Strategies For Pricing
Publicly Provided Health Services

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1. Overview

Most governments spend a large amount in the health sector. How these public expenditures are financed is a critical element of successful health policies, because it determines the budget available for public activities and has implications for how expenditures are allocated. Public expenditures are financed from both public and private sources, with public subsidies from the general government budget supplemented by revenues generated from private individuals through user fees. The combination affects how public subsidies are allocated across programs and who gets the subsidies. Subsidy allocation decisions also determine the extent to which the poor are cross-subsidized. The structure of fees provides financial incentives that affect utilization patterns and health outcomes, and affects how well individuals are insured against the risk of large economic losses associated with unexpected illness.

In this paper, we examine the way governments finance and allocate public expenditures. Much of the policy debate has focused on the extent to which governments are able to mobilize private resources that supplement public subsidies in financing public expenditures. Proponents of private resource mobilization argue that individuals are willing to pay for medical care and that additional financing will allow governments to expand and improve critical programs (e.g. World Bank, 1987; Jimenez, 1996). However, opponents argue that the poor are unable to pay for medical care and will be worse off if governments expand private resource mobilization (e.g. Cornia, Jolly and Stewart, 1987; Gilson, 1991).

Most of literature contributing to this debate has focused on the technical issues of how much money can be mobilized, and what is the impact on access to medical care and health outcomes. While informative, this literature does not fully prescribe optimal policy. Optimal policy needs to be based in terms of the benefit the policy would have for society above and beyond what would have happened without public intervention. The benefit of a proposed policy is the extent to which the policy ameliorates individual and social losses from private market failures. Priorities should be based not only the effectiveness of the policy, but also on the importance governments place on the types of losses and the individuals who incur the losses.

We examine the implications of current policy and possibilities for policy reform in the context of competing government priorities. Governments can intervene to correct private market failures that cause health outcomes to be lower than they otherwise could be, cross-subsidize the poor's access to medical care, and correct insurance and medical care market failure. Since governments have budget constraints, they cannot fully subsidize all programs and activities. In this paper, we argue the following:

- Public expenditures in the health sectors of countries can achieve important social goals of: a) improving health outcomes b) promoting non-health aspects of well-being, for example by insuring that individuals are not at risk for large unexpected economic losses associated with random adverse health events and c) financing redistribution to the poor. Optimal subsidy and fee policy will differ depending on how much relative weight government places on these competing objectives. Subsidies need to be reallocated toward the poor and toward public health programs. However, only a fraction of the resources needed to expand the health sector can be financed through increasing public subsidies.

- Prices for curative services (user fees) have two distinct roles. They can *raise revenue*, freeing public resources that can be reallocated to public health activities and for limited co-financing of curative care quality improvements. But perhaps more importantly, they can *improve efficiency* in the use of public facilities and of the health care system as a whole. However, the gains must be weighed against existing evidence that increased fees can compromise the goals mentioned above. The literature has tended to focus on raising revenue (and its consequences on the poor) whereas the more important effect is likely to be the guidance of resources. In general, user fees at point of service serve an important role in co-financing health care, but **not** as the primary means of finance.

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- There is evidence that revenue generated from user fees are sometimes used to finance improvements in quality and access to curative medical care. There is some empirical support to the notion that individuals are willing to pay at least a share of the cost of improvements in access and quality, especially for drugs. However, the wealthy are willing to pay a lot more than the poor. Therefore, if governments charge the "average willingness to pay" to finance quality improvements, utilization of the wealthy will increase and utilization of the poor will fall.

- Optimal policies will also depend on the behavior of consumers, private providers and civil servants. The first two determine the market environment in which policies operate - defining limits to or, sometimes, additional opportunities for what can be achieved. The last determines the abilities of governments to implement policies. We should not expect optimal policies from one context to generalize to all. Countries differ significantly by the relative weights of the goals of policy, and by the constraints they face in the extent of their resources and in the nature of the reactions of markets. Serious policy formation must rest on considerably more analysis relative to ideology than has characterized debates on the topic.

- Social insurance (SI) plans, which enable governments to mobilize private resources for the health sector by prepayment and charging for health services provided to beneficiaries, holds promise, particularly for middle and upper-income countries. These schemes mobilize private resources with no loss in the insurance value of the public health care system. Price discrimination is easier, because it can be centralized and it only needs to be done periodically outside the pressure of having to treat an illness. While prepayment plans hold promise, there is evidence that they introduce inefficient medical care cost inflation that lower and middle income countries may not be able to afford.

