out this survey?
___NO ___YES

CONSUMER SATISFACTION LEVELS OF HEALTH CARE SERVICE CHARACTERISTICS

CHARACTERISTICS	RANGE	
	Low Level (0% Satisfaction)	High Level (100% Satisfaction)
1. Availability of health care services.		
A. Emergency Room services	None	24 hours per day
B. Answering service	None	24 hours per day
C. Office hours to include labs, x-rays, etc.	1200-1600 hours daily Appointment necessary	800-2000 hours daily No appointment necessary
2. Waiting time involved in services.		
A. For provider		
With appointment	3 hours or more	0-15 minutes
Without appointment	4 hours or more	0-30 minutes
B. Labs, x-rays, etc.	2 hours or more	0-15 minutes
3. Competent care.		
A. Licensure, registration, and certification of allied professionals and physicians.	None	All classes
B. Professional Standards Review	Never	Yearly
4. Convenience of service locations.		
A. Travel time	Over 2 hours	0-30 minutes
B. Transportation mode		
Public	No access	Easy access
Private	No parking	Free parking
	Poor access	Easy access
5. Price of services.	Pay for each service at discretion of provider	Published, standard price for <u>all</u> services
6. Personal approach to health care.		
A. Primary provider	Always see "on call"	Always see
B. Interest by professionals	Always see "on call"	Always know name, case, etc.
7. Availability of preventative care.		
A. Check-Ups	None	Annually
B. Health education literature and consultation	None	Readily available

	Low Level (0% Satisfaction)	High Level (100% Satisfaction)
C. Diagnostic screenings	None	Routine
D. Immunizations	None	Routine
8. Selection of primary providers.	Assigned	Free choice
9. Treatment methods.	Outdated	Modern (as defined by appropriate organization; for example: Cardiac--American Heart Association)
10. Privacy of medical records.	All professionals have access; no consumer access	Only primary provider and consumer access
11. Continuity of care.	Utilization of "crisis" type, "on call" professionals with closest hospital	Utilization of same professionals and same hospital
12. Quality of associated hospitals.		
A. Emergency Rooms	Stand-by service	Complete service
B. Joint Commission on Accreditation of Hospitals	None	Maximum accreditation
13. Use of allied health professionals.	Institution trained	Utilized in the maximum capacity as defined by respective registration, licensure, and/or educational degree.
14. Organized and complete health care.		
A. Location of services	Multi-stop	One stop
B. Follow through	None	With same professional
C. Test results	You call	Call you
15. Amount of bureaucratic red tape.		
A. Forms to fill out	Every time	First time only
B. Reception, records, requests	Multi-location for each service	One central location
16. Competent MD's and Specialists.		
A. Primary provider	None	Board certified in family practice or internal medicine
B. Specialists	None	Board certified in specialty

APPROVAL SHEET

The dissertation submitted by Jill Ann Kammermeyer has been read and approved by the following committee:

Jack A. Kavanagh, PhD, Director
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Behavioral Foundations, Loyola University

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Director, Operations Research
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The final copies have been examined by the director of the dissertation and the signature which appears below verifies the fact that any necessary changes have been incorporated and that the dissertation is now given final approval by the Committee with reference to content and form.

The dissertation is therefore accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy.

April 20, 1978
Date

Jack A. Kavanagh
Director's Signature