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**QUALITY OF HEALTH CARE AND
ITS ROLE IN COST RECOVERY WITH A
FOCUS ON EMPIRICAL FINDINGS ABOUT
WILLINGNESS TO PAY FOR
QUALITY IMPROVEMENTS**

**Phase I:
Review of Concepts and Literature,
and Preliminary Field Work Design**

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Written by:

**Annemarie Wouters, Ph.D.
Olusoji Adeyi, M.D.
Richard Morrow, M.D.
Johns Hopkins School of Public Health
Consultants, Abt Associates Inc.**

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**Health Financing and Sustainability (HFS) Project
Abt Associates Inc., Prime Contractor
4800 Montgomery Lane, Suite 600
Bethesda, Maryland 20814
Tel: 301-913-0500 Fax: 301-652-3916 Telex: 312636**

**Management Sciences for Health, Subcontractor
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ABSTRACT

This paper looks at the interrelationship of cost recovery and quality improvements in the health sector of developing countries as well as at people's willingness to pay for perceived improvements in health services. Included in this document are in-depth literature reviews of five major types of studies: facility-based studies of the effect of cost recovery on utilization, econometric health care demand studies, hedonic pricing studies, contingent valuation studies, and cost-recovery intervention studies. By reviewing these studies, the paper provides a conceptual framework within which one can consider people's willingness to pay for quality improvements in health care by looking at how demand behavior interacts with supply, especially in terms of promoting the financial sustainability of government services. This paper also presents a preliminary design of possible field research activities.

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ACRONYMS

ARI	Acute respiratory infection
CV	Contingent valuation
HFS	Health Financing and Sustainability
MOH	Ministry of Health
NHS	National Health Service
PHC	Primary health care
STD	Sexually transmitted disease
TQM	Total Quality Management
U.K.	United Kingdom
USAID	U.S. Agency for International Development
WHO	World Health Organization
WTP	Willingness to pay

CURRENCY

KSh	Shilling (Kenya)
TSh	Shilling (Tanzania)

EXECUTIVE SUMMARY

Poor economic trends in many developing countries have motivated policymakers to consider cost recovery in the health sector, a mechanism whereby patients pay part or all of the cost of care in a public facility as a means to generate additional resources. A recurring lesson from initial experiences in cost recovery is that without visible and fairly immediate improvements in the quality of care provided, patients will not support the implementation of user fees. This report represents Phase I of a component of the United States Agency for International Development (USAID) Health Financing and Sustainability (HFS) Major Applied Research on "Cost Recovery and the Quality of Care." As stated in the HFS Applied Research Agenda (1991), the goal of research in this area is to enhance understanding of the interrelationship of cost recovery and quality improvements. This report focuses on what is known about willingness to pay for various attributes of quality. It provides an in-depth literature review of the topic; a conceptual framework that puts the empirical findings about willingness to pay in perspective; linking them to supply behavior and other requirements for financial sustainability; and a preliminary design of possible field research activities.

Five major types of studies were reviewed: facility-based studies of the effect of cost recovery on utilization, econometric health care demand studies, hedonic pricing studies, contingent valuation surveys, and cost-recovery intervention studies. The conceptual framework identified the following key relationships connected to the role of quality of care in cost recovery: the demand elasticity with respect to quality and the elasticity of costs with respect to improvements in quality. The framework highlighted the fact that market equilibrium occurs where there is consensus between providers and patients about the quality of services available in the health care market; the same quality variable is used in both demand and supply equations. The market equilibrium does not, however, necessarily coincide with maximum health of the population for a given amount of resources. Patients and providers may not always know about or agree on which quality improvements are efficacious.

On the demand side, little is known about the partial elasticities of demand with respect to specific quality improvements. What types of quality improvements generate highly elastic responses? Do these elasticities vary among target groups (by income, gender, or age)? On the cost side, almost no information exists about the cost implications of quality improvements. It is important to distinguish between the effects on cost of improvements in the quality of "grade" and improvements in the quality of "conformance." Multidimensional aspects of quality are explored using insights from economics, traditional Quality Assurance, Total Quality Management, and social marketing techniques.

The empirical results to date confirm the general importance of quality of care in motivating the demand for health care services, but some qualifications should be made. The findings of facility-based studies are obscured by the presence of numerous confounding factors. Health care demand studies provide useful information about the general importance of quality in choosing health care providers, but face some limitations in trying to

identify responsiveness to specific attributes of quality, especially because of problems with multicollinearity and endogeneity. Application of hedonic pricing methods requires fairly strong theoretical assumptions (such as perfect competition, complete information about all service attributes, profit maximization) and substantial amounts and types of data (measurement of attributes on a continuum, data on all attributes of the service or good in question) such that they are likely to have limited use in developing-country settings. Contingent valuation (CV) surveys are unique in their ability to elicit willingness to pay (WTP) for specific aspects of quality. Researchers, acknowledging the experimental nature of this method, interpret findings with caution. Many question whether individual responses to hypothetical scenarios are good predictors of actual behavior. More work needs to be done to improve the validity of the results. Finally, intervention studies have recently been used as an alternative research method for exploring relationships between quality improvements, user fees, and utilization. Quasi-experimental methods are applied to determine the effects of a health care financing intervention (implementation of user fees along with a package of quality improvements) on utilization patterns of the population as a whole and on various subgroups. Such studies can be quite useful for understanding the effects of cost recovery on utilization under actual circumstances; however, they also require substantial resources and must be carefully integrated with the implementation of cost-recovery initiatives.

Little has been done to determine whether preferences for quality improvements differ across various target groups; however, findings from three out of the five types of studies suggest that this might be so. The household production of health framework could offer some answers; it suggests that patients will demand and even pay for quality improvements, if these quality improvements increase the perceived marginal productivity of these services in relation to price. In light of concerns for the distributional impacts of cost recovery, further research on this issue is merited. The proposed field research tackles some aspects of this topic.

1.0 INTRODUCTION

Poor economic trends in many developing countries have motivated policymakers to consider cost recovery in the health sector, a mechanism whereby patients pay part or all of the cost of care in a public facility as a means to generate additional resources. An increase in user fees sometimes generates an increase in revenues, which can be recycled to support the provision of public health care services. Patients who do not perceive value for money under this user fee scenario may choose other providers or avoid treatment altogether. The distributional impacts of user fees continue to be of concern, especially on the poor and those with high health risks. Evidence of the success of cost recovery as a source of additional revenue for the health sector is quite mixed. Some experiences under the Bamako Initiative appear quite successful while others have generated less revenue.

A recurring lesson from initial experiences in cost recovery is that without visible and fairly immediate improvements in the quality of care provided, patients will not support the implementation of user fees (Vogel, 1988). In many cases, user fees are collected at the local health facility and sent directly to a central authority (Ministry of Health, Treasury), creating serious obstacles to recycling the revenues to improve quality at the collection facility. A recent study on health care financing in Ogun State, Nigeria, reconfirmed earlier studies that quality is a major determinant of patient choice of health care providers, strengthening the recommendation that quality improvements should accompany increases in user fees (Denton et al., 1991). However, the cost implications of these quality improvements are unknown. Quality improvements may also have distributional consequences. Some population groups may be more willing to pay for selected quality improvements than others.

This report represents Phase I of a component of the U.S. Agency for International Development (USAID) Health Financing and Sustainability (HFS) Major Applied Research on "Cost Recovery and the Quality of Care." As stated in the HFS Applied Research Agenda (1991), the goal of research in this area is to enhance understanding of the interrelationship of cost recovery and quality improvements. The scope of the topic is enormous as exemplified by the multitude of related research questions posed in the HFS Research Agenda, which are summarized below.

1.1 DEMAND-SIDE ISSUES

1. How do consumers view quality in choosing source and amount of care purchased?
2. For which improvements in quality are consumers willing to pay? Do patients perceive that they are getting "value for their money"?
3. What is the potential of quality improvements for increasing use by selected vulnerable groups?
4. Do providers' and consumers' perceptions differ?

5. How can consumer education affect perceptions of quality?
6. What are the distributional effects of improved quality; that is, how do different population groups view quality (i.e., by income groups, gender, age, education)?

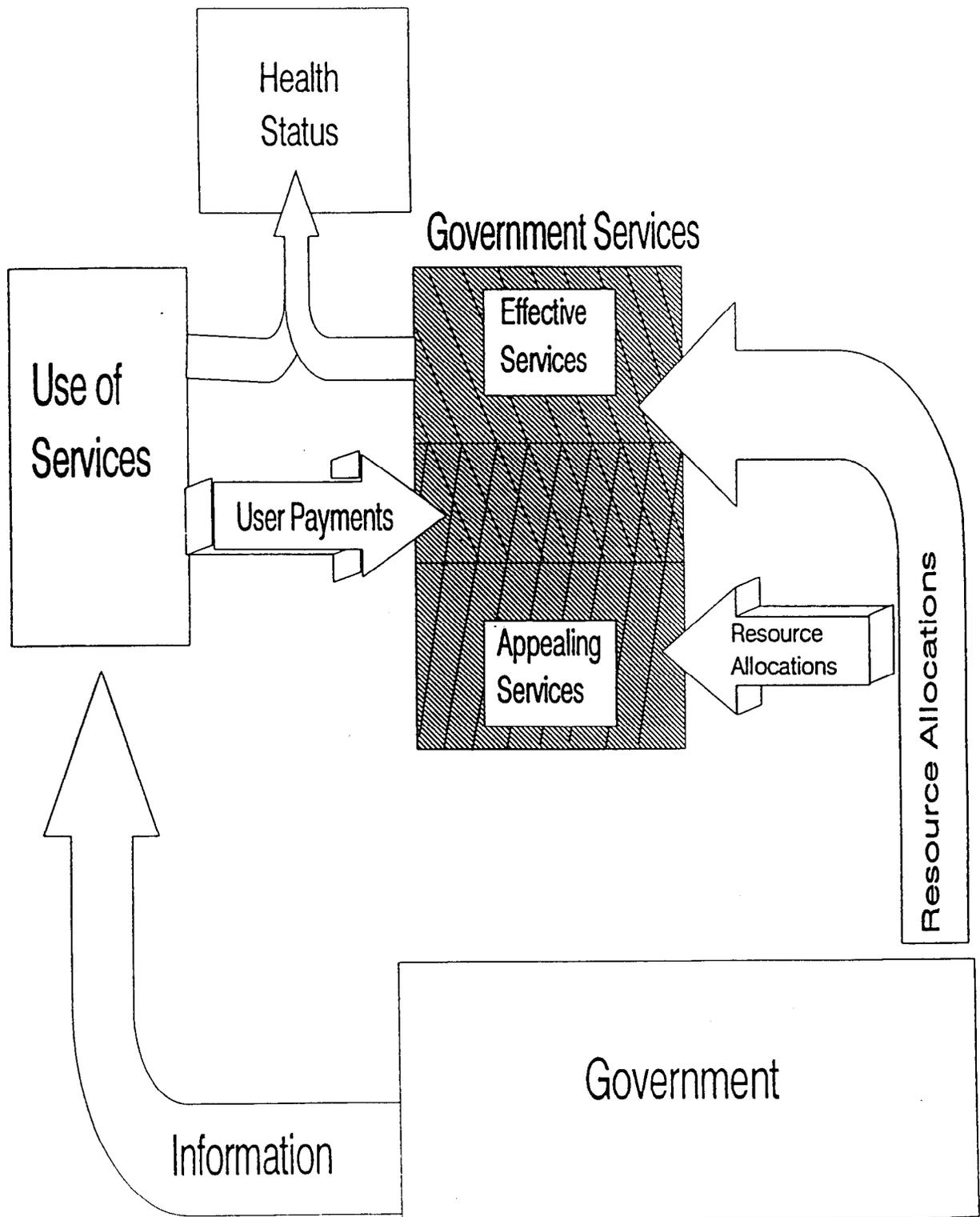
1.2 SUPPLY-SIDE AND OTHER FINANCING ISSUES

7. How do providers view quality?
8. How much do quality improvements cost?
9. To what extent can improvements in quality be paid for through user fees or related mechanisms?
10. What improvements in quality are required to facilitate cost recovery in the public sector?
11. How can quality be improved?

These questions stem from the basic framework of quality, cost recovery, supply, and demand for public-sector services presented in Exhibit 1.1 below (HFS, 1993). Several assumptions are imbedded in the diagram. First, the government bears important responsibility for providing information to consumers of health care: information is essential for the health care market to work. Second, the government allocates resources for the provision of selected services that should be both effective in improving health status and appealing to patients, and for which patients are willing to pay. Notably, this assumes that governments are currently in the business of providing selected health care services that are not necessarily public goods. In these cases, public services are probably in competition with private providers. Introducing cost recovery effectively reduces the role of government for nonpublic good-services: cost recovery privatizes the financing of public services. Another basic premise typically underlying government sponsorship of selected health services is that government should not only facilitate the operation of a competitive market but also ensure equitable distribution of services. The government is generally viewed as the provider of last resort for the very poor. If user fees decrease use by these target groups, it is widely believed that these groups are likely to suffer from inadequate or inappropriate care. However, private charitable institutions can also play a substantial role in caring for vulnerable households and/or individuals.

Exhibit 1.1 indicates that quality of care deals with both the effectiveness of the services and their appeal to patients. Quality of care is a multidimensional concept with many definitions. No one definition is applicable in all situations. Some include:

EXHIBIT 1.1
FRAMEWORK FOR PUBLIC SECTOR SERVICES: QUALITY,
COST RECOVERY, SUPPLY AND DEMAND



- ▲ "The degree to which actual performance or achievement corresponds to set standards." (USAID, 1991).
- ▲ "The quality of technical care consists in the application of medical science and technology in a manner that maximizes its benefits to health without correspondingly increasing its risk. The degree of quality is, therefore, the extent to which the care provided is expected to achieve the most favorable balance of risks and benefits." (Donabedian, 1980, p. 5-6).
- ▲ "Proper performance (according to standards) of interventions that are known to be safe, that are affordable to the society in question, and that have the ability to produce an impact on mortality, morbidity, disability and malnutrition." (Roemer and Montoya Aguilar, 1988).
- ▲ "Doing the right thing, right away." (Deming, Walton, 1986).

These definitions tend to focus on the technical aspects of care, that is, the medical efficacy of treatment protocols and the correct implementation of those protocols; the provider perspective is what counts. Most would concede that patient perceptions of quality do not always coincide with those of providers. Patients are looking for treatments that not only lead to health improvements but also are accessible, convenient, and pleasant; alleviate pain; and reduce trauma to the family. Technical dimensions of quality may not always be noticeable to patients. Similarly, those aspects of service delivery that patients prefer may have little direct relationship to medical efficacy (friendly staff, privacy). Exhibit 1.1 suggests that patients are most willing to pay for those services that are both effective and appealing. If patients feel that government services are not offering them "value for money," they will look to other private providers for care.

In addition to noting the potential contrast between patient and provider perceptions of quality, it is important to be clear about how quality is measured. Donabedian, well recognized for his comprehensive research in quality assessment and monitoring, proposed three levels for measuring quality: structure, process, and outcome (1980). Quality assessment of structural components involves that of the settings in which care takes place. Quality assessment of the process components compares what should be done with a given health technology with what is actually being done in terms of provider competence and user compliance. Quality assessment of outcome components examines whether a change in health status can be attributed to the health program or whether a patient is adequately satisfied with the health care provided. Although it is hoped that improvements in structure and process measures of quality lead to better health outcomes, it is not guaranteed. Given the previous discussion, it follows that patients, providers, the Ministry of Health, or other participants may differ in what specific aspects they prefer about the structure, process, or outcome of the health care service.

From this brief discussion of a simplified framework, basic assumptions, and definitions, it is quite evident that answering all the research questions posed by the HFS on this Major Applied Research Topic is beyond the scope of a single literature review. This report focuses on what is known about willingness to pay for various attributes of quality. Five major types of studies were reviewed: facility-based studies of the effect of cost recovery on utilization, econometric health care demand studies, hedonic pricing studies, contingent valuation studies, and cost-recovery intervention studies.

The conceptual framework casts the empirical findings about willingness to pay for quality improvements in a broader light by looking at how demand behavior interacts with supply, especially in terms of promoting the financial sustainability of government services. Still, the framework does not attempt to model all elements in a cost-recovery system in detail. Demand and supply analyses are covered separately and more completely in other documents (Bitran, 1988, 1992). Additional discussion about quality of care is given, integrating concepts and methods from Quality Assurance and Total Quality Management.

The remainder of the report is organized as follows. Section 2.0 summarizes the findings of facility-based studies of cost recovery. Section 3.0 reviews the approaches and results of econometric health care demand studies in looking at the effects of quality on choice of health care provider. Section 4.0 explains the basic hedonic pricing model and discusses its applicability to understanding health care utilization patterns in developing countries. Section 5.0 provides a fairly elaborate explanation of contingent valuation surveys, given their complexity, and highlights major findings from both developed- and developing-country studies. Section 6.0 summarizes the results of a unique cost-recovery intervention study in Cameroon. Section 7.0 attempts to provide a broader context in which to interpret these findings by developing an economic model that looks at both supply, demand, and financial sustainability issues. It also further develops the definition of quality of health care in a way that is relevant to exploring related health care financing policy questions. Section 8.0 concludes the literature and conceptual review by summarizing major findings and making suggestions for further research. Based on these recommendations for further research, Section 9.0 presents a preliminary proposal to analyze field data from a cost-recovery case control experiment in Niger in terms of how increases in user fees accompanied by quality improvements affect expenditures for an episode of illness.

2.0 FACILITY-BASED STUDIES, USER FEES, AND UTILIZATION

In this section, we review facility-based studies for findings on the effect of user charges and improved quality of care on health service utilization. These studies focus on relationships between price changes and utilization; little attention is given to quantitative analysis of quality of care. After a summary of the pertinent findings, we conclude with a summary of unresolved issues, areas of limited experience, and remaining gaps in knowledge.

2.1 MAIN FINDINGS

Health care facility-based studies seek to identify associations between the introduction of or increases in user charges and the pattern of service utilization, an indirect assessment of willingness to pay. They are typically longitudinal ex post studies examining service utilization patterns before and after the introduction of user charges, otherwise known as "one group (no control) pretest-posttest quasi-experimental designs." Textbooks on experimental design document extensively the limitations of this type of study (Cook and Campbell, 1989). One is typically unable to attribute changes in the independent variable (price) on a dependent variable (utilization).

In one of the most frequently quoted longitudinal studies, Waddington and Enyimayew (1990) examined whether or not utilization at health facilities fell as a result of the introduction of user fees in the Volta Region of Ghana (9 percent of Ghana's population). Three data collection methods and sources were used. Outpatient service consultation data gave information on service utilization in public facilities before and after user charges were introduced. Interviews with health workers provided information on fee levels, exemptions, administrative mechanisms for collection and safe keeping of revenue, and the use of revenue. Focus group discussions with community groups generated qualitative information on clients' views of and experiences with various forms of care.