This paper is organized as follows. In section 2, we discuss the role fees play in the budgetary process. We consider how fees can stretch the government's budget available for expenditures on various programs and how fees can be used to allocate public subsidies to programs. From this discussion comes a set of conditions that determine how fees affect budgetary flexibility—most of which concern how price and quality affect utilization. In section 3, we review the empirical literature on utilization. While information, section's 2 and 3 are not about prescribing optimal policy. Rather they describe the options and trade-offs. In section 4, we use this information to discuss optimal fee policy depending on government objectives.

2. THE ROLE OF FEES IN THE BUDGETARY PROCESS

Public expenditures in the health sector are financed out of two sources: allocations from the general government budget (general tax revenues and donor assistance) and revenues from private resources. In many cases, especially in lower and middle income countries, the public sector collects private revenues through fees charged at the point of service.

Much of the literature justifies increasing user fees in terms of resource mobilization (or cost recovery) and in terms of providing incentives for more efficient use of public medical care services (e.g. World Bank, 1987). However, an equally important role is to determine the allocation of public subsides from the general government budget across services (e.g. hospitalization, primary care, vector control) and types of individuals (e.g. poor, children, etc.). The allocation of the subsidies is one of the major policy instruments that governments have to correct health care market failures and improve welfare.

In this section, we describe the role of user fees in determining the government's budget constraint. The structure of fees not only determines the amount of total resources available and how much is spent on each program, but also the extent to which a particular program's expenditures are publicly subsidized out of the general government budget. Finally, it is important to remember that this discussion is limited to how fees affect the budget that constrains governments' choices. It says nothing about which programs should be funds, how much to

spend on them, and how much of the expenditure should be financed out of public subsidies. That discussion requires information on the benefits of the allocations and the objectives of government intervention. That discussion is provided in section 5.

This section is organized as follows. In subsections 2.1 and 2.2, we discuss the resource mobilization role of fees in the public budgetary process. In subsection 2.3, we argue that setting user fees not only mobilizes resources, but also affects how public subsidies are used. Finally, in subsection 2.4, we address a critical design issue—namely that fee revenues be retained, at least in part, by the organization that collects them.

2.1 The Budget Constraint

Most of the resource allocation decisions that public health care systems must make are related to one another through the government's budget constraint. The two major categories of decisions are:

- What are services to offer and at what quality?, and

- What is the user fee or co-payment for each service?

These decisions are relevant to all levels of government where officials have to make finance and resource allocation decisions. In many countries decisions are made at very high levels of government either at the central or provincial levels. However, other countries are devolving resource allocation and financing decisions to the local levels. The analysis below applies to local officials and public facility level managers as well as central and provisional officials. The extent to which it applies to the local level depends on the degree of autonomy in the system.

The level of services and the fee structure cannot be set independent of one another, but rather must be set so as to satisfy the budget constraint—i.e. total expenditures must be less than or equal to total revenues. In the budget constraint, revenues come from public subsidies from general tax revenues—i.e. allocations from the general public budget plus donor assistance—and from user charges for services provided. This budget is spent on administrative costs, inpatient services, outpatient services, and public health disease prevention and control activities.

Government spending in health covers a wide range of services from public health activities such as the prevention and treatment of communicable diseases to curative services that benefit only the individual. Expenditures on some programs depend on the number of individuals who demand care—i.e. hospitalization, primary care, prenatal care, etc. While there may be short term rationing of these services, the public sector is typically under obligation to provide these services to all who show up for them. The costs of other programs, such as mass information campaigns and vector control programs, do not depend on the number of users. In many cases, the amount of funds available from these programs is determined residually to the amount spent on patient services both prevention and treatment.

The budget constraint, which sets expenditures equal to revenues, can be expressed as:

$$A + \sum_i c_{iI} U_{iI} + \sum_i c_{iO} U_{iO} + CDC = \sum_i f_{iI} U_{iI} + \sum_i f_{iO} U_{iO} + G$$

where:
A = Administrative costs

c_{iI} = Cost of Inpatient Service i

U_{iI} = Utilization of Inpatient Service i

c_{iO} = Cost of Outpatient Service i

U_{iO} = Utilization of Outpatient Service I

CDC = Expenditures on Programs that are not Utilization Driven
(e.g. vector control, research, sanitation, water treatment),

f_{iI} = User Fee Charged for Inpatient Service i

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f_{iO} = User Fee Charged for Outpatient Service i

G = Subsidies from the general tax revenues

Many policy makers promote user fees as a means of mobilizing private resources for public expenditures. It is important to note that charging user fees is not the same as forcing individuals to pay out of pocket. We are defining user fees as the price received by the facility of program which is not necessarily what individuals pay at the point of services. Indeed, individuals could contribute to prepayment or insurance plans to finance their payment of fees at the time of treatment. Moreover, there is no reason why the fees need to be paid to providers in the form of fee-for-service. Prepayment and insurance plans could just as easily pay providers by capitation. However, since insurance affects individual's utilization decisions and the form of payment affects provider behavior, the source and form of payment need to be taken into account when deciding on the structure of fees.

While the above characterization of the public budget constraint is described in the context of a centralized decision making process, it easily generalizes to a more decentralized structure. The simplest and most efficient budgetary model is where the organization that collects the fee revenues keeps them and is free to use them as it sees fit. In this case, fee revenues expand available resources and local managers, if competent and publicly motivated, can use the resources most efficiently to improve welfare. In this case, the central government has to decide on how to allocate its public subsides from the central budget among national programs and to lower levels of government (e.g. provinces, districts, states, countries). These lower levels of government then combine these allocations with resources from the subsidies from the local budget and decide how to allocate the combined resources among facilities and local programs. Then each facility and program, combines these allocations with fee revenue and makes expenditure allocation decisions among programs and services. Thus, each decision-maker in the process receives an allocation from a higher level of government—G in the above equation—and then combines it with local resources to finance its expenditures.

2.2 Resource Mobilization.

The classic formulation of resource mobilization is to raise prices (user fees) to generate private revenues that can be used to finance a service or finance improvements in the quality of that service. The practice of charging user fees for medical services at public facilities has been adopted throughout much of the world (Griffin, 1987; Nolan and Turbut, 1995; Jimenez, 1996). However, the fee structure and control over revenues varies greatly across settings.

Much of the evaluation of resource mobilization focuses on cost-recovery—i.e. the percentage of total costs.   However, it is not clear how to evaluate when cost-recovery ratios are too low. In particular, the value of private resources needs to be measured in terms of freeing up scarce public subsidies to be reallocated to higher priority programs such as contagious disease prevention and vector control, and in terms of providing facility managers with enough additional resources to make the difference between effective and ineffective treatment—in many cases drugs. The value depends on the extent to which the funds provide needed budgetary flexibility at the margin where small amounts of money go a long way.

Creese and Kutzin (1995) examine national cost-recovery ratios from 15 (mostly African) countries and find that 11 of them have fee revenues that finance less than 5 percent of public sector expenditures.   While these numbers are substantially below the 10 to 20 percent potential cited in the 1987 World Bank Health Sector Financing Report, it is hard to evaluate these data outside of the institutional and policy environments of the countries.   A number of questions come to mind. For example, how do these cost recovery ratios compare to government targets and how much potential revenue is not being collected and why. Many countries do not allow local units to retain and spend the fees, and put few resources into administrating and monitoring collection. In addition, the data sources for these figures are typically national information systems that many times suffer from serious under-reporting.

These data do not imply that well designed and administered programs cannot mobilize resources, just that many countries did not have the political will to do so. For example, China

has been extremely successful in mobilizing resources through fees (World Bank, 1996). Even back in 1978, before recent reforms were initiated, subsidies from general tax revenues financed only 28 percent of total public health sector expenditures. In 1993, public subsidies were reduced to 14 percent of total public health sector expenditures. The rest was financed through fees charged both insured and uninsured patients. Indeed, one can find higher cost-recovery ratios when one examines local initiatives where the revenue is typically retained and where it is easier to implement and evaluate resource mobilization efforts. For example, in 1993 the revenues from fees charged insured and uninsured accounted for 91 percent of hospitals expenditures and 84 percent of health center expenditures in China (World Bank, 1996). In Viet Nam, private revenues amounted to 36.5 percent in 1995 (Gertler and Solon, 1996). In Senegal, private revenues amounted to 127 percent of recurrent expenditures in health centers (UNICEF/BIMU, 1995). Similar examples of high percentages of private financing of recurrent costs are reported in Latin America, and elsewhere (Richardson et al., 1992; Olave et al., 1992; Barum and Kutzin, 1993; Lewis, 1993). In addition, McPake, Hanson and Mills (1993) found that in a number of African countries drug fee revenues were used to obtain tangible improvements in health services.