The authors reported that utilization of public health facilities in rural areas fell by half and remained at low levels after the introduction of substantial user charges. In urban areas, utilization also dropped by half initially, but after several months rose back to pre-cost recovery levels. After the introduction of user charges, proportionately more of the 15-45 age group used the government services. The authors noted that while the population was obviously concerned with the price of care, there was an even greater concern about the quality of care and receiving value for money. People seemed unwilling to pay if drug supplies were unreliable or staff behavior was unpleasant. The availability of drugs and provider-client communication were regarded as important dimensions of quality in the determination of willingness to pay.

The study had some major weaknesses that were acknowledged by the authors. The most important of these was the impossibility of attributing changes in utilization rates to cost recovery alone, given the multiplicity of factors that influence the demand for health services. The one group (no control) pretest-posttest design is unable to factor out the effects of history (other events that

took place during the introduction of cost recovery), other random or confounding factors (such as changes in income levels, morbidity patterns, health beliefs), and learning behaviors (population's learning about cost recovery). All of these difficulties reduce the confidence with which one can attribute the observed reductions in utilization to increases in user fees and/or decreases in quality.

In Lesotho, the introduction of a new fee schedule for outpatient services in all Ministry of Health (MOH) facilities was not accompanied by quality improvements. Prior to the fee increase in MOH facilities, private health care was often preferred, despite its expense and long travel time, because government health care providers often had poor attitudes and long waiting times (Hall and Malahleha, 1989). In a longitudinal study of the Lesotho cost-recovery initiative, Matji and colleagues (1993) examined the impact of user fees on utilization at health centers and hospitals.

They used analytical techniques that were quantitatively more rigorous than those of Waddington and Enyimayew. While the latter used graphs of summary statistics alone, Matji and colleagues used regression techniques to detect linear trends in service utilization. Trend lines were estimated, which regressed weekly utilization counts on a time sequence variable and a dummy variable indicating the onset of increased user fees. The authors found that the number of outpatient visits declined in government hospitals and government health centers following the introduction of charges, with limited evidence of substitution between government and private facilities in one of the two study districts. However, the authors noted that they were unable to attribute the trends in outpatient utilization to increased fees. Many possible confounders could account for the observed outcomes: declining morbidity, increased transportation costs, natural disasters inhibiting travel during the study period, a decline in the quality of care in government facilities, changes in the prices and quality of services provided by private facilities and the phasing out of a child feeding program, and changes in the accuracy and completeness of reporting by health units. In particular, the authors noted the inadequacy of information on changes in drug supply, training, and quality and number of personnel during the study period.

Findings from other major studies (Yoder, 1989) have been largely similar, though specific conclusions and potential confounders vary. In 1984, the government of Swaziland introduced a new fee structure for health services provided by the government and mission sectors. The primary objective was to equalize the fees charged by the two sectors that together provided the majority of modern services, while keeping net revenues neutral. Improving the quality of care was neither a policy objective nor a policy instrument. Equalization of fees was designed to increase access to health services and to increase the potential for a more integrated health service system between the government and mission sectors, particularly in terms of the patient referral and supervisory system. The fee equalization policy generally meant a 300-400 percent increase in the price of government-provided curative services with mission-sector fees remaining essentially the same. Fees for preventive services increased to the equivalent of U.S.\$0.90 for what had been essentially a free service for both government and mission services.

Yoder (1989) studied the utilization effects of the nationwide increase in user fees on three levels: (a) total service utilization; (b) types of services most affected, and (c) changes in utilization by higher paying and lower paying groups. To eliminate nonprice influences on utilization that could occur in a single month, average attendance over a three-month period was used. Mean attendance during the first three months of the new equalized fee structure was compared with the three-month average attendance for the same three-month period in the previous year under the old unequal fee structure. These data were disaggregated by mission and government sectors, as well as by the combined totals. To check the durability of observed trends, a follow-up study was conducted one year after the new fee structure was introduced. Using data from a 71 percent sample of 35 government facilities and 20 mission health facilities, Yoder found that average attendance decreased at government facilities by 32.4 percent, increased at mission facilities by 10.2 percent, leading to a combined decline of approximately 17 percent.

There were several limitations to conclusions that might be drawn from Yoder's findings. The sample was nonrandom and there was no control group. Furthermore, the facilities in the original study were not all the same as those used in the follow-up study. Since the utilization data were service based rather than population based, changes in patterns of service utilization could hardly be attributed to user fees. Yoder, therefore, constructed a model of how people's choices of health care providers changed and possible reasons for these choices. The model hypothesized that decreases in use would be mainly attributable to people who, prior to the fee change, chose the least costly source of health care (the nearest government facility) because they have the lowest incomes and are consequently the ones who could least afford a fee increase. The analysis suggested that up to 34 percent of the overall decline in attendance was among patients who had paid the least for health care, with part of this decline including fewer multiple visits. Though possible, it could not be firmly concluded that the entire 34 percent decline was due to reasons of unaffordability, nor could it be stated with certainty that 17 percent fewer people were using the modern health system. The main conclusion was that there were 17 percent fewer visits.

In the Kindu Rural Health Zone of Zaire, fees were increased by a substantial amount in 1986. Following this increase the utilization of public services that were subject to fees declined, while the utilization of other public services increased (de Bethune et al., 1990). The authors suggested that health services were considered by the consumers as any other market good and that there existed some price elasticity of demand for curative and preventive services. However, the authors acknowledged that several confounders could limit the extent to which service utilization patterns were attributable, if at all, to fee increases. These included geographical accessibility, quality of service, changes in the competing segments of the local health care market, and data errors.

2.2 SUMMARY

In summary, facility-based longitudinal studies typically examined utilization of public facilities, though Matji and colleagues (1993) included the examination of shifts in service

utilization between the public and private sectors. These studies focused on the effects of changes in user fees on service utilization as an indirect assessment of willingness to pay. Rigorous examination of the effects of quality of care on utilization was not a central theme of these studies. Only Waddington and Enyimayew (1990) attempted to explain service utilization patterns in terms of quality of care. However their use of qualitative methods (focus groups) did not provide conclusive evidence that quality of care affected service utilization. Service utilization was examined in terms of total utilization and disaggregation by sociodemographic categories of interest, such as age groups, sex, and urban or rural residence. Facility-based utilization studies often had no data to classify patients by economic status, proxied by income and/or total expenditure for a given period of time.

Perhaps the greatest advantages of facility-based studies are the ease of data collection and lower resource requirements, relative to cross-sectional demand and experimental studies. However, facility studies conducted to date are limited by lack of control groups and by major confounders. Therefore, it is not possible to attribute changes in service utilization to the introduction of increases in user fees alone. The major confounders may be classified into three groups: (a) contextual factors, (b) client factors, and (c) provider factors. Contextual factors are those in the environment that limit accessibility and/or utilization of facility-based services. They include natural disasters, transient political upheavals and economic recession. Client factors include income, gender, age, religion, and literacy. Provider factors include the quality of services provided and changes in competing segments of the local health care market, as well as changes in accuracy and completeness of data collection systems. Methodological improvements are required, including the use of appropriate control groups and the elimination of confounding factors, which limit inferences that may be made from facility-based studies. If no control groups exist, pre- and postcensus or household data may be useful. The census data should contain the same types of data available from facilities. It will be important to determine to what extent facility users are representative of the population as a whole.

3.0 HEALTH CARE DEMAND STUDIES AND THE QUALITY OF CARE

In developing countries, poor economic trends and budget cuts in the health sector have forced policymakers to consider alternative sources of funding for health activities (e.g., the imposition of user fees). Much of the research in health economics has attempted to estimate the importance of financial factors—such as time price, cash price, travel price, and income—in influencing patient choice of provider type (e.g., public, private, mission, traditional). While focusing on financial determinants of choice, health care demand studies have also examined other factors, such as the quality of services, seasonality and patient and household sociodemographic characteristics. Although, the multivariate approach used in econometric health care demand studies resolves many of the weaknesses faced by facility-based studies, it is limited in the extent to which it can examine specific attributes of quality of health care.

Extensive reviews of health care demand studies for developing countries already exist (Bitran, 1988; Creese, 1991). This report extends the previous literature by taking a closer look at how the particular issue of quality of health care is addressed. The discussion builds on the framework and updates the findings presented in Wouters (1991, 1992).

Many health care demand studies recognize that health care services are valued for their contribution to health rather than for something in and of themselves. Health care services, in combination with several intermediate (proximate) determinants of health such as environmental sanitation and nutrition, have a direct influence on health. With this approach, the demand for health care, otherwise known as the "derived demand for health care," depends on the "health" production technology (Wouters, 1992). (Wouters [1992] provides a critical analysis of the empirical attempts to estimate the "derived demand" for health.) Bitran (1988) represents the general model as follows:

Objective:

Utility of individual X is a function of:
(health status of X, consumption of nonhealth goods by X)

Health Production Function:

Health status of X is a function of:
(age X, sex X, nutrition X, education X, consumption of health services)

Budget Constraint:

Household Income (Amount of nonhealth goods × price of nonhealth goods)
+ (Amount of health goods × price of health goods)

The individual's consumption choice is to maximize his or her utility subject to the health production technology and the budget constraint. This decision rule implies that individuals want value for their money. What do patients value in a health care provider? Is it technical competency, a pleasant and friendly atmosphere, accessibility, or other attributes? Creese (1991) makes the general observation that econometric health care demand studies are

still in their relative infancy in how they model the importance of user perceptions of quality of care as an influence on service use.

Two general categories of demand studies exist: (a) those that estimate parametric functions of unobservable quality, and (b) those that estimate coefficients for observable proxies of quality. The first category can only imply that quality plays a role in utilization. The specific role of quality cannot be distinguished from other unobservable variables. The second category can identify whether specific dimensions of quality influence utilization patterns.

Selected health care demand studies are reviewed below in terms of what is known about the effects of quality on health care use. Studies that do not have data to proxy quality are briefly discussed first (Bitran, 1989a, 1989b; Gertler et al., 1988; Mwabu, 1984). Studies that include observable measures of quality are examined next (Akin et al. 1981, 1986a, 1986b; Denton et al., 1991; Heller, 1982). More recent studies are beginning to pay particular attention to how to deal with multidimensional aspects of quality (Ellis and Mwabu, 1991; Lavy and Germain, 1993; Mwabu, et al., 1993). A summary of the quality attributes used is given in Exhibit 3.1.

3.1 DEMAND: UNOBSERVABLE QUALITY

For those studies where data on quality were not available, various methods were used to capture its effect. Mwabu (1984) and Mwabu and Mwangi (1986) used provider-specific dummy variables to capture the effects of unobservable provider attributes as perceived by the patient. Some of these unobservable attributes might relate to quality, but not necessarily. The clinic-specific constants were constructed by interacting patients' preferences with each of the classes of health providers. Mwabu found that these dummies greatly increased the explanatory power of the model. Patients appeared to place a lower value on traditional type of treatment than they placed on the treatment given by any of the other types of facilities. Mission clinics were the most preferred class of providers. Mwabu stated that since mission clinics did not have the shortage of drugs faced by other types of clinics, this empirical result was probably capturing drug availability. Using the preference dummy variables, Mwabu ranked facilities on the basis of patient preference as follows: mission clinics, government hospitals, private clinics, government clinics, pharmacies, and traditional healers. He claimed that this ranking is consistent with a ranking that one would obtain based on facility capacity to treat a range of illnesses and reliability of drug supply. Through simulations using the results of these health care demand estimations, he found that user fees could generate welfare gains if they were used to improve the quality of medical services (Mwabu and Mwangi, 1986).

EXHIBIT 3.1
SELECTED HEALTH CARE DEMAND STUDIES: CAPTURING THE QUALITY OF CARE¹

Study	Measures of Quality
<i>Observed Quality</i>	
Akin et al. (1981)	▲ measures not available
Akin et al. (1986a)	▲ Modern ▲ △ Type of attending practitioner ▲ Traditional ▲ △ Treatment of any of 5 common illnesses
Akin et al. (1986b)	▲ Satisfaction with health services
Denton et al. (1991)	▲ Physical condition of facility ▲ Percentage of year drugs are available ▲ Operational costs per capita ▲ Functioning X-ray machines & labs ▲ Support personnel + RN per capita ▲ MDs per capita
Ellis and Mwabu (1991)	▲ Single score based on principal components of 13 facility measures
Heller (1982)	▲ Probability of seeing a physician ▲ Expenditure on health care per capita
Lavy and Germain (1993)	▲ Availability of essential drugs ▲ No. of nurses and MDs ▲ Provision of basic adult and child health services ▲ Availability of electricity and running water
Mwabu et al. (1993)	▲ No. of different types of drugs available ▲ No. of days in last 180 days antimalarials are out of stock ▲ No. of days in last 180 days aspirin is out of stock ▲ No. of health workers in a facility
<i>Unobserved Quality</i>	
Bitran (1989a,1989b), Gertler et al. (1988)	▲ Unobservable quality captured by parametric function of observable determinants and provider-specific coefficients
Mwabu (1984), Mwabu and Mwangi (1986)	▲ Provider-specific dummy variable

Quality of care attributes not including time price, distance, cash price, waiting time, and other measures of accessibility.

In the Gertler et al. (1988) and Bitran (1989a, 1989b) studies, quality was also unobservable. Quality was included as a parametric function of its observable determinants, which include patient sociodemographic characteristics. Provider-specific coefficients created provider-specific intercepts, which allowed for a certain core dimension of quality to vary by alternative. In addition, slope coefficients reflected how the provider's quality varied by each sociodemographic characteristic. In other words, when individual and observable provider characteristics were the same, the only factors that accounted for differences in predicted demand for the types of providers were the coefficients associated with individual characteristics that vary by provider and the different provider-specific constant terms. These coefficients were said to capture people's perceptions of the quality of care among facilities. In Gertler's work in the Ivory Coast, the intercept turned out not to be significant. In Zaire, Bitran interpreted the provider-specific constant term to show that health centers were viewed as being of higher quality, followed by private dispensaries and then pharmacies. In the Dominican Republic, the quality of private health services was perceived to be higher. In both studies, the remaining coefficients suggested that quality perceptions vary between individuals of different sociodemographic groups.

3.2 DEMAND: OBSERVABLE QUALITY

The study of Ogun State, Nigeria, used facility operational costs per capita, observed physical condition of the facility, percentage of year drugs are available, number of functioning X-ray machines and labs, number of support personnel and nurses per capita, and doctors per capita to proxy quality of care (Denton et al., 1991). Of all of these proxies, three were significant: facility operational costs per capita, observed physical condition of facility, and percentage of year drugs are available at the facility. The results of the multinomial probit estimation were then used to simulate probabilities of choosing public care, private care, or self-treatment. When public and private operational expenditures per person were simulated to double, patients moved, to a limited degree, from self-care into public care, with no change in private care usage. If only the public-sector operational expenditures doubled, patients would shift from the private to the public sector. Improvements in drug availability elicited large responses in use. Full availability of drugs in both the public and private sectors induced patients to move in substantial proportions from self-care and the private sector to public care. Improvements in building conditions also increased public-sector usage but not by much. Interestingly, if the quality of the public sector improved to nearly match the private sector at the same time that all prices doubled, the probability of self-care and private care dropped while the probability of using public care increased.

Akin and his colleagues (1981, 1986a, 1986b) explored price and quality trade-offs to some extent in three studies of the Philippines. In the study of demand for primary health care services (outpatient, prenatal, obstetric, well-baby, and immunization), quality was defined by whether or not a physician attended the patient (Akin et al., 1986b). For a traditional practitioner, the quality variable was a dummy variable for whether he or she treated any of the five common illnesses cited in the survey. The authors

found, counter to their expectations, that for adult outpatients, the quality variables were statistically insignificant. They did observe a strong movement of patients toward private physicians for more serious illnesses, which they interpreted as a quality phenomenon. They concluded that patients in the Bicol Region considered more the orientation of the facility (modern versus traditional) and type of facility (private versus public) than the type of attending practitioner.

In the two other studies of the Philippines, Akin and colleagues (1981, 1986a) were unable to control for quality of care, but they interpreted their results with quality of care issues in mind. In the analysis of child health services, they inferred from the variable for mother's education that modern public, traditional services and self-treatment were considered to be of lower quality than modern private-sector treatment by the more educated people. In the study of adult outpatient services, they included some measure of satisfaction with health services, but they did not define it nor did they interpret it as a measure for quality. It turned out not to be significant. Akin and colleagues recognized how the omission of a proxy for quality could confound the price variable; the apparent insensitivity to price might be at least partially caused by the willingness of individuals to pay more for higher quality care.

In an earlier work, Heller (1982) proxied quality by creating variables that identified the type of provider the patient expected to see based on previous visits. These included the probability of seeing a physician during an outpatient visit, the probability of seeing a physician during a private outpatient visit, and the probability of seeing a physician during a government outpatient visit. Heller found that the likelihood of being seen by a physician had only a statistically insignificant effect on total usage of outpatient care. However, households did respond significantly to a higher probability of care from a physician rather than a paramedic in their choice between public and private clinics.

In a more recent study, Mwabu, Ainsworth, and Nyamete (1993) paid particular attention to the difficulties of examining the effects of quality improvements on utilization patterns using nonexperimental cross-sectional data. The typical expectation was that an improvement in some aspects of quality would increase demand, either by attracting new users or by increasing the number of visits by existing users. However, the coefficients on the quality variables could be biased by three types of endogeneity problems. First, although individuals might have demanded higher quality services, utilization could appear to decrease with improved quality if quality improvements were effective in treating illnesses, thus reducing overall population morbidity in the long run. Second, variables measuring observed quality (especially if measured as stocks of supplies) were actually capturing both supply and demand behavior. If demand was high such that stocks were quickly depleted, the coefficients would imply that individuals preferred low-quality facilities. Third, quality measures were not exogenous if they were collected from respondents who actually chose the service in question. Self-selection was a problem.

Their study of a Kenyan rural health district looked at treatment-related facility measures of quality including the availability of a variety of drugs and diagnostic equipment.

Because of the small sample size and difficulties with multicollinearity, only a limited number of quality variables could be used in the estimations. The results indicated that their measures of quality improvements had significant negative and positive effects on demand. Demand was lower for facilities that had no aspirin, but higher for facilities with antimalarial drug shortages. The interpretation was that the high demand for antimalarials actually led to shortages (excess demand). They also found that the probability of a visit to a public facility was most sensitive and positively related to the availability of a broad number of drugs.

The quality attributes were interacted with gender variables to investigate gender-specific quality preferences that affect utilization. The absence of antimalarials was associated with higher demand, especially if the patient was male. Men might have had a higher demand for antimalarial drugs, but facilities could not keep sufficient supplies in stock. Including such interaction terms was an important first step in understanding the distributional impacts of quality improvements. Further research is needed to look at differences among income groups and other vulnerable populations.