However, the evidence that some locales are mobilizing substantial resources does not account for the administrative costs of collecting the fees including the time (opportunity) costs of administering fee exemption policies. There is little if any credible data on this important issue. As noted by Creese and Kutzin (1995), most assessments take place in the context of schemes that have been funded through external assistance which biases down the estimates of real world administrative costs.

The extent to which raising fees mobilizes private resources depends on the extent to which individuals are willing to pay the higher price for the services. Patients are not willing to pay any amount for curative care. As fees rise, utilization will fall; The question is by how much? The less sensitive demand increases is to price increases—i.e. the more price elastic[1], the more revenue is mobilized through increases in fees. This is because price increase has two effects on revenues. It increases revenues by raising the revenue per visit, but it lowers revenues by reducing visits. If the reduction in visits is great enough, then price increases actually reduce revenues. Similarly, the less sensitive in demand, the less prices will change service use.

The story is somewhat more complicated with respect to increasing user fees to finance improvements in quality. In this case, there are two effects on utilization—the negative effects of the price increase and the positive effect of the quality increase. Both need to be measured to assess the amount of resources that can be mobilized. The less price elastic and the more quality elastic is the demand, the more the resources that can be mobilized from a fee increase used to finance a quality improvement.

2.3 Allocating Public Subsidies.

In this section, we will show that while fees may be able to mobilize private resources, they also determine the allocation of public subsidies. This point is extremely important since it is through the allocation of these public subsidies that the government is able to pursue its objectives and correct market failures. Increases in fees free up subsidies that can be reallocated to other programs. The more subsidies a given fee increase frees up, the greater the government's budgetary flexibility in allocating subsidies. Interestingly, we will show that the condition that leads to more budgetary flexibility is exactly the opposite of the condition that mobilizes more private resources—namely, the more price elastic in demand, the greater the amount of subsidies that are freed up.

To see this, we rewrite the budget constraint as follows:

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[1]Price elasticities are negative indicating that demand falls as prices rise. If the price elasticity is small, between 0 and -1, then demand is said to be inelastic as the percentage reduction in demand is less than the percentage increase in price. When demand is inelastic, price increases raise revenues since the positive price effect is larger than the negative demand effect. When the price elasticity is large, less than - 1, then demand is said to be elastic and increases in price reduce revenues because the negative demand effect outweighs the positive price effect. Finally, when demand is unitary elastic, equal to -1, the percentage decrease in demand is exactly equal to the percentage increase in price and there is no change in revenues.

$$A + \sum_i (c_{iI} - f_{iI})U_{iI} + \sum_i (c_{iI} - f_{iI})U_{iO} + CDC = G$$

where (c_{ij} - f_{ij}) is the public subsidy rate per unit of a service. Then the amount of public subsidies spent on a public program is the subsidy rate times the amount of services provided. In this formulation of the budget constraint, administrative costs plus the sum of subsidies to each of the services and public health program costs cannot exceed total subsidies allocated from the general government budget.

There are a number of ways the government might want to reallocate its public subsidies. Consider increasing public spending on public health activities such as vector control or sanitation—i.e. *CDC* spending. In order to increase *CDC* expenditures, the government must reduce subsidies to other programs otherwise it would spend more than its available resources and violate the budget constraint. To do so, it raises the fee for those services thereby reducing lowering the subsidy rate for existing beneficiaries of the program and inducing some to stop using the service.

The amount of subsidies that can be reallocated depends on the amount freed up by the price increase which depends on how sensitive utilization is to price. The more price elastic demand, the greater the fall in utilization for a given price increase. Therefore, the greater the amount of subsidies that can be reallocated through reductions in both unit subsidies and in volume provided. In essence, the more price elastic demand, the more easily the government can reallocate subsidies—i.e. the greater its budgetary flexibility. However, the more price elastic demand, the fewer the amount of private resources that can be mobilized.

Another reallocation priority maybe to shift subsidies from a lower priority patient care program to another higher priority care program. In order to increase public subsidies to a care program, the government lowers the fee charged thereby increasing the subsidy rate. The amount of public subsidies going to that program increases for two reasons. First, existing users of the program get a higher subsidy rate. Second the lower fee attracts new users who otherwise would not have gotten the subsidy. Again, in order to increase subsidies to a program, the government must reduce subsidies to other lower priority programs. As before, it lowers subsidies by raising the fee for those low priority services thereby reducing lowering the subsidy rate for existing beneficiaries of the program and inducing some to stop using the service. This discussion implies that reallocating public subsidies across care programs is a careful balance of raising and lowering user fees.

2.4 Revenue Retention.

An important assumption in this discussion is that any revenues raised from private sources are kept in the health sector. If the fee revenue must be returned to the general treasury, then resources effectively are not increased through the fee increase; the same holds for local health units who are forced to return revenues to central Ministries of Health. It is as if the government lowered public subsidies by one dollar for every dollar raised privately. Not only does this imply that no resources are mobilized, but there is no incentive for the health sector to collect these fees and substantially less revenue than could be raised is actually collected—an important administrative issue in implementing a successful user fee strategy.

In reality, while fee revenues are collected at the local level, the claim on the use is likely to be at higher levels of government. In the worse case, fee revenues just leave the health sector and are returned to the central or local treasuries so that they do not expand health sector resources. For example, Creese and Kutzin (1995) report that this is the case in African countries such as Eritrea, Ethiopia, Namibia and Zimbabwe.

A more subtle case which is harder to document is where the fee revenues just displace public subsidies by one dollar for every dollar of fee revenue raised. Indeed, Leighton (1995) cites Cambodia, Chile, China, Iran, Jordan, Nepal, and Thailand of cases where Ministries of Health budgets have reduced as fee revenues increase. In contrast, Kenya and the Central African Republic sought and received explicit assurances from their Ministries of Finance that public subsidies would not be reduced before they restructured fees.

In both the direct and subtle cases, fee revenues do not augment the policy-makers' and facility managers' abilities to expand and improve programs. Rather, user fees become just a method of reducing public subsidies to the health sector.

Even when the fee revenues remain in the health sector, many governments do not allow local facilities and programs control of the funds. In many countries, this is because local facility and program managers do not have authority on how to spend resources. For example, manpower and infrastructure decisions are usually handled at higher levels. At best local managers can alter the mix of drugs and supplies. However, few are allowed to shift resources between budgetary items. The reasons for this lack of local control in these countries include lack of budgetary skills and concern over graft. However, as the current decentralization trend gathers steam, this rationale may diminish.

Indeed, one reason to speed the decentralization process is that it improves the efficiency with which fees are collected. The point is that just because of a government mandates that fees will be charged doesn't mean that facilities and programs will actually collect the fees and remit them back to the government. Indeed, if revenues are simply passed onto higher authorities, then there is little or no positive incentive to collect them. All that remains is the threat of audit and punishment, which is costly and rarely credible. If, on the other hand, local facilities and programs are able to keep and use at least some of the revenues, then there is an incentive to collect them.

Despite the strength of this argument, there has been little systematic evaluation of the hypothesis that fee retention increase the efficiency of collection. There have been a few case studies, such as Chisvo and Munro (1994) in Zimbabwe, that raise this a reason that only a small percentage of public health sector expenditures are financed through fee revenue. In a study of Africa, Nolan and Turbot (1995) present cross-national comparisons of percentages of public expenditures financed through fee revenues and cannot find a correlation with fee retention authority. However, the comparisons are not clear and many other factors including differential fee policies could confound the observed cross-national relationship.

However, there is some evidence on the expenditure side that local control is important. Parker and Knippenberg (1991) examined 14 countries experiences under the Bamako Initiative and found that in the cases where there were increases in local management of resources, there was availability of essential medical care inputs improve and utilization increased. Mwabu et al. (1994) noted that while revenues from a 1989 fee increase were largely locally retained, the central treasury retained authority over spending. As a result, 40 percent of Kenyan facilities reported that they did not spend the revenues.

3. THE EFFECT OF PRICES ON THE BUDGET AND INDIVIDUAL WELFARE?

In this section we examine the empirical evidence on extent to which public health care systems are able to mobilize private resources, budgetary flexibility to reallocate public subsidies, and the consequences of these policies on overall access to medical care and health outcomes. This first two issues boil down to how much does raising a fee lower utilization. In subsection 3.1 where we review the empirical evidence on how increases in prices affect the utilization of the institution that raises the price—i.e. the own price elasticities of demand.