The authors acknowledged the difficulty of disentangling the demand effects of quality improvements from offsetting supply constraints and health effects over time. They suggested that experimental design, in which inputs are exogenously varied by researchers, might be the most promising way to isolate the demand effects of specific quality improvements. Examples of such field studies currently under way include the USAID HFS cost recovery experiment in Niger and the World Bank Indonesian Resource Mobilization Study (World Bank 1993a).

In another study of Kenya (with data from another district), Ellis and Mwabu (1991) examined relationships between willingness to pay and quality using 13 measures of physical attributes of the facility that were available from the Kenyan Ministry of Health. These 13 measures were collapsed into an overall score of quality using principal components. The score or index explained 33.1 percent of the total variability in these measures. This approach to quality measures showed that the facility-level quality index strongly influenced the choice of provider and that consumers were willing to pay significantly more for higher quality services. Simulations were also used to generate nonwelfare-neutral measures of willingness to pay for quality improvements. For a typical individual (estimated using variable means), willingness to pay was about 19.1 KShs per visit (average treatment cost for full sample of facilities is 29.7 KShs) if government dispensaries were upgraded to have the same quality index as government health centers). This adds further support to the importance of quality in influencing health care utilization patterns; however, the aggregate measure of quality does not allow one to determine preferences for specific dimensions of quality.

Lavy and Quigley (1993) attempted to measure specific quality improvements that "can pay for themselves" with increased user fees. The Ghanaian study measured directly the quality of the various options available to the consumer: infrastructure (beds, vehicles, laboratory, operating room, etc.), personnel (number of doctors, nurses, medical assistants, etc.), and availability of health services and drugs (number of hours open per week, type of

services provided, stocks of 16 types of drugs). As in other studies problems with multicollinearity forced the authors to group quality variables into five measures of quality: availability of essential drugs (mean availability of ampicillin, chloroquine, paracetamol), number of medical staff (nurses and doctors), provision of basic adult and child health services (measured by the availability of a functioning laboratory, ability to vaccinate children, and the ability to provide prenatal, postnatal and child growth), the availability of electricity, and the availability of running water.

All of the quality factors had significant and large positive effects, both as individual variables and jointly, although the authors noted cautiously that the quality variables might be capturing both supply and demand effects. The coefficient on the quality variable reflected the net effect. When quality variables were omitted from the equation, the coefficients on the price variables were smaller. Elasticities of probability of choice in response to quality improvements suggested that preferences for improvement in drug availability were the largest. Improving infrastructure resulted in the least impact on probability of use. These elasticity measures are difficult to interpret since incremental changes in quality variables are hard to quantify in meaningful terms. Simulations using the estimated multinomial logit coefficients showed that when quality was improved in both the private and the public sectors, the relative changes in both sectors were about the same.

A unique aspect of the Ghana study was the attempt to specifically estimate the willingness to pay using measures of compensating variation: welfare-neutral estimates of willingness to pay (the amount of income individuals are willing to give up to remain at the original level of satisfaction). Compensating variation is a function of the utilities before and after the change and the marginal utility of income. Most previous studies focused on estimating price elasticity rather than on generating actual estimates of willingness to pay. Willingness to pay was measured as the incremental amount of income necessary to keep the individual at least as well off (constant utility) after the improvement as before. Simulations were based on estimated probabilities of use for a typical individual (variable means). Also, willingness-to-pay figures for typical individuals in three different income groups (sample mean, plus one standard deviation, minus one standard deviation) were calculated. Willingness to pay was expressed as a percentage of income, rather than in absolute terms. The results indicated that the willingness to pay (holding utility constant) increased with income, no matter what the scenario. However, the income effect was more important for the quality variables (infrastructure, drug availability, services, and personnel) than for distance or price. The willingness to pay, expressed as a percentage of income, increased as income increased. The authors concluded that the richest were more concerned with quality of health services than its costs (price or distance). Willingness to pay was highest for travel, then drug availability, and lowest for building infrastructure.

3.3 SUMMARY

The findings of these health care demand studies all strongly suggest that quality of health care is an important factor in choosing a health care provider and that patients are willing to

pay for improvements in quality. Most of the studies indicated that the strongest preference was for the availability of drugs, both in amounts and types of essential drugs. Preferences for building infrastructure and type of health providers were weaker, but apparent.

Investigations of demand patterns—in this case, patient choice of type of provider—should include patient and not provider perceptions of quality. However, most studies measured quality using only structural attributes (the most easily collectable quality data) without careful investigation as to whether these were appropriate or complete measures of what patients were looking for. Perceptions of process or outcome measures of quality are almost totally lacking in health care demand studies. Further investigation of patient perceptions of quality is merited.

Little has been done to investigate the distributional aspects of quality improvements. The most recent study of Kenya tested gender-specific effects of quality attributes (Mwabu et al., 1993). The results implied higher demand for antimalarials by men. The Lavy and Quigley (1993) study looked at welfare-neutral willingness to pay for three different income groups. The results indicated that willingness to pay (as measured by percentage of income) increased with income. The income effect was more important for the quality variables (infrastructure, drug availability, services, and personnel) than for distance or price. The authors concluded that the richest are more concerned with quality of health services than its costs (price or distance).

These findings lend mixed support to an increasingly posited hypothesis that user fees could be a source of welfare transfers if fees are based on ability to pay and are channeled into improvements in service quality and accessibility (Creese, 1991). Anecdotal evidence suggests that quality improvements, especially improved drug supplies, might be more important to the poor. What remains to be done is to understand how preferences and willingness to pay for various types of quality improvements differ over income groups, gender groups, and other vulnerable groups (i.e., children under five).

The more recent health care demand studies paid particular attention to measurement problems associated with quality variables, especially in the analysis of nonexperimental static cross-sectional studies. The coefficients on the quality variables could be biased for a variety of problems related to endogeneity. First, quality improvements might actually affect health outcomes, reducing population morbidity. If so, demand for health care services would drop in future periods. Second, observed quality reflected both supply and demand conditions. An estimated negative relationship between probability of use of a provider and the quality attribute of the provider might simply reflect excess demand rather than the counterintuitive behavior that individuals do not prefer better quality. Third, data on quality should be exogenous indicators of quality. Data collected solely from patients who actually use the facility are hampered by selection bias.

Other data problems encountered in these cross-sectional studies were the small sample sizes of facilities and multicollinearity of various indicators of quality. Typically, the

solution has been to use aggregate measures of quality or omit more detailed measures of quality. This greatly limits one's ability to look at willingness to pay for specific dimensions of quality, the information most pertinent to health care managers.

Some health care demand studies have attempted to measure elasticities of demand with respect to quality improvements, where demand is measured in terms of probabilities of choosing a given provider. These elasticity measures should be interpreted with caution since it is difficult to quantify incremental changes in quality, especially in a manner that can be compared across quality attributes. Is a 10 percent improvement in drug availability comparable to a 10 percent improvement in building conditions or provider knowledge?

Finally, one of the most recent health care demand studies attempted to go beyond traditional estimates of price elasticities of demand to estimate willingness to pay (at constant utility). The interest here was to generate actual price levels for various quality improvements. However, one should use these estimated price levels with caution. They were based on simulations using the discrete choice empirical results where quality was typically measured in an aggregate form and coefficients were potentially biased due to endogeneity problems. As we will see in a later section, compensating variation can also be measured through contingent valuation surveys. Such surveys can elicit information on more specific aspects of quality, but only in a hypothetical scenario.

4.0 HEDONIC PRICES AND THE QUALITY OF HEALTH CARE

In contrast to health care demand studies, hedonic prices look more closely at willingness to pay (WTP) for specific attributes of a product or a service, some of which may pertain to quality. The basic premise underlying hedonic pricing studies is that goods and services are valued for their utility-bearing attributes (Rosen, 1974). Hedonic pricing studies look at the markets for goods that can be completely described as bundles of several objectively measured characteristics. Hedonic prices are the implicit prices of product attributes. They are revealed to individuals through observation of actual market prices and the specific amounts of service attributes associated with those prices. The goal of hedonic studies is to estimate demand and supply functions for product attributes. For example, market researchers have used hedonic pricing methods to identify market segments for their products; in particular, they are interested in the WTP for various attributes of a specific good and whether the WTP varies among types of consumers as described by sociodemographic and economic characteristics. This is similar to the question posed by health care financing policymakers who want to know the WTP for different types of improvement in the quality of health care services; however, the application of hedonic pricing techniques to health care services is almost nonexistent.

Hedonic pricing studies fall in the group of observed/indirect methods for estimating consumer valuations of goods and services (Mitchell and Carson, 1989). They rely on data from actual market situations; however, for the most part, they can only infer preferences for the product attribute under consideration from consumer choices about *related* product characteristics. Hedonic pricing studies have often been used to corroborate the results of contingent valuation studies that fall within the group of hypothetical/direct methods for estimating consumer valuation of goods and services (Brookshire et al., 1982). Because neither type of study is an observed and direct assessment of consumer valuations, they cannot be used as a means of internal validation (Mitchell and Carson, 1989).

This section gives a brief review of hedonic pricing techniques and discusses their potential application in estimating WTP for quality improvements to support cost-recovery initiatives. First, Rosen's theoretical model is summarized. Then, key assumptions and estimation techniques are discussed in terms of their applicability to the health care service market in developing countries.

4.1 ROSEN'S HEDONIC PRICING MODEL: AN OVERVIEW

The Rosen model consists of three major components: the consumption decision, the production decision, and the equilibrium solution. This is built on the work of Lancaster (1966), which focused on consumer behavior. Rosen introduces a market between buyers and sellers of the service or good in question.

The consumer is viewed as choosing a bundle of characteristics, z_1, z_2, \dots, z_n , and a quantity of all other goods, Y , so that maximum utility given a budget constraint is obtained. This is shown in equations (4.1) and (4.2):

$$(4.1) \quad \text{Maximize } U(z_1, z_2, \dots, z_n, Y)$$

$$(4.2) \quad \text{subject to } P(z_1, z_2, \dots, z_n) + Y = K$$

In these equations, U is the consumer's utility function, P is the price of each alternative bundle of characteristics, K is the consumer's income, and Y is the aggregate of other goods, measured in dollars. The solution of the consumer problem yields the traditional first-order conditions, where the ratios of the marginal utilities of each pair of characteristics must be equal to the ratios of their marginal prices. Note that marginal prices pertain to the additional amount the consumer has to pay for an additional unit of a given characteristic.

As profit maximizers, the firm's behavior is shown in equation (4.3).

$$(4.3) \quad \text{Maximize profits} = MP(z_1, z_2, \dots, z_n) - C(M, z_1, z_2, \dots, z_n).$$

M is the number of units produced, P is the market price of each alternative bundle of characteristics, and C is the total cost of M bundles of given attributes. Typical first-order conditions hold where the marginal revenue product of each characteristic equals marginal cost of adding an incremental amount of the given characteristic into the good.

Under perfect competition, the consumer and producer arrive at an equilibrium set of prices and product attributes. The hedonic price equation (4.4) traces out the equilibriums, or market clearing conditions between price and product attributes:

$$(4.4) \quad P(z_1, z_2, \dots, z_n)$$

To estimate the price vector, there must be ample variation in the attributes of a product or service (a spectrum of the product or service, nonhomogeneous good). Variation in the characteristics of the product allows one to measure marginal utilities of each attribute. Using the price associated with each "package of attributes," one can derive the marginal price for each attribute.

Estimating the demand or WTP for various service or product attributes requires a multistep process. The hedonic price equation (4.4) maps equilibrium points between supply and demand. Separate supply and demand functions are not directly available. Cross-sectional data describing market transactions map out the various points of intersection between supply and demand. This is similar to the problem of endogeneity for quality attributes found in cross-sectional data sets used by most health care demand studies (Levy and Germain, 1993; Mwabu et al., 1993). Given assumed functional forms for the demand and supply equations and also certain exogenous variables to which supply and demand equations can be related, it is possible to trace out the supply and demand functions for the various market attributes. Of particular interest for applications to cost recovery is that exogenous variables for estimation of the demand curve could include various patient characteristics of interest (income, age, gender, etc.). The estimation results would generate a picture of market segmentation for specific service attributes. Ultimately, the coefficients can be used to generate the elasticity of prices with respect to characteristics.

4.2 APPLICATIONS TO DEVELOPING COUNTRIES

Assumptions underlying the Rosen model and its estimation techniques may prove problematic for application to the developing-country context. The model assumes that producers are perfectly competitive in that they cannot affect the going market price of a commodity. This includes no entry restrictions, no economies of scale in producing marginal amounts of the good or service. Frequently, such assumptions may not hold in the case of a developing country.

Competition by consumers also exists. They shop around, comparing prices of brands of goods or services with different characteristics. The price vector gives the minimum price of any package of characteristics. If two brands offer the same bundle, but sell for different prices, consumers only consider the less expensive one. Rosen assumes that consumers have complete information on product or service attributes such that they agree on the set of attributes being evaluated and they are able to recognize and agree on the objective amount of characteristics embodied in each good. Subjective valuations of attributes can differ. In a developing country where consumer education about health care services is quite limited, assumptions of complete information may be unreasonable. Consumers are often not well informed about all of the price and quality attributes available to them.

The Rosen model assumes that the attributes of goods are available on a continuum. The model breaks down if attributes are available only on a yes-no basis; marginality does not hold (Agarwal and Ratchford, 1980). Without continuous product attributes, one would have to resort to the linear programming methods used by Lancaster (1966); however, the Lancaster model does not work out the properties of market equilibrium as done by Rosen.

Satisfying the requirement that all attributes of the hedonic price equation be measured on a continuum is likely to be difficult. The implication is that a sufficiently large number of differentiated products or services are available so that choice among various combinations of quality attributes is continuous for all practical purposes (Rosen, 1974). Many of the quality attributes included in health care demand studies in developing countries are included as limited discrete variables (i.e., building condition—good, fair, poor; presence of a physician; availability of functioning X-ray machines; availability of electricity and running water). For other health service attributes, measurement using a continuous variable is more reasonable (i.e., percentage of the year drugs are available, number of essential drugs available).

A related problem with the empirical analysis of quality attributes is that of multicollinearity. Frequently, hedonic studies have encountered multicollinearity between several product or service attributes. Ultimately, some quality attributes will have to be dropped or aggregated to deal with this problem.

Hedonic pricing techniques have been used to a very limited extent for health services in developing countries. In contrast to typical hedonic studies that estimate marginal prices of

increments in product attributes, a health care demand study in Peru borrowed from hedonic techniques to generate a predictive model of private provider prices (Gertler et al., 1988). In particular, the purpose was to generate a complete set of prices for all private provider options available to a patient from the subset of prices from those private providers actually chosen. Prices of private doctors, hospitals, and clinics were estimated as a function of patient age, patient illness, region, number of doctors in the district, number of hospital beds in the district, number of clinics in the district, and district population.

4.3 SUMMARY

It appears unlikely that hedonic pricing methods can be used to determine the willingness to pay for selected health service quality improvements in developing countries. The assumptions underlying this approach are quite strong and may be unreasonable for many developing-country settings. This includes perfect competition for both providers and consumers, complete knowledge about types of attributes and their objective measures, measurement of product characteristics on a continuum, profit maximization for providers, and ability to measure quality attributes in objective terms. The data requirements of hedonic studies are quite substantial since all relevant service characteristics should be controlled for.

5.0 CONTINGENT VALUATION SURVEYS—WILLINGNESS TO PAY (WTP) FOR QUALITY

Contingent valuation (CV) studies attempt to directly elicit revealed preferences or willingness to pay (WTP) from respondents by describing a hypothetical market that is as close to actual market conditions as possible. CV studies involve *direct observation of WTP in a hypothetical market*. Contingent valuation studies are most frequently compared with hedonic pricing studies and travel cost studies that involve *indirect observation of WTP in actual markets*. In particular, these latter studies observe consumer price behavior under actual market conditions for services or commodities which are *similar but not identical* to the new or changed service or commodity under consideration. WTP for new services or commodities is *inferred* from observations of pricing behaviors for existing related products. Since neither approach generates actual WTP for the new service or commodity under actual market conditions, they cannot be used as an ultimate test of internal (criterion) validity. Another related method is contingent ranking in which attitudes (rather than direct WTP) about the new service or commodity are determined. This involves *indirect observation of WTP in a hypothetical market*. This method is an even weaker test for the internal validity of CV studies.

This section introduces contingent valuation methods and reviews the empirical literature. The section begins with a short description of the method and a brief explanation of the theoretical basis for CV studies. Because the method is relatively new in applications to developing countries, more detail is given about key issues in study design. The sections on concepts and methods provide the background necessary for the final section, which gives a review of selected empirical applications of contingent valuation in the context of health.

5.1 THE METHOD IN BRIEF

The contingent valuation survey is a relatively new technique for the valuation of goods that are typically not traded or not yet available in the private market. The ultimate aim of a contingent valuation survey is to obtain an accurate estimate of the benefits (costs) of a change in the provision of some public, or quasi-public good. CV can be applied to private goods, but it is rarely used for them since the market usually generates price information on their value. This technique measures an individual's willingness to pay in monetary amounts for the good in question.

The results of this method are "contingent" upon the particular hypothetical market described to the respondent of the survey. The key assumption is that individual responses to hypothetical markets are comparable with individual responses to actual markets—an assumption that is often challenged; many believe that hypothetical responses are poor predictors of behavior.

Contingent valuation analysis has frequently been used to estimate marginal benefits for cost-benefit analysis of interventions such as improved freshwater quality, transportation safety, and introduction of new services (Cummings et al., 1986; Mitchell and Carson, 1989), but only rarely has it been used in the evaluation of health services (Acton, 1973; Thompson, 1986).

Applications to environmental issues are quite frequent in light of their public-good nature. Some applications to health care are reviewed below.

The contingent valuation method involves asking individuals in a survey setting to reveal their preferences in monetary terms for incremental changes in a service or commodity that is typically not traded in private markets. The survey carefully describes a hypothetical market to the individual. This description (a) identifies the baseline level of satisfaction (i.e., usually in terms of their current income level); (b) defines property rights (i.e., public, quasi-public, private); (c) specifies the good or service in terms of what it is, how long it will be available, and the baseline level of provision; (d) characterizes the structure under which the good or service is to be made available; (e) identifies the range of available substitutes; and (f) clarifies the method of payment (user fee, tax). The monetary valuations given by respondents should reflect the consumer's maximum willingness to pay, not his or her perception of a "fair price." The survey usually ends with data collection on the respondents sociodemographic and economic characteristics.

5.2 THEORETICAL BASIS

The theoretical underpinnings of contingent valuation come from basic welfare economics. It will be shown that contingent valuation reflects Hicksian compensating and/or equivalent measures of welfare (Mitchell and Carson, 1989).

A foundational element of welfare economics is the Pareto criterion that states that policy changes that make at least one person better off without making anyone worse off are Pareto-improving and should be undertaken. Cost-benefit analysis applies this criterion by attempting to place a monetary value on gains and losses to those affected by the policy change such that one can calculate the net gain or loss and determine whether or not it is Pareto-improving. (Cost-benefit analysis shows when winners can compensate the losers, but does not imply that this Pareto transfer will actually take place.)

The traditional measure of consumer benefits in welfare economics is consumer surplus, the area under the ordinary (Marshallian) demand curve. However, a well-known problem with this approach is that the Marshallian consumer surplus does not hold the level of utility or satisfaction constant; instead, income is held constant. In contrast, the Hicksian demand curve expresses the relationship between willingness to pay and quantity while holding utility constant. The Hicksian or compensated demand curve answers the question: How much compensation is needed to make the consumer as well off as before (remains at utility level, u^0) when the price (p) rises from p^0 to p^1 , all other things remaining constant (quality remains at q^0)? Two related concepts—compensating variation and equivalent variation—are defined below (Layard and Walters, 1978). Compensating variation focuses on the original utility level; equivalent variation focuses on the final utility level. (Variation measures are different from surplus measures in that variation measures are used whenever the consumer is free to vary the quantity of the good considered. Surplus measures require the consumer to buy a constrained amount of the particular good.) The expenditure function (E , the minimum amount of income required

to maintain a given utility given prices and quantities) can be used to demonstrate these concepts as shown in the equations following each definition.

Compensating variation (cv) is defined as the amount of money we can give to or take from an individual after an economic change, while leaving the individual as well off as he or she was before. For a welfare gain, it is the amount he or she would be willing to pay for the change (e.g., how much would one pay for a quality improvement). For a welfare loss, it is minus the amount he or she would need to receive as compensation for the change. An increase in user fees is demonstrated in equation (5.1):

$$(5.1) \quad cv = E(p^0, u^0) - E(p^1, u^0)$$

Equivalent variation (ev) is the amount of money we would need to give an individual, if an economic change did not happen, to make him or her as well off as if it did. For a welfare gain, it is the compensation an individual would need to forgo the change (e.g., the price discount offered to sell a "scratched or bent" good rather than one in perfect condition). For a welfare loss, it is the amount an individual would be willing to pay to avert the change. Equation (5.2) shows this concept for a change in user fees:

$$(5.2) \quad ev = E(p^0, u^1) - E(p^1, u^1)$$

Note that both *cv* and *ev* have the same sign as the direction of the change in welfare: for a welfare gain both are positive.

Contingent valuation studies that elicit information about willingness to pay for the introduction of various quality improvements are really measuring the difference between two expenditure functions or the compensating variation, as quality changes. Equation (5.1) can be rewritten as equation (5.3). If *cv* is positive, then q^1 is preferred to q^0 , and the consumer would be willing to pay up to the point where his or her utility level was the same as it was originally. Intuitively, this means that an individual achieves u^0 either through higher expenditures or higher quality. Improved quality compensates for lower expenditures such that u^0 is still achieved.

$$(5.3) \quad cv = WTP = E(q^0, p^0, u^0) - E(q^1, p^0, u^0)$$

The original utility curve is given by u^0 . The higher level of satisfaction achieved when quality is improved is given by u^1 . The minimum expenditure required to reach each of these levels of utility is identified by the point of tangency between the income line and the utility curve.

There is one other major theoretical point to consider before moving to key design issues: the question of aggregation both across persons and across various components of quality improvements. Typically, cost-benefit analysis requires aggregating benefits across all individuals to obtain a societal measure of benefits in order to invoke the Pareto decision rule. There is no clear weighting rule on how to do this. Similarly,

Mitchell and Carson (1989) show that independently measured benefits of various commodity attributes cannot generally be aggregated without some degree of double counting. Moreover, when benefits are measured sequentially in the same study, the order in which the subcategories are presented to respondents may influence the values ascribed to them.

5.3 KEY DESIGN ISSUES

Empirical methods to measure revealed preferences are challenging exercises. Conducting a contingent valuation survey is no exception. Six key questions should be addressed in designing a contingent valuation study.

- ▲ Should the survey be modeled on a public or quasi-public market structure?
- ▲ What type of elicitation method should be used?
- ▲ How can the survey minimize strategic behavior?
- ▲ Will the survey obtain meaningful responses?
- ▲ How valid are the results?
- ▲ How reliable are the results?

Each of these questions is discussed below. The discussion is derived heavily from Mitchell and Carson (1989).

5.3.1 Market Structure

The selection of the underlying approach for the survey really depends on the type of good in question. Some goods will never be provided in a market or quasi-market setting; therefore, the survey should more appropriately simulate a political market (i.e., a referendum) where individuals express preferences through voting. The private goods model is appropriate for those goods that could be offered in a quasi-private or private market. In this case, the survey would more closely simulate a market transaction.

5.3.2 Elicitation Method

In a private market model, there are four principal approaches to obtaining an individual's willingness to pay for the service or commodity in question: (a) bidding game, (b) payment card, (c) take-it-or-leave-it, and (d) take-it-or-leave-it-with-follow-up. The bidding game imitates an auction where the respondent is asked, in an iterative process, whether he or she is willing to pay a particular price for a good. The major drawback of this method is that the starting bid may bias responses. The payment card method is similar to the bidding process except that a visual aid, containing a range of prices is given to respondents. Benchmark prices for similar goods are sometimes indicated to provide the context. In this way, the response is not biased by a single starting bid; however, the bias is not totally eliminated since the range of prices and types of benchmarks chosen may influence WTP answers. The take-it-or-leave approach uses a large number of predetermined prices, randomly assigned to respondents, which form the basis of willingness to pay on an all-or-nothing basis.

The method is fairly simple for the respondent who makes a yes-no decision about the quoted price. A drawback of the take-it-or-leave approach requires a large number of observations to estimate WTP. Moreover, analysis of the results sometimes requires strong assumptions about the valuation function, the relationship between WTP and a series of independent variables. Finally, the take-it-or-leave-it-with-follow-up approach may reduce the number of observations required by the simpler take-it-or-leave-it version. In particular, depending upon the respondents answer to a quoted price, willingness to pay for other prices are solicited (higher prices if the answer is positive, lower prices if the answer is negative). Problems with selection of the valuation function still exist. In general, the trend has been to use variations of the take-it-or-leave-it elicitation method.

5.3.3 Strategic Behavior

In an attempt to have individuals reveal their preferences for selected goods or commodities, it is not always certain whether individuals will reveal their *true* preferences. Are individuals motivated to give false impressions? For example, respondents might be motivated to underbid their price if they believe that they will actually have to pay the amount they reveal, and believe that there is a good chance the good will be provided even if they understate their true WTP amount. This is the well-known problem of "free riding". On the other hand, respondents may "overpledge" if they believe they will *not* have to pay the amount they state, yet feel that the stated amount will influence provision of the service or commodity. Mitchell and Carson note that strategic behavior is a function of two factors: (a) the respondent's perceived payment obligation in relation to the revealed WTP, and (b) the respondent's expectation about the certainty of provision of the good. In combination, these factors generate six motivational states for strategic behavior:

- ▲ State 1 Respondent perceives that he or she will be *obligated to pay revealed WTP* and that the *provision of the good depends on revealed preferences*.
 - △ True WTP is revealed.
- ▲ State 2 Respondent perceives that he or she will be *obligated to pay revealed WTP* and that the *provision of the good is likely*, regardless of revealed preferences.
 - △ The free-rider motivation is strong; the respondent will tend to underbid.
- ▲ State 3 Respondent perceives that *obligation to pay is uncertain* and *provision of the good depends on revealed preferences*.
 - △ The motivation for strategic behavior is unclear.
- ▲ State 4 Respondent perceives that the *obligation to pay is uncertain* and the *provision of good is likely*, regardless of revealed preferences.

- △ The free-rider motivation is moderate and will tend to underbid.
- ▲ State 5 Respondent perceives that the *obligation to pay is a fixed amount* and the *provision of the good depends on revealed preferences*.
 - △ The over-pledging motivation is strong; the respondent will tend to overbid.
- ▲ State 6 Respondent perceives that the *obligation to pay is a fixed amount* and the *provision of the good is likely*.
 - △ The respondent will have little motivation to offer meaningful answer.

Contingent valuation studies tend to fall under state 3. Strategic behavior is not inevitable, but if certain precautions are not taken, it could become problematic.

5.3.4 Meaningful Responses

The challenge of contingent valuation surveys is to obtain true willingness-to-pay measures. In fact, respondents may provide careless responses, especially considering the hypothetical nature of the survey and the pressure to provide an answer within the short time of the interview. Several factors may contribute to obtaining more meaningful responses. If respondents are given a chance to say they do not know a response, they are less likely to feel pressured to give a meaningless answer. Also, the CV survey should make the scenario understandable, plausible, and as familiar to respondents as possible so that they can give meaningful answers in spite of their lack of experience with the good or service in question. The hypothetical description should correspond closely with the actual circumstances that may eventually occur. In the case of illness, it is often hard to create a realistic scenario of symptoms, severity, and accompanying emotions that would elicit a response true to actual behavior. The CV should elicit more information about intentions to pay, rather than beliefs and attitudes since experience shows that intentions are better predictors of behavior than beliefs or attitudes.

5.3.5 Validity

The validity of contingent valuation studies has and will continue to be a serious topic of debate. Many researchers question the internal validity of this approach. *Internal validity* pertains to whether one can infer that a relationship between two variables is causal or that the absence of a relationship implies the absence of a cause. Estimating the internal validity of a study is a deductive process whereby the investigator searches out threats to validity. There are several components to internal validity: content validity, criterion validity, and construct validity. *Content validity* (face validity) pertains to how well the survey explains the domain of the construct, WTP, such as the structure of the market and the description of the service or commodity. Content validity will determine how well respondents can offer meaningful responses. *Criterion validity* deals with whether the measure of the construct (WTP) is related to other

measures that may be regarded as criteria. This may provide the most important test of validity. A criterion of central importance to CV studies is the actual market price. *Construct validity* pertains to how well the WTP measure relates to other measures as predicted by theory. One dimension of construct validity is *convergent validity* which compares WTP with other measures of revealed preference. For example, results of CV studies might be compared with hedonic pricing and travel cost studies. The other dimension of construct validity is *theoretical validity*. This looks at whether findings are consistent with theoretical expectations (i.e., relationships between causal variables). WTP should be related to several independent variables, such as income and quantity consumed.

Probably the greatest threat to the validity of contingent valuation studies is content validity, creating a plausible hypothetical scenario. The best test of the internal validity of CV studies is likely to be through criterion validity; but, this requires the researcher to have a criterion that is closer to the theoretical construct of WTP than the revealed preferences from CV studies (i.e., actual prices). For example, in a quasi-public goods market, it may be possible to compare price behavior in identical markets in which the service or commodity in question was actually bought and sold.

5.3.6 Reliability

The final design issue concerns reliability. To what extent is the variance in the WTP amounts given by respondents predictable? Some of the variance in the WTP estimates will be due to the true randomness that exists in individuals' preferences. However, some of the randomness in the results may be caused by the instrument. If it is not designed correctly, a large proportion of respondents may generate meaningless answers. Without large sample sizes (600-1,500), CV studies are unlikely to generate reliable results because of the large variance in true WTP.

5.4 EMPIRICAL RESULTS

There are three major types of the contingent valuation empirical studies looking at health-related issues. The first group looks at valuation of health outcomes in terms of reduction in the risk of mortality and morbidity. The second group looks at the valuation of specific health services described by their structural and process attributes. The third major type of contingent valuation studies elicits WTP information for incremental changes in a specific process or structural attribute for a specific health service. Developing-country studies fall in the third group and focus on WTP for structural attributes. Some of this empirical literature is reviewed below. This review is not exhaustive, but instead attempts to outline major trends, issues, and themes.

Contingent valuation analysis has frequently been used in the application of cost-benefit analysis to health services as an alternative to the human capital approach for valuing benefits in monetary terms. The human capital approach is based on the cost of illness method that equates the value of additional life and losses due to morbidity with forgone earnings discounted to their present value. This method is limited in that it omits the costs of pain

and suffering, undervalues the illness of those who are not working or retired, and is subject to valuations emanating from market imperfections and unemployment. Moreover, the human capital approach is concerned with maximizing net output of society, while cost-benefit analysis should be directed toward the broader objective of welfare improvement based on individuals' preferences.

Some researchers suggest that WTP measures of health benefits are more appropriate than human capital measures since WTP incorporates those quantities and qualities that are difficult to measure, such as the individual's preference for risk aversion and valuation of pain and suffering. However, WTP measures have other limitations, such as being driven by existing patterns of income distribution. One could simulate the effect of different income distributions by assigning weights to different income groups, but this is likely to be extremely value-laden and controversial. Discussion of how to measure benefits is quite complex and beyond the scope of this report. The intention here is to provide an introduction for the application of contingent valuation methods.

5.4.1 WTP for Health Outcomes: Reductions in Risk of Mortality and Morbidity

Contingent valuation studies that look at willingness to pay for health outcomes for health services have measured outcome in terms of reducing the risks of mortality or morbidity associated with specific treatments (Acton, 1973; Thompson, 1986). Similar outcome measures have been used to assess the willingness to pay for reduced health risks associated with the use of various consumer goods such as cleaning products and automobiles (Magat et al., 1988; Muller and Reutzel, 1984).

Acton's (1973) study looked at how much people would pay (in the 1970s) for the availability of mobile coronary care units. The average response was a willingness to pay \$56 for a 0.002 chance that one's life would be saved in the next year, implying a value of life saved of \$28,000. Reviews of this study suggest that well over half of the respondents gave irrational responses (Fischer, 1979).

In the Thompson (1986) study, 247 patients with rheumatoid arthritis enrolled in a randomized control trial were asked about their willingness to pay money and to incur mortal risk to cure their disease. Subjects were asked to think about all the ways their arthritis affected their lives and their families. They were also told to assume that a complete cure for arthritis existed and that they would have to pay the full costs of receiving it if they chose it. Respondents were asked what percentage of their household income they would be willing to pay for this treatment. Thirty-one other independent variables were considered in the analysis covering various sociodemographic characteristics, medical history, other measures of health status, and other economic costs. The rate of plausible responses was substantially higher than previous studies. Thompson suggested that substantial improvements in questionnaire design (explanatory introductions, question repetition for confused respondents, opportunities to revise earlier answers) and performance of the interviewers accounted for improved response rates. The results indicated that both the likelihood of the response and the likelihood of plausible responses increased with the education of the respondent. Income

did not appear related to these WTP measures; however, personal investment measures (proxying accumulated wealth) were. Many of the alternative measures of health status were also positively related to WTP.

In a study by Muller and Reutzel (1984), 87 students were asked about their willingness to pay for reduction in fatality risk due to car crash protection. Internal validity of the CV study was checked by estimating theoretical proposed relationships, such as the relationship of WTP to respondents' disposable income, ownership of a car, accident experience, exposure to potential accidents, risk aversion and mathematical ability. The results showed enormous variation in value-of-life estimates, suggesting that the students were not able to evaluate small risks well. In addition, none of the variables posited to be related to the WTP were significant. The authors conclusions about the usefulness of such WTP questions were quite mixed.

Another study elicited consumer valuations of morbidity risk reductions associated with safer cleaning products, in terms of reducing the probabilities of suffering several types of accidents (Magat et al., 1988). This study differs from many others in that it estimates consumer values for a private good. WTP was elicited using the take-it-or-leave-it approach. The contingent valuation approach was contrasted with another type of direct, hypothetical revealed preference method known as paired comparisons. This approach is widely used by marketing research because it simulates actual choices in the marketplace. Respondents are given a pair of products where the description of the current product matches the current market situation and the description of the new product includes a new risk level and a new price. Respondents rate, on a scale of one to nine, which of the two products they prefer. Depending on the responses, the first comparison is followed up with questions about the preferences for other paired comparisons. Their results show that the contingent valuation method yields valuation estimates different from those in the paired comparison.

To summarize, these studies suggest that it can be quite difficult for respondents to evaluate certain types of hypothetical information, such as incremental changes in the risk of mortality and morbidity. Results are ambiguous. Comparing results with similar hypothetical direct observation methods cannot resolve concerns for internal validity. Other applications of CV methods have also found that accurately conveying risk levels and risk reductions is quite challenging (Mitchell and Carson, 1989).

5.4.2 WTP for a Specific Health Service

Another application of contingent valuation methods looks at willingness to pay for specific services described in terms of structural and process attributes rather than specific health outcomes. For example, a Swedish pilot study attempted to elicit the willingness to pay for antihypertensive therapy (Johannesson and Jönsson, 1991). In this case, since all patients were already under treatment, willingness to pay is the amount of money that, if paid by the consumer, leads to the same level of expected utility as without treatment (Hicksian equivalent variation). Two elicitation methods were used: an open-ended question, in which patients were asked to state their maximum willingness to pay for their current treatment for hypertension; and a discrete (yes-no)

question, in which patients were asked to accept or reject a specified increase in user fees for their current treatment. Additional information collected included patient subjective estimates of the risk of death from myocardial infarction or stroke if treatment were not given and of the risk reduction under treatment; and patient intentions to change life styles (i.e., improved diet, exercise) if user fees increased—a measure of perceived substitutions between medical and nonmedical prevention. The availability of nonmedical therapies could lower WTP. The study found that discrete valuation questions work better than open-ended CV questions; the nonresponse rate for the latter was much higher. The analysis produced estimates of both the mean and the median WTP for antihypertensive therapy. The authors interpret the results with considerable caution. They acknowledge that reliability and validity of the contingent valuation method are not yet well established. The assessment of validity is more difficult because there is no "true" value for WTP with which to compare.

5.4.3 WTP for Structural and Process Improvements in Health Care in the United Kingdom

In the last two sections, we look at how contingent valuation studies have been used to evaluate specific structural and process improvements in a specific health care service. Developing-country studies using contingent valuation fall in this latter group.

A United Kingdom (U.K.)-based study attempted to measure an individual's willingness to pay for public health services for elderly care provided under two different settings: National Health Service (NHS) nursing homes and hospitals (Donaldson, 1990). Patients had been randomly assigned to these delivery sites. The study elicited information on what individuals believe the government should be prepared to pay for each type of care since this is the typical scenario in the British Health Service. To minimize strategic behavior (free riding), respondents were given information about the tax consequences of the WTP figures they gave. In looking at the individual responses, most of the patients preferred to stay in the facility type in which they were currently being cared for. However, calculation of aggregate benefits (summation of the net benefits for each group) showed that the group that preferred NHS nursing homes could potentially compensate the group that preferred hospital care and still remain better off, satisfying the Pareto optimal criteria. As reasons for their responses, patients cited factors such as privacy, freedom of choice or independence, "at home" atmosphere, and availability of immediate medical treatment. Differences in actual health outcomes between the types of facilities were not assessed. Again, as in other studies, the author acknowledges that the validity and reliability of the contingent valuation method are uncertain. Several questionable assumptions had to be made to be able to estimate WTP for those respondents who would never be willing to change delivery systems and to aggregate responses (simple summation) for making the Pareto comparison.