Whether inelastic demand is good or bad, depends on what the government wants to do. In the case of reallocating subsidies from one program to another, the more a given fee increase reduces utilization, the greater the amount of subsidies that can be reallocated. In the case, of raising fees to finance a program, the more price inelastic demand, the greater the amount of resources that can be mobilized. In the case of raising fees to finance improvements in quality, the less the fee increase reduces utilization and the more the quality improvement raises utilization, the greater the amount of resources mobilized. In this case, we are essentially asking how much are individuals willing to pay for the quality improvements which is examined in subsection 3.2.

 It is important to remember that the discussion in subsections 3.1 and 3.2 should be interpreted only in terms of implications for the budget and in terms of welfare. Just because we

observe a decrease in utilization of public facilities does not mean that access to all medical care or health outcomes were reduced. For example, the price increase could have induced individuals to substitute private sector care for public sector care, thereby not reducing access. In addition, those for whom the price increase caused them not to seek care at all, may have had only minor illnesses that did require treatment or could easily be treated at home. The point is that the own price effects tell us nothing about access and health outcomes, only about resource mobilization and budgetary flexibility in allocating public subsidies. We investigate the effects of price increases on access and health outcomes in subsection 3.3.

Finally, we note with caution that none of the discussion in this section is devoted to what governments should do. This discussion provides information of the budgetary constraints on government action and implications of actions on outcomes. To take the discussion a step further, we need to understand the objectives of government policy. This is the subject of section 4.

3.1 The Price Elasticity of the Demand for Medical Care.

There have been a large number of studies that have tried to estimate the price elasticity of demand for outpatient services using cross-sectional household surveys (Table 1). While a few early studies with questionable data found completely inelastic demand (i.e. no effect of price on utilization), most report that higher prices are associated with lower utilization, but that overall own price elasticities are low and well below unity. This suggest that increases in fees will mobilize substantial private revenues, but that flexibility in reallocating subsidies is limited.

Another important result coming out of a number of these studies is that price sensitivity differs among economic and demographic groups. In particular, the poor appear to be more price sensitive than the wealthy, and children's utilization seems to be price sensitive than adults' utilization. This means that increasing in fees may reduce the utilization of the poor and children by more.

Table 1:
Econometric Estimates of Own Price Elasticities of
the Demand For Medical Care in Developing Countries

Country	Data	Service Type	Own Price Elasticity			Source
			Overall	Low Income	High Income	
Burkina Faso	1985	Public Provider				Sauerborn et al. (1994)
	All Ages		-0.79	-1.44	-0.12	
	Age 0-1		-3.64			
	Age 1-14		-1.73			
	Age 15+		-0.27			
Cote d'Ivoire	1985	Health Clinic		-0.61	-0.38	Gertler & Van der Gaag (1990)
		Hospital Outpatient		-0.47	-0.29	
Cote d'Ivoire	1985-87	Health Clinic	-0.37			Dow (1996)
		Hospital Outpatient	-0.15			
Ghana	1987	Hospital Inpatient	-1.82			Lavy & Quigley (1993)
		Hospital Outpatient	-0.25			
		Dispensary	-0.34			
		Pharmacy	-0.20			
		Health Clinic	-0.22			
Kenya	1980-81	Government provider	-0.10			Mwabu et al. (1993)

Country	Year	Provider				Source
		Mission provider	-1.57			
		Private provider	-1.94			
Indonesia	1991-93					Gertler and Molyneaux (1997)
	Children	Health Center	-1.07			
		Health Subcenter	-0.35			
	Adults	Health Center	-1.04			
		Health Subcenter	-0.47			
	Elderly	Health Center	-0.47			
		Health Subcenter	-0.11			
Mali	1982		-0.98			Birdsall et al. (1983)
Nigeria						Akin et al. (1995)
Pakistan	1986					Alderman & Gertler (1997)
	Female	Traditional Healer		-0.43	-0.24	
	Children	Public Clinic		-0.43	-0.23	
		Pharmacist		-0.44	-0.25	
		Private Doctor		-0.17	-0.09	
	Male	Traditional Healer		-0.60	-0.26	
	Children	Public Clinic		-0.61	-0.27	
		Pharmacist		-0.63	-0.27	
		Private Doctor		-0.25	-0.10	
Peru	1985	Private Doctor		-0.44	-0.12	Gertler & Van der Gaag (1990)
		Hospital Outpatient		-0.67	-0.33	
		Health Clinic		-0.76	-0.30	
Philippines	1981	Public Providers		-2.26	-1.28	Chin (1995)
		Private Providers		-3.93	-2.23	
Philippines	1981	Prenatal Care	-0.01			Akin et al. (1986)
Philippines	1983-84	Urban Maternity	-0.24			Schwatz et al. (1988)
		Rural Maternity	-0.05			