In another study of the U.K. National Health Service, Proper (1990) elicits information on the willingness to pay to reduce waiting time for admission to a specific NHS service by a specified amount. In a public system where user fees are not paid, one can only infer preferences by whether the patient stays on the waiting list for admission or opts out for some alternative private care

setting. The study used contingent valuation methods in conjunction with the stated preference approach, in which respondents rate or rank prespecified alternatives characterized by various selected attributes. Waiting time, price, and uncertainty of admission were the focus of this study. The hypothetical context was specified as a choice between immediate treatment at some positive price in a public-sector hospital and treatment after some positive wait in the same hospital at no monetary cost. Treatment, nursing care, and recovery were specified as identical under the two options. Average willingness to pay for reductions in waiting time was estimated. Results from the standard preference and contingent valuation methods did not differ significantly.

5.4.4. WTP for Structural and Process Improvements in Health Care in Developing Countries

This review found only two studies about developing-country health service issues that used contingent valuation techniques. Of these studies, only the study by Weaver and colleagues (1993) follows CV methods rigorously.

A study by Abel-Smith and Rawal (1992) was part of a larger effort to look at the introduction of user fees for public health services in Tanzania. In surveys of 893 outpatients at three referral hospitals and of 1,820 households with 11,918 persons in a population-based survey, respondents were asked, among other things, their willingness to pay for public services. Interestingly, the study notes that contrary to expectations, respondents were not reluctant to answer questions about willingness to pay. Specifically, respondents were asked to assume that waiting time was reduced to less than one hour and/or that drug supplies had been improved, and then whether they would be willing to pay a specified list of charges. Abel-Smith and Rawal did not explicitly cite contingent valuation techniques, but the survey appears to have used related techniques, such as the payment card elicitation method.

The Tanzanian study found that the proportion of outpatients willing to pay for a one-hour reduction in waiting time varied with the charge proposed. WTP fell as higher prices were suggested. Overall, outpatients were willing to pay more at referral hospitals than at district hospitals for a one-hour reduction in waiting time. In comparison, outpatients were also asked if they would be willing to pay if services were improved in general. The percentage of those *unwilling* to pay dropped at both district and referral hospitals. The population-based survey repeated the questions concerning reductions in waiting time and added questions about WTP for improved availability of drugs. One of the most interesting results of the study was that respondents in the lowest income groups indicated a fairly high WTP: 45 percent were willing to pay Tsh 200 for government hospitals. This is quite close to the 60 percent figure estimated for those in the highest income group who were willing to pay the same amount. Questions about health centers produced similar findings. Strikingly, the higher income groups had a higher proportion of those who said they were *unwilling* to pay. In comparing the two types of quality improvements, substantially fewer people said that they were unwilling to pay if drug supplies were always available than if

waiting time were reduced to under one hour. Also, individuals were willing to pay higher amounts for improvements in the reliability of drug supplies. In listing preferences for quality improvements, respondents cited improved availability of drugs most frequently, followed by attitudes of the doctors. Next came quicker service. The researchers interpreted these results cautiously, readily acknowledging that answers to hypothetical questions may not be good predictors of actual behavior.

Using some of the other survey information about individual and household preferences, attitudes, and sociodemographic and economic characteristics, the authors provided some potential explanations for willingness to pay for some of the quality improvements. In particular, the greatest challenge seemed to be to explain the higher willingness to pay for quality improvements among the poor, in light of the already sizable financial payments for transport and other travel-related costs. As noted, rural households appeared willing to pay fairly substantial amounts for quality improvements and relatively fewer rural households were *unwilling* to pay for these improvements—in spite of the evidence showing that the use of public services was already quite costly if one considered opportunity costs and other nonfacility-related costs, such as transportation, waiting time, etc. For example, a government visit took about three hours, a health center visit about two and a half hours, and a dispensary visit or missionary-operated facility visit about one hour and 40 minutes. Travel costs were also sizable. Although the average price of an admission to a mission hospital was reported to be lower than for a government hospital, total user costs for the government hospital tended to be higher because patients had to supply food, drugs, and other medical supplies. Moreover, the study reports that rural households have difficulty paying for services.

Taking into consideration these various data, the authors made two key recommendations. First, charges could be appropriate if the money could be used to improve the quality of services. Second, policymakers should focus on those quality improvements that might ultimately reduce the financial burden on the poor. These might include improved availability of drugs (and food for inpatients), and reduced travel costs, especially for admissions.

A study of willingness to pay for quality improvements in the Central African Republic by Weaver and colleagues (1993) closely follows contingent valuation methods. Additional documentation of this case study includes Barker (1992) and Kornfield (1992). The purpose of the study was to determine whether a particular combination of user fees and quality improvements would increase utilization of public facilities. The results of contingent valuation methods were compared with estimations of total actual health expenditures for health services as a function of different quality improvements. Six quality improvements were considered: (a) facility maintenance, (b) supervision of personnel, (c) availability of pharmaceuticals to treat malaria, (d) availability of pharmaceuticals to treat acute respiratory infections, (e) availability of pharmaceuticals to treat intestinal parasites, and (f) availability of pharmaceuticals to treat diarrhea. The take-it-or-leave-it elicitation method was used. Prices varied around the estimated cost of the quality improvement.

The analysis generated the median willingness to pay for each of the six quality improvements. Respondents had the highest

median WTP for pharmaceuticals (especially ARI and diarrhea) and the lowest WTP for supervision of personnel. Notably, median WTP estimates were substantially larger than the estimated costs of implementing the quality improvements. Logistic regression of the WTP function for the various quality improvements indicated that WTP was significantly related to various factors in the following directions: positively related to income, negatively related to the price level, positively related to rural residence, sometimes negatively related to health status (especially for diarrheal, ARI, and STD drugs), and negatively related to cleanliness with competing nearest facilities implying that substitution was possible. Geographic differences were also observed.

The study took important steps to check internal validity and reliability. Theoretical validity was supported by obtaining significant and appropriately signed coefficients for key determinants of WTP, some of which have already been mentioned above (i.e., price decreases with higher levels of quality—downward-sloping demand curve in terms of price and quality). Comparisons of the contingent valuation median WTP results with estimates of median health expenditures at facilities with different quality attributes indicated greater similarities for drugs than for personnel supervision or facility maintenance. These results are somewhat clouded since it is not quite clear what expenditure components are included in total expenditures. Reliability is partially confirmed by significant chi-squared tests and a prediction rate of 30 percent.

5.5 SUMMARY

Contingent valuation studies attempt to directly elicit revealed preferences from respondents by describing a hypothetical market that is as close to actual market conditions as possible. The theoretical underpinning of CV analysis comes from basic welfare analysis, namely compensating and/or equivalent variation. Researchers must deal with six key design issues.

- ▲ The survey instrument should ask questions in a way that adequately simulates the relevant market structure: public, quasi-public, private.
- ▲ Four elicitation methods are possible: the bidding game, the payment card, take-it-or-leave-it, and take-it-or-leave-it-with-follow-up. The trend has been to use the latter two methods.
- ▲ Careful attention must be paid to avoiding strategic behavior. Strategic behavior in CV studies is not inevitable, but could become problematic if not considered.
- ▲ The hypothetical nature of the method challenges the researcher to develop an instrument that reduces the likelihood of generating meaningless responses from respondents.
- ▲ The validity of CV studies has and will continue to be a serious topic of debate.

- ▲ Without large sample sizes (600-1,500), CV studies are unlikely to generate reliable results because of the large variance in true WTP.

In general, researchers using contingent valuation method studies have acknowledged the experimental nature of the technique and have interpreted findings with caution. Particularly troubling was the lack of data to validate the results. Debatable assumptions were required at both the individual and aggregate level of analysis, such as the expectation that intentions based on hypothetical scenarios can predict actual behavior and that summation of individual preferences can be used to generate estimates of total benefits. The goals of some studies, such as the study of antihypertensive treatment, were quite modest—namely, to determine the feasibility of obtaining mean WTP estimates. Others studies were more ambitious. The study of nursing home care in the United Kingdom attempted to generate an aggregate measure of benefits for a population group in order to invoke the Pareto optimality decision rule for cost-benefit analysis. All studies have encouraged further research.

The difficulty of conducting contingent valuation research is likely to vary with the nature of the quality improvement in question. Evaluation of health outcomes in monetary terms can be quite difficult for patients, as shown by the studies that looked at reductions in risk of mortality or morbidity. Process and structural improvements may be easier to describe and understand in a hypothetical context; however, concerns for the internal validity of the results remain. Comparisons of contingent valuation results with other indirect or hypothetical preference measures may be interesting, but cannot remove doubts about validity.

The studies of WTP for quality improvements in developing countries suggested that patients intend to pay for quality improvements, especially for pharmaceuticals and that these amounts are quite substantial. Strikingly, rural populations exhibit strong intentions to pay for improved services. Although higher income groups tend to be willing to pay more for quality improvements, the results suggest that WTP can be quite high in lower income groups. Strong preferences for improvements in drug availability at facilities over other types of quality improvements, such as provider attitudes and building conditions, suggest willingness to pay for quality improvements may be closely tied to financial considerations, a hypothesis that should continue to be tested. Also, some quality improvements (e.g., improved accounting systems) are less visible to patients. Another interpretation might be that rural populations have fewer alternatives.

It is difficult to determine the extent to which these results may be artifacts of methodology. For example, rural populations may be less able to deal with the hypothetical nature of contingent valuation studies. Overpledging might occur if they believe their preferences will affect provision of quality improvements, but that they will not have to pay the full costs (i.e., donor aid programs). As previous literature has shown, lower education levels, less experience with private health markets, and difficulties in dealing with hypothetical situations may all contribute to the estimated differences in median WTP between different groups, such as rural-urban and/or lower-higher populations.

6.0 INTERVENTIONS STUDIES: COST RECOVERY AND QUALITY

All of the types of studies reviewed in the four previous sections attempted to estimate the willingness to pay for quality improvements through indirect methods. The facility-based studies looked at longitudinal trends in utilization corresponding to the introduction of user fees, without explicit measures of changes in quality of care. Health care demand studies simulate changes in choice of providers due to changes in price and quality, using estimated coefficients derived from actual market behavior. Since they depend on cross-sectional data, the potential demand effects of quality improvements are difficult to estimate because of problems with endogeneity (interactions of supply and demand on observed quality). Hedonic pricing studies involve indirect observation of willingness to pay in actual markets. Contingent valuation studies use direct observation of willingness to pay in hypothetical markets.

In contrast, interventions studies using experimental design methods can directly observe willingness to pay for quality improvements under actual market conditions. In this case, the intervention includes the introduction of user fees accompanied by a package of quality improvements. Experimental design studies provide the most convincing evidence to test hypotheses establishing cause-and-effect relationships. However, they are often not feasible because of the substantial resource requirements; the absence of long-term commitments from governments, donors, and researchers; the inappropriate timing of interventions; and the difficulty in controlling a variety of confounding factors that may contaminate the research design (political, economic, and other events). In addition, health economists typically focus on secondary data analysis using econometric techniques. Application of experimental design methods to study issues in health economics is fairly new. It is not surprising, then, that there is only one study to review in this section—the Litvack (1992) study. Discussions of both the experimental design methods and the results are included.

6.1 THE CONTEXT

The study took place in the Adamaoua province of Cameroon. As part of a USAID project, drug revolving funds were initiated at each health center in the province. Revenues from drug sales were used to replenish the drug supply and subsidize other aspects of primary health care (PHC) delivery.

The study looked at three main hypotheses.

- ▲ The desire for an improved drug supply was sufficiently strong that the introduction of health facility user fees would actually result in an increase in facility utilization when fees were accompanied by an improvement in the quality of care.
- ▲ The poorest quintile would be less positively affected by the simultaneous imposition of fees and improved drug supply than the rest of the population.

- ▲ Utilization would increase where quality was improved because even with the health facility fees, the local availability of drugs did not represent an increase in total cost and may even have represented a real savings in the total cost per episode of illness when both direct and indirect costs were considered.

6.2 THE EXPERIMENTAL DESIGN

Random assignment of the intervention to facility sites required in true experiments was not possible due to political and management constraints. Instead, the study used a pretest, posttest, intervention-control quasi-experimental design to control for as many confounders as possible. The intervention groups included three facilities where user fees were introduced with improved drug supplies. The control group consisted of two facilities not yet phased into the health care financing initiative. The dependent variables for the analysis were the percentage of ill people seeking care at the health center before and after the implementation of the health care financing intervention and the total health expenditures per episode of illness (fees, travel costs). Population-based coverage measures from a random household survey were used to determine probability of provider choice. Baseline data were taken three months before the intervention, and posttest data collection occurred five months after the intervention.

6.3 RESULTS

The results showed that the probability of using the health center increased significantly for people in the intervention areas compared to those in the control areas. The evidence also indicated that the probability of the poorest quintile seeking care increased at a rate proportionately greater than the rest of the population. Litvack suggested that travel and time costs to get prescriptions filled for the poorer households might have been high enough that they were benefiting from the local availability of drugs. Health expenditures per episode of illness did not change significantly with the intervention suggesting that individuals were using lower cost providers. Litvack proposed that improved quality in the form of improved drug supply was valued because it may actually reduce total costs (by providing efficacious treatments locally and avoiding additional transportation and time costs). For the poor, this may have represented a real savings.

7.0 QUALITY IMPROVEMENTS IN COST-RECOVERY INITIATIVES: A FRAMEWORK

The conceptual framework for this research has two major components. The first part develops an economic model that describes the general role of quality of health care services under a system of cost recovery. In this section, quality is introduced as a unidimensional variable, the focus being on the most basic relationships between price, cost, quality, and quantity that exist in cost-recovery systems. The second part expands the concept of quality attempting to develop, in more detail, the multidimensional aspects of quality of health care services, especially those most critical for looking at the effects of quality improvements on cost-recovery initiatives.

To set the stage for the conceptual framework, the context of cost recovery including the specific policy question is reviewed first. Then, the basic economic model—looking at the general role of quality improvements under cost recovery—is explained, followed by a look at the multidimensional aspects of quality, especially those most relevant for understanding the effects of quality improvements on demand (willingness to pay) and costs.

7.1 THE CONTEXT

According to public-finance theory, privatization (financing or provision) for a particular health service is justified when there are no market failures (including externalities) and the service does not have public-good characteristics. Merit-good arguments may limit privatization; however, the question of which services are merit goods is heavily value-laden and often controversial. It is well known that many services offered by the public sector do not strictly meet public-finance criteria (World Bank, 1993b); therefore, cost recovery is increasingly being encouraged as a critical step toward privatization. Cost recovery privatizes the financing of public health services. Budget constraints have compounded the need for cost recovery; policymakers want to find a means to encourage utilization that is financially sustainable and requires minimal government subsidies.

Patients want value for money. Like any private provider striving for financial viability, government facilities under cost recovery must offer a product for which patients are willing to pay. Do quality improvements provide such an incentive? Do quality improvements contribute favorably towards the manager's bottom line? If so, the manager has an incentive to selectively improve the quality of his or her service. Juran (1962) said:

The choice (of level of quality) is a study of the consuming habits of people, of the prices they are willing to pay for various products or services, and of the choice of a design of a product which meets the needs of the consumer and at the same time is susceptible to manufacture at a cost which can yield a profit. (p. 12)

Although Juran is referring to for-profit commercial enterprises, the statement is relevant for those public facilities that are struggling to become more financially self-sustaining. In a system of cost recovery, the levels of price and quality are policy choices to be made by public managers. Utilization levels

depend on patient responses to the prices set and quality offered by the providers.

7.2 THE ECONOMIC MODEL: SOME BASIC RELATIONSHIPS

The empirical evidence reviewed in this report focuses on trying to understand patient rather than provider preferences for quality. The results confirm that patients are willing to pay for improvements in the quality of care, although there is still much to be learned about which dimensions of quality patients perceive to be most important. The purposes of this conceptual discussion are to explain how these results relate to an overall cost-recovery framework (integrating supply and demand behavior) and to motivate general areas for future research. As specific country applications arise, this framework should be adapted to the specific context and research questions at hand.

The framework chosen for this exposition comes from Barnum and Kutzin (1993). They develop a framework that clearly demonstrates basic and important relationships relating quality, price, cost, quantity and affordability. Their model is derived from Jimenez (1987) and ultimately from Thobani (1984). The basic theme of the Thobani model is that welfare gains are possible under a system of fixed public subsidies when user fees are introduced because more services can be offered. Here, the demand-and-supply-side specifications are kept simple. It is beyond the scope of this report to develop them in more detail. The reader is referred to Bitran for detailed explanations of demand (1988) and supply behavior (1992). (Bitran discusses in detail the technology of providing health care and the objectives of facility owners and managers, especially in terms of technical and economic efficiency.)

This framework models a cost-recovery mechanism characterized by four major conditions.

- ▲ The cost-recovery system examines the relationships between price, quality, and quantity at subsidized *market equilibrium*. Policymakers are looking for solutions where there is neither excess demand nor excess supply.
- ▲ The framework models a situation where the cost-recovery system is *financially viable* in the sense that revenues from user fees in combination with partial fixed subsidies should just be able to cover costs.
- ▲ The level and type of *quality demanded must equal the level and type of quality supplied*. If patients do not want the quality offered by providers, market equilibrium will not be achieved.
- ▲ *Additional revenues generated through user fees can be channeled to fund improvements in quality.*

As will be shown, these conditions are an integral part of the model.

Notably, the economic framework does not require that quality necessarily improve health. Market equilibrium occurs at a point where there is a consensus between providers and patients about the

quality of services available in the health care market; the same quality variable is used in both demand and supply equations. *Market equilibrium does not, however, necessarily coincide with maximum health of the population for a given amount of resources.*

Quantity demanded (Q) depends on the price (P) and quality of the health care perceived by patients' (Z) service, as given in equation (7.1):

$$(7.1) \quad Q = D(P, Z)$$

The cost (C) of supplying the service, represented in equation (7.2), depends on the amount demanded (Q), the quality of the service given by the providers (Z), and the input prices (w). To facilitate presentation of the key relationships, quality is presented unidimensionally and is the same for both providers and patients.

$$(7.2) \quad C = C(Q, Z, w)$$

Equation (7.2) can be reformulated by incorporating equation (7.1) into (7.2) to yield equation (7.3):

$$(7.3) \quad C = C\{ D(P,Z) , Z, w\}$$

Fiscal solvency or a break-even constraint means that total costs must equal total revenues, where total revenues include the revenues from user fees (fee \times quantity demanded) plus any government subsidies (S).

$$(7.4a) \quad C\{ D(P,Z) , Z, w\} = P \times D(P,Z) + S$$

Totally differentiating equation (7.4a) yields (subscripts denote partial derivatives):

$$(7.4b) \quad [C_Z + C_Q D_Z - P D_Z] dZ = [P D_P + Q - C_Q D_P] dP$$

$$(7.4c) \quad E_{ZP} = \frac{(1 + \eta_{QP} - \frac{\eta_{CQ}}{\eta_{QZ}} - \frac{\eta_{QP}}{\eta_{QZ}})}{(\eta_{CZ} + \eta_{CQ} - \eta_{QZ})}$$

E_{ZP} = total elasticity of quality with respect to a change in prices;
 η_{QP} = partial elasticity of quantity with respect to price (e.g., all else constant);
 η_{CQ} = partial elasticity of cost with respect to quantity (e.g., all else constant);
 η_{CZ} = partial elasticity of cost with respect to quality (e.g., all else constant); and
 η_{QZ} = partial elasticity of quantity with respect to quality (e.g., all else constant).

$$\begin{aligned}
(7.4d) \quad E_{QP} &= \eta_{QP} + (\eta_{QZ} \times E_{ZP}) \\
&= \text{direct} + \text{indirect} \\
E_{QP} &= \text{total elasticity of quantity demanded with respect} \\
&\quad \text{to price.}
\end{aligned}$$

Using this framework, it becomes possible to trace the effect of an increase in user fees on utilization, while taking into account accompanying changes in quality. When user fees increase, quantity demanded is affected in two ways. First, patients respond directly to higher prices, usually by buying less (perhaps eliminating frivolous use). Second, demand is indirectly affected when additional revenues generated from higher user fees can be channeled to pay for quality improvements that may attract more patients. (The quality improvements preferred by patients may or may not improve health.)

To summarize, user fees might generate additional revenues. The amount of additional revenues earned depends on how insensitive patients are to price increases. For example, when they are less sensitive to price increases, more revenues can be generated, that is, the same amount is demanded at a higher price. (When demand is elastic, increases in user fees will reduce revenues; however, this might be counteracted by an elastic demand for quality.) Additional revenues can be channeled to fund improvements in quality. The extent to which quality can improve depends on the cost consequences of quality improvements and the extent to which quality further increases quantity demanded such that revenues are even higher. Also, expanding capacity to produce additional units may also increase costs, perhaps eroding some of the additional net revenues available to pay for quality improvements. Although this framework does not deal explicitly with equity issues, it can be modified to reflect differences in elasticities between the rich and poor, or other target groups.

7.2.1 Implications for Research

Clearly, this exposition of the framework highlights several important directions for research. *On the demand side*, little is known about the partial elasticities of demand with respect to specific quality improvements. What types of quality improvement generate highly elastic demand responses? Obviously, quality of health care is far more than simply improvements in the availability of drugs. In fact, it is often suggested that patients demand too many drugs and providers are willing to overprescribe. If patients appear to be insensitive to other kinds of improvements in quality (some of which may have important health effects), policymakers might promote health education programs to increase willingness to pay for such attributes.

Although the Barnum and Kutzin framework does not deal explicitly with distributional aspects, it does not rule out the possibility that these partial elasticities of demand with respect to quality could vary among population groups (by income, gender, health risk, age, etc.). Answering these questions requires an understanding of patient perceptions of quality; this is discussed in the next section. (A word of caution about elasticities: any elasticities with respect to quality improvements may be quite

difficult to obtain and interpret since quality improvements are not always easily quantified, especially in terms where one quality improvement can be compared with another. Although this conceptual discussion of the relationships between price, cost, quality, and quantity is easily done using elasticities, in practice such elasticities are likely to be quite hard to generate.)

On the supply side, there is almost no information about the cost implications of quality improvements. Different aspects of quality may have different cost consequences. Also, long-run financial sustainability requires the facility to break even; however, in the short run, revenues should at least cover average variable costs (Nicholson, 1986; Garrison, 1991; Porter/Novelli, 1990). This implies that one should know the implications of quality on both variable and fixed costs. How do quality improvements affect short- and long-run financial sustainability? The second part of the discussion of the framework goes into further detail about quality-cost tradeoffs.

From the *market perspective*, the financial viability of cost-recovery systems depends on interaction of supply and demand conditions. Limited government subsidies must be planned to support affordable quality improvements for which patients are willing to pay, at least in part. An example of these trade-offs is discussed for a health maintenance organization in Haiti (Barker, 1991).

Further research is also required to test the plausibility of the assumption related to *financial management*: Are the additional revenues generated from user fees being channeled to fund affordable quality improvements, especially those that are demanded by patients? Some studies suggest that financial management issues are proving to be a substantial obstacle to the success of cost recovery (Waddington and Enyimayew, 1989, 1990). In terms of improving quality, one needs to know about items such as the amount of revenues (in real terms) being generated, the portion of revenues that are locally retained, ease of disbursement of funds for quality improvements, and types of quality improvements being funded.

7.3 COST RECOVERY: CONSIDERING MULTIDIMENSIONAL ASPECTS OF QUALITY

To identify and understand the most basic relationships between cost, quality, price, and quantity in a cost-recovery setting, the simplified economic framework modeled quality in a single dimension. This section attempts to expand the analysis by looking at the multidimensional aspects of quality and their relevance for understanding the role of quality of health care in supporting cost recovery initiatives. *In particular, the goal is to clarify what aspects of quality are involved in the estimation of the two key elasticities identified above: η_{qz} , the elasticity of demand with respect to quality, and η_{cz} , the elasticity of total costs with respect to quality improvements.*

7.3.1 A Typology of Quality of Health Care for Health Care Financing

It is well known that providers and patients do not always agree on what is good quality health care. It is not unreasonable to expect that elasticities of demand with respect to improvements

in some technical dimensions of quality are likely to be lower than elasticities of demand with respect to dimensions of quality easily perceived and frequently preferred by patients, such as privacy and cleanliness.

Many definitions of quality of health care services exist. No one definition of quality is applicable in all situations. Some definitions include:

"The degree to which actual performance or achievement corresponds to set standards." (USAID, 1991).

"The quality of technical care consists in the application of medical science and technology in a manner that maximizes its benefits to health without correspondingly increasing its risk. The degree of quality is, therefore, the extent to which the care provided is expected to achieve the most favorable balance of risks and benefits." (Donabedian, 1980, p. 5-6).

"Proper performance (according to standards) of interventions that are known to be safe, that are affordable to the society in question, and that have the ability to produce an impact on mortality, morbidity, disability and malnutrition." (Roemer and Montoya Aguilar, 1988).

"Doing the right thing, right away." (Deming, Walton, 1986).

Donabedian, well recognized for his comprehensive research in quality assessment and monitoring, proposed three levels for measuring quality: structure, process, and outcome (1980). Quality assessment of structural components involves that of the settings in which care takes place. Quality assessment of the process components compares what should be done with a given health technology with what is actually being done in terms of provider competence and user compliance. Quality assessment of outcome components examines whether a change in health status can be attributed to the health program or whether a patient is adequately satisfied with the health care provided. Complete definitions of these attributes are presented in Exhibit 7.1. From these definitions, one can see that although it is hoped that improvements in structure and process measures of quality lead to better health outcomes, it is not guaranteed.

**EXHIBIT 7.1
DONABEDIAN'S ATTRIBUTES OF QUALITY**

Structure: Assesses the quality of health care through a study of the settings in which the care takes place. This includes adequacy of facilities and equipment, administrative processes, qualifications of medical staff and organization. This assumes that given proper settings and instrumentalities, good medical care will follow.

Process: Considers not only that medical technology exists to achieve results, but also whether what is now known to be good medical care has been applied: clinical history, physical examination, diagnostic tests, justification of diagnosis and therapy, technical competence, evidence of preventive management, coordination and continuity of care, acceptability of care to recipient. This assumes that given the proper procedures, good health outcomes will result.

Outcome: Considers whether a change in a person's current and future health status can be attributed to antecedent health care. It examines recovery, restoration of function and survival. The validity of outcomes as a dimension of quality is seldom questioned. However, frequently there are multiple factors that in addition to the treatment protocol affect health outcomes, such that it is not always easy to attribute good health backwards to good procedures.

Source: Donabedian (1980).

Each of these three measurements of quality in turn contains several important elements that may be perceived in different ways by the different groups involved—the Ministry of Health, other providers, and the users. Wouters (1991) presents a simple matrix that shows, these multiple dimensions of quality in the context of supply and demand. This microeconomic framework is replicated in Exhibit 7.2. Developing-country studies typically focus on structural and some process attributes. Some examples include a facility assessment for Embaba Hospital in Egypt (Becker, 1990), establishment of mechanisms for accreditation and standard setting in Pakistan (Becker, 1993), and numerous efforts by the USAID Quality Assurance Project.

Total Quality Management (TQM), developed by Deming, offers useful terminology for identifying quality attributes. Although they are most frequently applied to estimating the costs implications of quality improvements, these terms can be applied to any element in the typology presented above (Morse et al., 1987). These concepts are depicted pictorially in Exhibit 7.3. "Quality of design" occurs when customer and provider expectations are accurately translated into design specifications. Deficiencies in design result in poor standards for evaluating quality. "Grade"

refers to differences in customer and provider expectations about products that have the same functional use (i.e., a bicycle versus a car). "Quality of conformance" occurs when the actual product meets all of the design specifications or standards. A detected failure of conformance between design and actual product results in a reported quality failure. Frequently, quality of design issues are dealt with at a higher level of policymaking (i.e., mandating cost-effective standards of care). Quality Assurance programs tend to focus on quality of conformance of issues.

Focus on improving quality of conformance without periodic attention to quality of design may result in a process where everything is done right the first time but the desired health outcome is not necessarily achieved. This may be particularly true when health technologies are constantly changing.

The focus of TQM has typically been on internal facility operations. In developing countries, finding solutions that ensure that things are done right the first time often requires consideration of district-level management issues. A good example is the improvement of the availability of essential drugs. Facility stocks of drugs are closely tied to district-level procurement and distribution systems. Many problems in the processes of health care can be traced to difficulties faced by district-level health managers.

One final empirical point: This typology clearly shows that measurement of quality is complex. Researchers must assess patients' perceptions of quality for up to three levels of measurement—structure, process, and outcome. In addition, analysis of quality using cross-sectional data sets encounters several problems with endogeneity: observed levels of quality are a result of interactions between supply and demand conditions. This problem is well recognized in the literature (Bitran, 1992; Mwabu et al., 1993).

7.3.2 Multidimensional Aspects of Quality and Demand

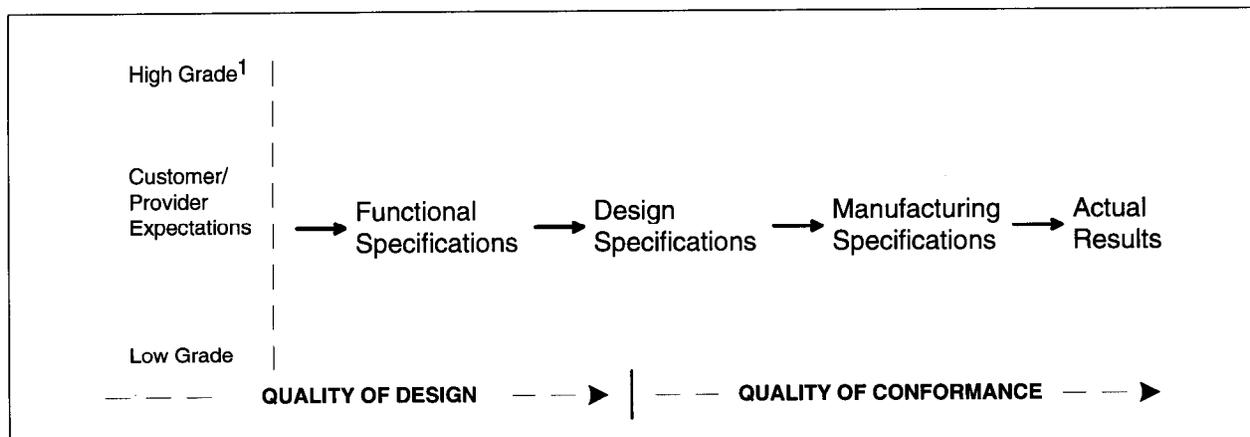
The preliminary evidence so far from health care demand studies is that patients prefer improvements in quality, but some aspects of quality appear to be more important than others. For example, patients appear to have strong preferences for the availability of essential drugs and are even willing to pay for them. The question is, what other types of quality improvements are important to patients and would they be willing to pay fees to ensure their provision? Some measures of technical quality used by health professionals (i.e., efficacy) are not likely to be appropriate for answering this question. Instead, one must have a clear understanding of patient perceptions of quality (Bitran, 1992; Lavy and Germain, 1993; Mwabu et al., 1993; Wouters, 1991). It is the users' perception of quality that affect their utilization patterns; and there may be several attributes that they weigh in choosing their providers.

**EXHIBIT 7-2
DIMENSIONS OF QUALITY FOR HEALTH CARE FINANCING**

Consumer Perception				Provider Perception	
Structure Physical facilities Organization Administration Staff organization Fiscal organization	D E M A N D	?	=	S U P P L Y	
Process Patient complaints Patient compliance Knowledge of health care, illness Changes in knowledge or behavior expected after prior exposure to medical care					Physical facilities Organization Administration Staff organization Fiscal organization
Outcome Patient satisfaction with health outcome					Screening Diagnostic activity Provider compliance Coordination and continuity of care Provide indicators of health outcomes: mortality, morbidity, disability, death

Sources: Adapted from Donabedian (1980) and Wouters (1991), p. 259.

**EXHIBIT 7-3
UNDERSTANDING THE COSTS OF QUALITY,
GRADE, EXPECTATIONS, SPECIFICATIONS, ACTUAL RESULTS**



Source: Adapted from Morse, et al. (1987), p. 9.

¹Grade refers to differences in one or more dimensions of quality, such as efficacy, diagnostic accuracy, compliance, and coverage.

The importance of patient perceptions is also a major premise of TQM. Organizations cannot be successful unless they satisfy their customers. What is the point of producing a product right the first time if no one wants to buy it? The challenge is to provide the customer with a product or service he or she wants and do it right the first time.

Social marketing techniques also approach distribution of health products and services with a strong consumer orientation (Helitzer-Allen, 1984; Lefebvre and Flora, 1988; Novelli, 1988). Special attention is given to audience (market) segmentation; that is, identification of subpopulations (i.e., geographic, socioeconomic, cultural, demographic) that have special preferences and needs. Identification of market segments for various quality attributes is also a major goal of hedonic price studies and contingent valuation surveys. The social marketing approach reminds the health planners to consider the competition for their products and services in the marketplace, otherwise known as *competitive advantage*. This is the recognizable advantage of a given product or service in comparison to the competition *perceived by the consumers*. Social marketing relies heavily on the use of formative research to gain an in-depth understanding of target audiences.

Do patients look for more for structure, process, and/or outcome aspects of quality? Some qualitative studies have been done to identify what characteristics patients look for when evaluating the quality of a source of health care, what relative importance they attach to those characteristics, what they are willing to pay for various aspects of quality, and how patients' perceptions of quality currently affect their utilization of health services (Attah, 1986, 1991; Tsongo et al., 1993; Waddington and Enyimayew 1989, 1990). The Ghana studies found that patients are discouraged by rude staff, excessive waiting times, absence of prescribed drugs, inflexible payment procedures, and inadequate facilities for proper physical examinations. The studies did not give a ranking of preferences among these. However, the studies concluded that the most important criterion was whether the patient had been cured after visiting a particular place. Patients expressed concern for adverse effects of treatment. Availability of the complete treatment process at the facility was also important (i.e., diagnostic labs). Perceptions appear to be formed either from personal experience or from what friends and relatives reported about their experiences. In Fiji, Attah and Plange (1993) found that the art of care (consideration, friendliness, patience) emerged as the foremost issue, followed by availability of drugs and relevant personnel.

What motivates patient preferences for different aspects of quality? The standard household health production model assumes that patients are attempting to maximize health outcomes under budget and health production constraints (Wouters, 1992). Following this approach, the "derived demand function" shows that willingness to pay for health care from a particular provider depends on the marginal productivity of that health care, to health. Based on the discussion above, it is the patient's perception of marginal productivity of health care that is important here. Patients may consider both direct health outcomes and related psychic benefits (e.g., manner and attitude in which health care is rendered) in their perceptions of marginal

productivity. This does not necessarily mean that patients always have the correct knowledge of how efficacious treatments are. It has often been observed that patients overfocus on drugs when other treatments are more efficacious. The choice of health care is determined by its perceived marginal productivity and its price relative to the marginal productivities of other health inputs and their prices. The question then becomes: Which improvements in quality of care increase the marginal productivity of health care for improved health (broadly defined in physical and psychic aspects) as perceived by the patient? Demand for these improvements in quality will increase even if patients have to pay for them, if the ratio of the perceived marginal productivity to price is still larger than for other health providers. This points to the critical role of health education and health communication in increasing patient knowledge of how health care services contribute to health outcomes.

This household framework could be extended to explain why different segments of the population have different preferences. For example, evidence from Tanzania leads to recommendations that policymakers should focus on those quality improvements that might ultimately reduce the financial burden on the poor (Abel-Smith and Rawal, 1992). These might include improved availability of drugs (and food for inpatients) and reduced travel costs, especially for admissions. In terms of the household production framework, one could posit that poor patients perceive the availability of essential drugs to substantially increase the marginal productivity of public providers and perhaps even decrease the price of that provider since they avoid other travel costs to pharmacies. In other words, the ratio of perceived marginal productivity to price for the public provider substantially increases when drugs are made available.

7.3.3 Multidimensional Aspects of Quality and Costs

The economic framework has shown that the success of cost recovery depends critically on the size and nature of the costs associated with quality improvements. Frequently, the assumption is made that quality increases costs. Vuori (1982) summarizes three potential relationships between quality and costs:

- ▲ Linear and positive association—increased costs result in improved quality that has real functional utility in relation to the objectives of care;
- ▲ A scatter diagram—increased costs result in ostensibly better care, i.e., in more numerous and sophisticated services that have, however, no functional utility; and
- ▲ A logarithmic curve—in the beginning, the improvements in quality are relatively cheap, but gradually their marginal costs increase to a point after which added resources may actually lower the quality (law of diminishing marginal returns). Vuori assumes that the latter relationship is most reasonable; however, little empirical work has been done to verify these relationships. The quality assurance literature offers other hypothesized relationships between quality and cost.

Quality assurance methods identify two major dimensions in the relationship between quality and costs: those associated with the quality of design and those associated with the quality of conformance. Generally, it is assumed that there is a *positive* relationship between costs and improvements in grade and a *negative* relationship between costs and improvements in quality of conformance. It is believed, and in some cases has been shown, that higher degrees of quality of conformance can be attained at a lower cost to the provider. Higher quality of conformance means fewer "defective" services or products. Fewer "defective" services or products mean less waste of materials, labor, and/or equipment time. Less waste of inputs means greater output for a given level of inputs, resulting in lower costs per unit of output. All of these are testable hypotheses.

Assessing the cost implications of the design of a service or product can be done using cost-effectiveness-benefit analysis. Individuals, health facilities, and public or private programs must choose between alternative standards or design specifications. Which standard or design specification satisfies provider and customer expectations (reaches a target health effect) for the least cost? Which improvements in the grade of a service or product are worth the additional costs? Such decisions involve choosing among several design and standards options. In contrast, quality of conformance issues assume that an acceptable standard has been found. The main issue here is to identify the cost consequences of not meeting the accepted standard. What are the cost implications of not delivering the service or product right the first time?

TQM methods look at the costs of quality improvements that eliminate or prevent poor quality of conformance in terms of prevention and appraisal, internal failure costs, and external failure costs. These are defined in Exhibit 7.4. Little has been done to empirically estimate the behavior of these cost components. Hypothesized relationships between quality of conformance and these four categories of costs are suggested in Exhibit 7.5. As the degree of conformance improves, failure costs fall quite rapidly as major deficiencies are detected and eliminated. Costs of appraisal and prevention increase gradually. Initially, gross deficiencies can be detected quite easily, but as the degree of conformance improves, it may become increasingly more difficult to detect problems such that costs of appraisal and prevention rise more dramatically. Perfection is harder to achieve.

Another way to view these four components is in terms of the net financial costs of a quality assurance program. In Exhibit 7.5, appraisal and prevention costs are shown as before-positive and increasing-quadrant A. Elimination of internal and external failures will generate cost savings. As represented in quadrant B, cost savings are large at first and decrease as conformance reaches perfection. Exhibit 7.5b shows the summation of appraisal and prevention costs plus cost savings from elimination of failures, yielding net costs. All of these relationships must be empirically tested.

EXHIBIT 7.4
COSTS AND THE QUALITY OF CONFORMANCE

Costs incurred because poor quality of conformance MAY exist:

Prevention Costs	Expenses incurred to prevent "defective" units or services from being produced.
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Examples: costs of staff training in quality assurance, supervision of prevention activities, pilot studies, technical support to those providing the services/products, analysis or in-house processes for the purpose of improving quality

Appraisal Costs	Expenses incurred to identify "defective" units or services before they are given to clients.
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Examples: costs of labor, supplies and materials used in testing and inspection, supervision

Costs incurred because poor quality of conformance DOES exist:

Internal Failure Costs	Expenses incurred when materials, services, or their components are identified as "defective" before they are shipped to customers.
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Examples: net costs of spoiled materials, rework, additional supervision.

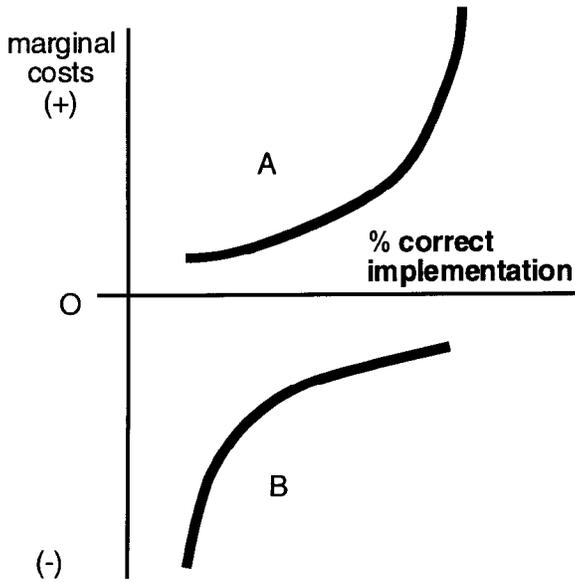
External Failure Costs	Expenses incurred when "defective" products are shipped to customers.
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Examples: cost of responding to customer complaints, cost of treating complications, cost of additional services, opportunity costs of lost services because of poor quality reputation

Source: Adapted from Morse et al., (1987), p. 19.

EXHIBIT 7-5

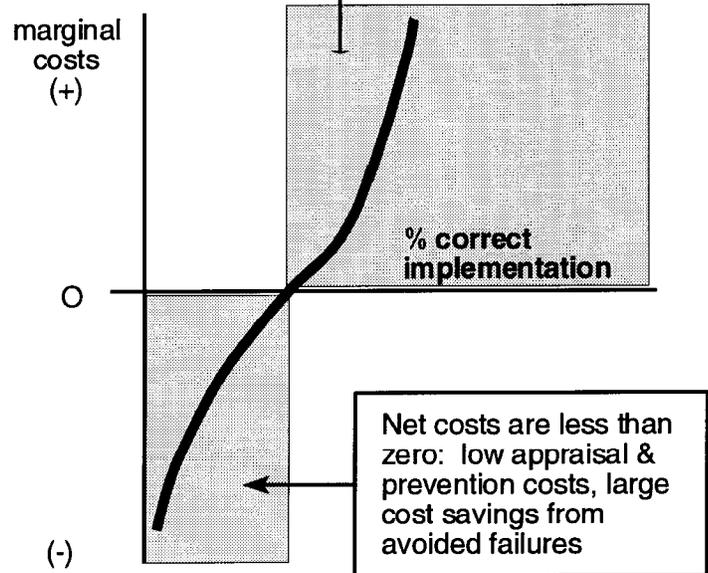
NET MARGINAL COST OF QUALITY IMPLEMENTATION



7-5a

Top portion (quadrant A):
Costs of appraisal & prevention

Bottom portion (quadrant B):
Cost savings from avoided failures



7-5b

Net costs:
Adding costs of appraisal & prevention
cost savings from avoided internal &
external failures

7.4 SUMMARY

The conceptual framework identified the following key relationships related to the role of quality of care in cost recovery: the demand elasticity with respect to quality and the elasticity of costs with respect to improvements in quality. Market equilibrium occurs at a point where there is a consensus between providers and patients about the quality of services available in the health care market; the same quality variable is used in both demand and supply equations. *The market equilibrium does not, however, necessarily coincide with maximum health of the population for a given amount of resources.* Patients and providers may not always know about or agree on quality improvements that are efficacious.

Based on the conceptual framework, clear directions for future research are evident. On the demand side, little is known about the partial elasticities of demand with respect to specific quality improvements. What are other empirical estimates of the elasticity of quality with respect to improved drug availability? What other types of quality improvements generate highly elastic demand responses? Are these elasticities the same among various target groups? On the supply side, there is almost no information about the cost implications of quality improvements. A word of caution was given about the challenges of generating elasticities with respect to quality improvement—primarily due to difficulties in measurement. In terms of financial management, the feasibility of allocating revenues from user fees to fund quality improvements must be verified.

Building on traditional quality assessment techniques from Donabedian and TQM methods, we proposed a typology of quality of health care for application to health care-financing issues. In any health care-financing research, it should always be understood that quality issues cannot be pursued independently from either demand or supply perspectives. Also, approaches to quality improvement in developing countries are likely to require the involvement of district-level health management, not internal facility operations alone.

The discussion emphasized that the effect of quality improvements on demand can best be understood by looking at patient perceptions of quality. This is recognized by many researchers of health care demand and other experts of social marketing and total quality management. Not much is known about what aspects of quality patients perceive in terms of either structure, process, or outcome. Moreover, little has been done to explain preferences patterns and why they vary across various target groups. The household production of health framework frequently used in health care demand studies may offer some answers. Patients will demand and even pay for quality improvements, if these improvements increase the perceived marginal productivity of these services in relation to price.

Finally, this section looked more closely at how to estimate the elasticity of costs with respect to improvements in quality. We distinguished between the effects on costs of improvements in the quality of grade and improvements in the quality of conformance. Different empirical methods are required to assess each of the quality-cost relationships.

8.0 CONCLUSION

This section summarizes the conclusions of each of the previous chapters as well as provides general conclusions for the report as a whole. Based on the findings of the literature review, recommendations are made for further research, especially in terms of motivating future field research.

8.1 FACILITY-BASED STUDIES

The facility-based longitudinal studies of cost recovery typically examined utilization of public facilities as an indirect assessment of willingness to pay (WTP). Only Matji and colleagues (1993) included the examination of shifts in service utilization between the public and private sectors. The facility-based studies have emphasized the effects of increases in user fees on service utilization without specific attention to quality of care. Only Waddington and Enyimayew (1990) attempted to interpret their findings on service utilization patterns in terms of quality of care. However, their use of qualitative methods alone did not provide conclusive evidence of the effect of quality of care on service utilization. Service utilization has been examined in terms of total utilization and disaggregation by sociodemographic categories of interest, such as age groups, sex, urban or rural residence, but not by economic status (proxied by income and/or total expenditure for a given period of time). Perhaps the greatest advantages of facility-based studies are the ease of data collection and fewer resource requirements relative to cross-sectional demand studies and experimental studies. However, facility studies, as conducted to date, are limited by lack of control groups and by major confounders. Therefore, it is not possible to attribute changes in service utilization to the introduction of increases in user fees alone.

Future facility-based studies should make every attempt to follow experimental design methods: identifying control groups and tracking the effects of potential confounders. Without these design improvements, facility-based studies can make very limited contributions to research linking quality of care and user fees to changes in utilization patterns. At best, they can provide intermediate results to inform short-term management decisionmaking. The major confounders encountered in previous studies may be classified into three groups: (a) contextual factors; (b) client factors; and (c) provider factors. Contextual factors are those in the environment that limit accessibility and/or utilization of facility-based services. They include natural disasters, transient political upheavals, and economic recession. Client factors include income, gender, age, religion, and literacy. Provider factors include the quality of services provided and changes in competing segments of the local health care market, as well as changes in accuracy and completeness of data collection systems.

8.2 HEALTH CARE DEMAND STUDIES

The findings of health care demand studies all strongly suggest that quality of health care is an important factor in choosing a health care provider and that patients are willingly to pay for improvements in quality. Most of the studies indicate that the strongest preference was for the availability of drugs, both in amounts and types of essential drugs. Preferences for

building infrastructure and type of health provider are weaker, but apparent.

Investigations of patient choice of provider type should include patient, not provider, perceptions of quality. However, most studies measured quality using only structural attributes of facilities without further investigation as to whether these were appropriate and complete measures to capture what patients were seeking. Perceptions in terms of process and outcome measures of quality are almost totally lacking.

Little has been done to investigate the distributional aspects of quality improvements. The most recent study of Kenya tested gender-specific effects of quality attributes (Mwabu et al., 1993). The results implied higher demand for antimalarials by men. The Lavy and Quigley (1993) study looked at welfare-neutral WTP for three different income groups. The results indicated that the willingness to pay (as measured by percentage of income) increases with income. The income effect was more important for the quality variables (infrastructure, drug availability, services, and personnel) than for distance or price. The authors concluded that the richest were more concerned with quality of health services than with their costs (price or distance). These findings lend mixed support to an increasingly posited hypothesis that user fees could be a source of welfare transfers if fees are based on ability to pay and are channeled into improvements in service quality and accessibility. Anecdotal evidence suggests that quality improvements, especially improved drug supplies, may be more important to the poor.

The more recent health care demand studies pay particular attention to measurement problems associated with quality variables, especially in the analysis of nonexperimental static, cross-sectional studies. The coefficients on the quality variables might be biased for a variety of problems related to endogeneity. First, quality improvements could actually affect health outcomes, reducing population morbidity. If so, demand for health care services would drop in future periods. Second, observed quality reflected both supply and demand conditions. An estimated negative relationship between probability of use of a provider and the quality attribute of the provider might simply reflect excess demand rather than the counterintuitive behavior that individuals do not prefer better quality. Third, data on quality should be exogenous indicators of quality. Data collected from patients who actually use the facility are hampered by selection bias.

Other data problems encountered in these cross-sectional studies were the small sample sizes of facilities and multicollinearity of various indicators of quality. Typically, the solution has been either to use aggregate measures of quality or to omit more detailed measures of quality, which hampers attempts to look at WTP for specific dimensions of quality.

Some health care demand studies have attempted to measure elasticities of demand with respect to quality improvements, where demand is measured in terms of probabilities of choosing a given provider. These elasticity measures should be interpreted with caution since it is quite difficult to quantify incremental changes in quality, especially in a manner that can be compared across quality attributes. Is a 10 percent improvement in drug availability comparable to a 10 percent improvement in building conditions or provider knowledge?

Finally, one of the most recent health care demand studies has attempted to go beyond traditional estimates of price elasticities of demand and estimate welfare-neutral WTP. The interest here was to generate actual price levels for various quality improvements. Such information is critical for policymakers in designing user fee systems. However, one should use these estimated price levels with caution. They were based on simulations using the discrete choice empirical results where quality was typically measured in an aggregate form and coefficients were potentially biased due to endogeneity problems.

Many researchers have suggested that although econometric health care demand studies have made important contributions to understanding, in general terms, the determinants of health care utilization patterns, they are ultimately limited in their capacity to identify causal relationships between demand and specific aspects of quality of care. As we have seen, nonexperimental static, cross-sectional health care demand studies are hampered by significant problems with endogeneity and multicollinearity among multidimensional aspects of quality. These problems will also exist when one extends the analysis to further explore the provocative question: How do preferences and willingness to pay for various types of quality improvements differ over income groups, gender groups, and other vulnerable groups (i.e., children under five)? Some researchers suggest that longitudinal intervention studies may ultimately be the best method to access these specific relationships.

8.3 HEDONIC PRICING STUDIES

Hedonic pricing studies require fairly strong assumptions that may often be unreasonable for many developing-country settings. These include perfect competition for both providers and consumers, complete knowledge of attributes, conceptualization of product characteristics on a continuum, profit maximization for providers and measurement of quality attributes in objective terms. The data requirements of hedonic studies are quite substantial since all relevant service characteristics should be controlled for. Choice of functional forms for the demand curve may significantly affect the results. Others have shown that it is difficult to value simultaneous changes in services or goods that are substitutes (Brown and Rosen, 1982). In conclusion, hedonic pricing methods are unlikely to be feasible to determine the WTP for selected health service quality improvements in developing countries.

8.4 CONTINGENT VALUATION SURVEYS

In general, researchers using contingent valuation method studies have acknowledged the experimental nature of the technique and have interpreted findings with caution. Particularly troubling is the lack of data to verify the internal validity of the results. The core issue is whether responses of intentions based on hypothetical scenarios can predict actual behavior.

The goals of some studies, such as the Johannesson and Jönsson (1991) study of antihypertensive treatment, were quite modest, namely, to determine the feasibility of obtaining mean WTP estimates for individuals. Others studies were more ambitious. Donaldson's (1990) study of nursing home care in the U.K. attempted to generate an aggregate measure of benefits for a population group in order to invoke the Pareto optimality decision rule for cost-benefit analysis.

A challenge with conducting contingent valuation studies related to the quality of health care is that valuation is more difficult for some aspects of quality than others. Evaluation of health outcomes in monetary terms can be quite difficult for patients, as shown by the studies that examined reductions in risk of mortality or morbidity. Process and structural improvements may be easier to describe and understand in a hypothetical context; however, concerns for the internal validity of the results remain. Comparisons of contingent valuation results with other indirect or hypothetical preference measures may be interesting, but cannot remove doubts about validity.

The studies of WTP for quality improvements in the Central African Republic and Tanzania suggested that patients intend to pay for quality improvements, especially for pharmaceuticals, and that these amounts are quite substantial. Strikingly, rural populations exhibit strong intentions to pay for improved services. Although higher income groups tend to be willing to pay more for quality improvements, the results suggest that WTP can be quite high in lower income groups. Strong preferences for improvements in drug availability at facilities over other types of quality improvements, such as provider attitudes and building conditions, suggest that willingness to pay for quality improvements may be closely tied to financial considerations.

The advantage of contingent valuation studies is that they can potentially estimate specific price levels reflecting willingness to pay for different aspects of quality. Also, they can determine how these prices vary among various population segments. Early evidence from contingent valuation studies about the distributional impacts of quality improvements is enlightening and certainly deserves further attention. There are, however, major drawbacks to these types of studies; researchers need to proceed with caution. In particular, it is quite difficult to determine the extent to which results might be artifacts of methodology. For example, rural populations might be less able to comprehend the hypothetical nature of contingent valuation studies. Overpledging might occur if they believe that their preferences will affect provision of quality improvements, but that they will not have to pay the full costs (i.e., donor aid programs). As previous literature has shown, lower education levels, less experience with private health markets and difficulties in dealing with hypothetical situations may all contribute to the estimated differences in median WTP between different groups, such as rural-urban and/or lower-higher populations.

8.5 INTERVENTION STUDIES

Only one quasi-experimental intervention study was found in the published literature linking cost recovery, quality improvement and health care utilization in developing countries (Litvack, 1992). The intervention, implemented in Cameroon, consisted of an increase in user fees and an improvement in the availability of essential drugs. The results showed that the probability of using the health center increased significantly for people in the intervention areas compared to those in the control areas. The evidence also indicated that the probability of the poorest quintile seeking care increased at a rate proportionately greater than the rest of the population. It was posited that travel and time costs to get prescriptions filled for the poorer households might have been high enough that there were significant cost savings for them by having drugs available at the facility.

Health expenditures per episode of illness did not change significantly with the intervention suggesting that individuals were avoiding the higher costs incurred by going to other providers.

Similar to the three other types of studies (health care demand, hedonic pricing, and contingent valuation), intervention studies require a significant investment of resources. In addition, these studies must be carefully integrated with a planned health care financing intervention; perhaps as an evaluation component of the cost-recovery project. However, various political and management factors may prevent the researcher following through with the basic experimental requirement of random allocation of the intervention. As a result, a variety of potentially confounding factors may cloud the results. Nevertheless, there is a fairly elaborate set of quasi-experimental design methods that may help to substantially reduce the effects of confounders.

8.6 GENERAL CONCLUSIONS

The empirical results from these studies confirm the importance of quality of care in stimulating demand for health care services. The conceptual framework puts these findings in perspective, linking them to supply behavior and other requirements for financial sustainability. Looking back at the policy questions in the introduction to this report, it will be shown that many remain unanswered.

The conceptual framework identified the following key relationships connected to the role of quality of care in cost recovery: the demand elasticity with respect to quality and the elasticity of costs with respect to improvements in quality. Market equilibrium occurs at a point where there is a consensus between providers and patients about the quality of services available in the health care market; the same quality variable is used in both demand and supply equations. The market equilibrium does not, however, necessarily coincide with maximum health of the population for a given amount of resources. Patients and providers may not always know about or agree on quality improvements that are efficacious.

Based on the conceptual framework, clear directions for future research are evident. On the demand side, little is known about the partial elasticities of demand with respect to specific quality improvements. What are other empirical estimates of the elasticity of quality with respect to improved drug availability? What other types of quality improvements generate highly elastic demand responses? Are these elasticities the same among various target groups? On the supply side, there is almost no information about the cost implications of quality improvements. It is important to distinguish between the effects on costs of improvements in the quality of grade and improvements in quality of conformance. Different empirical methods are required to assess each of the quality-cost relationships. In terms of financial management, the feasibility of allocating revenues from user fees to fund quality improvements must be verified. The difficulty of estimating elasticities with respect to quality improvements was noted.

In any health care financing research, it should always be understood that quality issues cannot be pursued independently from either demand or supply perspectives if market equilibrium (even with subsidies) is to be achieved. A typology of quality of health

care for application to health care financing issues was proposed with this in mind. It borrows heavily from Quality Assurance and TQM methods.

The effect of quality improvements on demand can best be understood by looking at patient perceptions of quality. This is recognized by many researchers of health care demand and other experts of social marketing and total quality management. Not much is known about what aspects of quality patients perceive in terms of either structure, process, or outcome, or when and how their perceptions are formed.

Little has been done to determine whether preferences for quality improvements vary across various target groups and if they do, why. Findings from three out the five types of studies reviewed suggested that willingness to pay for quality improvements might differ among market segments. The household production of health framework frequently used in health care demand studies may offer some answers. It states that patients will demand and even pay for quality improvements if these improvements increase the perceived marginal productivity of these services in relation to price. Future research to improve the reliability and validity of these results seems merited: what specific quality improvements, for whom, and why? In light of concerns for equity, this issue seems particularly important. Creese (1991) observed that to date fees have not been used on a large scale to improve the quality of accessibility of services in a way that would compensate for the regressive effects of charge.

When resources for evaluation research are limited, a well-designed facility-based study might offer further empirical evidence on general impacts of quality improvements accompanying user fees on utilization. With more resources, an intervention study is best suited to answering in detail the questions raised above. The USAID Health Financing and Sustainability Cost Recovery Experiment in Niger and the World Bank Indonesian Resource Mobilization Study (World Bank, 1993a) provide examples of innovative work along these lines. But research on this topic cannot be conducted without first-paying special attention to understanding patient perceptions of quality—using qualitative research methods (i.e., focus groups).

Clearly, answering the demand-related policy questions are substantial undertakings in themselves. However, ultimately, the role of quality improvements in supporting cost recovery cannot be known without linking demand behavior with cost implications. The advantage of using either a facility-based study or an intervention study is that they could be enhanced, resources permitting, to tackle some of the cost issues. For example, one could undertake a short exercise to track the capacity of financial management processes to channel user fee revenues to fund quality improvements. This was one of the conditions incorporated in the conceptual framework that needs to be tested. Ideally, one could go on to monitor costs as quality improvement interventions are being implemented.

9.0 PRELIMINARY DESIGN OF FIELD RESEARCH ACTIVITIES

Cost-Recovery and Improved Drug Availability: Implications for Total Patient Treatment Costs for an Episode of Acute Illness

This is a proposal for Phase III of the Major Applied Research Project related to the role of quality of health care in health care financing. Under Phase I, the technical report "Quality of Care and Its Role in Cost Recovery" was produced. The HFS project has nearly completed Phase II activities—pilot tests of cost recovery and quality improvements in Niger. This document describes the scope of work for Phase III analysis on Cost Recovery and Improved Drug Availability: Implications for Total Patient Treatment Costs for an Episode of Acute Illness. It will require analysis of household and facility data already collected during the pilot tests. No additional data collection is foreseen.

The proposal is organized as follows: (a) research objective, (b) literature review, (c) study site, (d) intervention, (e) general hypotheses, (f) study design, (g) sample size, (h) analysis, and (i) management and evaluation.

9.1 RESEARCH OBJECTIVE

There is fairly good empirical evidence that patients have strong preferences for user fee systems in public facilities, which include improved drug availability. A possible explanation for these preference patterns is that revolving drug funds actually lower the total costs of an episode of illness for the patient. *The overall objective of this research is to determine whether the implementation of cost recovery (either through a fee per episode of illness or through a compulsory tax plus copayment) accompanied by an improvement in the availability of drugs at public health facilities reduces the total patient treatment costs for an episode of acute illness, especially for selected vulnerable groups, including the poor, women, and children under five.*

9.2. LITERATURE REVIEW

The Phase I review revealed that little has been done to investigate the distributional aspects of quality improvements (Wouters et al., 1993). Some evidence suggests that cost recovery could be a source of welfare transfers if fees are based on ability to pay and are channeled into improvements in service quality and accessibility, that is the poor would have access to higher quality health care services at prices they are able to pay.

Two contingent valuation surveys that elicited willingness to pay for selected improvements in quality of health care in the Central African Republic (Weaver et al., 1993) and Tanzania (Abel-Smith and Rawal, 1992) found that patients intend to pay for quality improvements, especially for pharmaceuticals, and that these amounts are quite substantial. Strikingly, rural populations exhibited strong intentions to pay for improved services. The authors of the Tanzanian study suggested that a possible explanation for the strong preferences exhibited for improvements in drug availability at facilities over other types of quality

improvements (such as provider attributes and building conditions) is that improved drug availability at public facilities might actually reduce total patient cost of treatment.

Similarly, a quasi-experimental study in Cameroon, investigating the introduction of user fees and improved drug availability, showed that the probability of using the health center increased significantly for people in the intervention areas compared to those in the control areas. The probability of the poorest quintile seeking care increased at a rate proportionately greater than the rest of the population. It was posited that there were significant cost savings for the poorer households by having drugs available at the facility. Health expenditures per episode of illness did not change significantly after the cost-recovery intervention, suggesting that individuals were avoiding higher costs by using other providers and pharmacists who had drugs.

9.3 STUDY SITE

In collaboration with the Ministry of Health in Niger and the World Bank, the USAID Health Financing and Sustainability project has been developing pilot tests in cost recovery in Niger since 1988. This study will use data collected through HFS involvement in these social experiments in health care financing. Say and Boboye are the districts chosen for the intervention. Illela is the control district.

9.4 INTERVENTION

The one-year pilot tests started in May 1993. They involve about 20 Ministry of Health ambulatory facilities of three districts in Niger. The district of Boboye adopted a head tax combined with a small copayment per illness episode. The district of Say adopted a fee-per-episode cost-recovery system. Both cost-recovery districts also experienced a substantial improvement in the availability of essential drugs. The third district in the study, Illela, served as the control site where no health care financing interventions or quality improvements were introduced.

The fees and taxes adopted by the test facilities are insufficient to permit full cost recovery for drugs. The government of Niger heavily subsidizes the cost-recovery initiative. Start-up drug inventories were supplied through a grant from the World Bank. It is expected that an ongoing subsidy will be required to support the cost-recovery experiments. The World Bank is likely to provide funding to replenish drug inventories. The Ministry of Health will subsidize the remaining components.

9.5 GENERAL HYPOTHESIS (stated as null)

The **general hypothesis** states that for the general population, there is no significant difference in total patient costs for selected episodes of acute illnesses between the control site and each cost-recovery site (where cost recovery consists of a *fee per episode of illness* accompanied by an improvement in the availability of drugs or a *compulsory head tax plus copayment* accompanied by an improvement in the availability of drugs).

Additional hypotheses are the same as the general hypothesis conducted for special target groups: by income class (poor, non-poor), by gender, and by age (especially children under five).

9.6 STUDY DESIGN

The study follows a nonequivalent control group quasi-experimental design. This design involves two intervention groups and a control group all given a pretest and a posttest, but where the controls and experimental groups are not randomly assigned (i.e., districts were selected for a variety of [often political] reasons). Exhibit 9.1 presents the study design. The baseline household survey has already been conducted. Due to delays in the start-up of the interventions, the baseline data took place almost six months before the intervention began. Time constraints will not allow the post-test to be pushed back; as a result, it will take place about six months after the intervention rather than the desired one year. Facility-level observations are made to identify potential confounding factors such as compliance with fee schedules, availability of drugs, sustained improvements in other aspects of quality.

**EXHIBIT 9.1
MAJOR APPLIED RESEARCH PROJECT STUDY DESIGN**

ACTIVITY	DATES	BOBOYE (Tax with copayment)	SAY (Fee per Episode)	ILLELA (Control)
Tax collection	Early 1991	yes	n.a.	n.a.
Setup of MIS	June-Dec 1992	yes	yes	no
Training in diagnostic and treatment protocols	June-Dec 1992	yes	yes	n.a.
Baseline household survey	Oct-Nov 1992	yes	yes	yes
Drug distribution and introduction of cost recovery	May 1993	yes	yes	n.a.
Bimonthly facility supervision and data collection	Aug 1993 – June 1994	yes	yes	n.a.
Additional data collection from facilities	Sept 1993 – June 1994	yes	yes	n.a.
Follow-up household survey	Oct-Nov 1993	yes	yes	yes

Notes: MIS = management inventory system; n.a. = not applicable.

9.7 SAMPLE SIZE

9.7.1 General Sample

According to the 1988 general census the population of the survey districts totaled approximately 554,000 individuals (Boboye; 205,000, Say; 163,000, Illela; 176,000). The sample covered 1,836 households using stratified sampling techniques. Ultimately, 1,825 households interviews were completed (99 percent). The completion rate was similar across all three districts. The eligible (residents or visitors) number of individuals interviewed in each district included 13,667, (Boboye, 5,181 individuals; Say, 4,610 individuals; Illela, 3,876 individuals), representing about 2.5 percent of the total population and of each district.

9.7.2 Study Sample

In the baseline survey, only a small proportion of those interviewed reported having an illness in the previous two-week recall period: Boboye had 26.2 percent (1,357 individuals); Say had 14.2 percent (655 individuals); Illela had 23.3 percent (903 individuals). The total study population in the baseline consists of 2,915 individuals.

The follow-up survey should generate about the same number of illness cases. Although the household survey will reinterview the same households, the individuals who reported an illness in the

baseline survey may or may not report an illness in the follow-up survey.

9.8 ANALYSIS

The empirical analysis will consist of two major components: a descriptive analysis and a multivariate analysis. This section discusses the unit of analysis, dependent and independent variables, and methods.

9.8.1 Unit of Analysis

The unit of analysis for descriptive and multivariate work will be the individual who reports a completed episode of acute illness during the two-week recall period. For each individual, the total patient costs incurred for curative treatment of an episode of acute outpatient illness will be calculated as the dependent variable. Individual sociodemographic, economic, and health status will be used as the independent variables.

9.8.2 Dependent Variable

The dependent variable will be the total patient costs incurred for curative treatment of an episode of acute outpatient illnesses (headaches, diarrhea, fever, and cough). Total patient costs per episode of acute illness will be constructed using the household survey data listed below. Two steps are required: (a) Identification of episodes of illness that are begun and completed during the two-week recall period (see *Exhibit 9.2*); truncated episodes will not be included in the analysis; and (b) Construction of total patient costs for completed episodes of illness (see *Exhibit 9.3*).

Payments in kind are measured using patient estimates of monetary value. Where estimates of opportunity cost of time are required, reported household income will form the basis for this calculation. Relevant variables constructed from the empirical estimation of health care demand will be used here when appropriate to maintain consistency between various components of the overall study.

**EXHIBIT 9.2
IDENTIFICATION OF COMPLETE EPISODES OF ILLNESS DURING THE RECALL PERIOD**

Select Cases Where All Symptoms Begin and End During the Two-Week Recall Period

Symptom	Date Symptom Began	Date Symptom Ended
Fever	V404A	V403MA,JA
Headache	V404B	V403MB,JB
Eyeache	V404C	V403MC,JC
Stomachache	V404D	V403MD,JD
Cough	V404E	V403ME,JE
Liquid feces	V404F	V403MF,JF
Blood in feces	V404G	V403MG,JG
Vomiting	V404H	V403MH,JH
Injury/accident	V404I	V404MI,JI
Other	V404J	V404MJ,MJ

Select Cases Where General Illness Period Falls in Two-Week Recall Period

Beginning of illness	V406M,J
Date received care for last time	V409M,J

EXHIBIT 9.3
TOTAL PATIENT COSTS PER TWO-WEEK TREATMENT PERIOD

Cost of home care before visit to health facility

- ▲ Payment for home visit by a health worker (v419)
- ▲ Payment for medication purchased for home care (v422)

Cost of first visit to first health facility

- ▲ Transportation costs of patient & accompanying persons to first facility (v431)
- ▲ Food & lodging cost of patient & accompanying persons during travel to first facility (v433)
- ▲ Opportunity cost of travel time to first health facility (v434A-B)
- ▲ Opportunity cost of waiting time at first facility health facility (v435A)
- ▲ Payment for first consultation to first health facility (v446A)
- ▲ Payment for drugs received at first facility (v448A)
- ▲ Payment for tests received at first facility (v450A)
- ▲ Payment for other services received at first facility (v452A)
- ▲ Monetary value of other payments in kind (v454)

Cost of additional visits to first health facility (up to six visits)

- ▲ Transportation costs of patient and accompanying persons to first facility (v431)
- ▲ Food & lodging cost of patient & accompanying persons during travel to first facility (vv433)
- ▲ Opportunity cost of travel time to first health facility (v434A-B)
- ▲ Opportunity cost of waiting time at first facility health facility (v435A)
- ▲ Payment for additional consultation to first health facility (v446B-F)
- ▲ Payment for drugs received at first facility (v448B-F)
- ▲ Payment for tests received at first facility (v450B-F)
- ▲ Payment for other services received at first facility (v452B-F)
- ▲ Monetary value of other payments in kind (v454)

Cost of visits to other health facilities (up to three more health facilities)

- ▲ Transportation costs of patient and accompanying persons to additional facility (Q?-demand study?)
- ▲ Food & lodging cost of patient & accompanying persons during travel to additional facilities (Q?-demand study?)
- ▲ Opportunity cost of travel time to additional health facility (v465AA-AH)
- ▲ Opportunity cost of waiting time to additional health facility (v466BA-BH)
- ▲ Payment for consultations at additional facilities (v459A-C)
- ▲ Payment for drugs received at additional facilities (v460A-C)
- ▲ Payment for other services received at additional facilities (v461A-C)

Notes: Household survey question number given in parenthesis. One or more of the components may be included depending on the amount of health-related services in the given episode.

9.8.2.1 Total Patient Costs per Health Center

Analysis of health center costs may indicate whether patients are compensating for higher health center costs in the intervention sites with other less expensive types of follow up care.

9.8.3 Independent Variables

A variety of factors affect total patient costs in addition to the presence or absence of the intervention. The independent variables listed below are those available from the survey that are expected to account for a significant amount of the variation in total episode costs. This analysis will closely follow the construction of variables used in the health care demand study.

- ▲ Sociodemographic
 - △ Age (V105)
 - △ Gender (V104)
 - △ Marital status (V106)
 - △ Ethnic origin (V107)
 - △ Education (V108-9)
- ▲ Economic status (as constructed in the health demand study)
 - △ Household monthly expenditures or annual income
 - △ Assets (i.e., physical condition of housing, rent or ownership)
 - △ Types of revenue (agriculture, livestock, trade, salaries, transfers)
- ▲ Severity of illness
 - △ Types of symptoms (V402A-J)
 - △ Multiple symptoms (V402A-J)
 - △ Days of illness (V405A-J)
 - △ Days work interrupted (V412-13)
 - △ Days in bed (V414-15)
- ▲ Other health-care related variables
 - △ Type of health care facility or provider used

9.8.4 Descriptive Analysis

The descriptive analysis will be a critical component of the proposed research. It will determine whether the proposed multivariate analysis is in fact feasible and which multivariate techniques will ultimately be most appropriate. The descriptive analysis will conduct the following key steps:

1. Review any findings (descriptive and multivariate) from the health care demand analysis to guide this empirical analysis.
2. Check the general validity and reliability of each item of data required for the analysis.

3. Determine whether valid and reliable measures of each independent variable can be feasibly constructed.
4. Construct total patient costs for an episode of acute illness.
 - ▲ Determine whether complete episodes of illness can be reasonably identified.
 - ▲ Determine whether total costs can be reliably calculated (including cash outlays, in-kind payments, and measures of opportunity costs).
 - ▲ Determine classification of completed episodes of illness by types of symptoms (single or multiple symptoms) and severity.
 - ▲ Determine numbers of completed episodes for various target groups in question (general population, by income, by gender, by key age groups) .
5. Examine distributions of each variable (mean, standard deviations, outliers, type of distribution, etc.).
6. Verify the comparability of control and intervention populations by comparing key independent variables from the pretest and posttest household surveys. Determine to what extent the quasi-experimental design has removed problems of selection bias.
7. Identify the presence of other potential confounding factors through examination of facility surveys (e.g., disruption in drug supplies, variation in other structural or process attributes of quality, other measures of successful implementation of user fees).
8. Modify proposed multivariate methods as appropriate.

9.8.5 Multivariate Analysis

If the descriptive analysis shows that all necessary variables can be adequately constructed and that there are no major problems with selection bias or other confounding factors, the following multivariate analysis is proposed.

Basic cost equations with total patient episode costs as the dependent variable will be estimated for each intervention and control site. The independent variables listed above will be used to explain variation in episode costs not directly attributable to the presence of the intervention. These equations will be used to generate predictions of total episode costs for each intervention and control site (i.e., adjusted episode costs). Ideally, the remaining variation in these adjusted episode costs should be explained by the presence or absence of the cost-recovery interventions. These predictions (adjusted episode costs) will be averaged for each site and tests for significant differences between each site separately and simultaneously will be conducted. This general procedure will be repeated for selected target groups.

Alternatively, a second (less preferred) approach is to conduct multivariate analysis on the pooled data (from all sites), while introducing dummy variables indicating the site from which the individual comes. This dummy variable can be included as an intercept term or interacted with other independent variables designating individuals in various target groups.

9.9 MANAGEMENT AND EVALUATION

9.9.1 Outputs

Progress Reports

Two progress reports (two pages) will be submitted: (a) The results of descriptive statistics and an explanation of final empirical methods to be used and (b) The draft, final report.

Draft Report

A complete draft of the final report will be delivered documenting the empirical methods, findings, and conclusions.

Debriefing

The team will also present the results from the draft report at a debriefing seminar for the Health Financing and Sustainability staff and other interested parties.

Final Report

A final report will be delivered after review of the draft report by the HFS staff.

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