However, policy makers need to view the results of these studies with some caution, since the studies suffer from several methodological problems. First, the countries studied typically had public institutions that charged very low fees with little geographical variation in those fees. In some of these studies, the investigators used travel costs to measure the price elasticities, since time costs ration the market when fees are low. These studies used the estimated models of demand to conduct policy simulations that forecast how increases in fees are likely to affect utilization and revenues. However, the forecasts were based on price changes well outside the observed range of the price data and are, therefore, highly unreliable. In particular, while individual's utilization decisions may be insensitive to prices at low levels of prices, they might be very sensitive to prices when prices are big.

A number of studies have evaluated actual price increases by comparing utilization before and after a fee increase at public facilities. In the Ashanit-Akim region of Ghana, Waddington and Enyimayew (1990) found that after an increase in user fees, long-term utilization fell at clinics serving poor patients but that utilization at clinics serving non-poor did not. Mwabu et al. (1995) reports a 52 percent decrease in outpatient visits to government health centers after the introduction of fees in Kenya in 1989. After suspension of the fees in 1990, visits increased by 41 percent close the original level. Yoder (1989) reports a 32 percent reduction in visits to government health care facilities after a fee increase in Swaziland. Greene (1994) reports a 50 percent fall in utilization at primary health units after the introduction of a consultation fee at government clinics in Mozambique. Kahenya and Lake (1994) report that attendance to 11 clinics in Zambia fell on average 64 percent with larger reductions occurring at facilities located in poorer areas. Finally, Bennett (1989) reported drops of 40 to 51 percent in the utilization of government facilities after they increased fees in Lesotho, and that the drops were greatest among children.

However, one needs to interpret these event history studies with a note of extreme caution. While the results of these studies are consistent with the econometric findings that demand is sensitive to price, but they only report the fall in utilization and say little about the degree of price elasticity. Large falls could be associated with big price increases so that demand is still relatively price insensitive. Moreover, these studies lack control groups where fees did not change, so one doesn't know how much of the fall in utilization was due to the price increase and

how much was due to other factors such as change in quality or changes in the disease environment.

Most of the results discussed so far analyze data that reflects the rules that governments use to set prices and locate facilities (Rosensweig and Wolpin, 1986; Pitt, Rosenswieg and Gibbons, 1993; Gertler and Molyneaux, 1994; Frankenberg, 1995). Since government policy is trying to achieve some objective, the variation in fees is not likely to be random but rather reflects government policy. In many cases, governments set fees and locate facilities based on the characteristics of the population, such as economic status and health problems. If the multivariate analysis does not explicitly account for the government's policy rule for setting fees and locations of facilities, the estimates of the effects of the fee on utilization will be confounded with the effects of utilization on government policy. [2] In addition, most of these studies have only rudimentary controls for quality of care. While they typically distinguish between levels (e.g., hospital, health center) and sector of care (i.e., public or private), they do not control for quality variation within provider types, such as drug availability and provider training.

Three studies that are not subject to these criticisms analyze the effect of experimentally designed fee increases on individual utilization in experimental and control areas. The first, Gertler and Molynueax (1997), estimated price elasticities of demand for outpatient services in Indonesia using longitudinal panel data in which public-sector user fees were varied experimentally in 2 of Indonesia's 27 provinces. The study design was integrated into the local political decision-making authority, already in the process of developing user fee increase plans. Rather than raising fees everywhere, fees changes were staggered to generate price variation based on an explicit experimental design. User fees were increased in some districts (treatment areas) but not in others (controls) and in both government health and health subcenters.

The estimated Indonesian price elasticities of demand are reported in Table 1. While price increase significantly lowers utilization, the effect on children is greater than on adults, and the effect on adults is greater than on the elderly. The demand for health center care is more price elastic than for health subcenters. This is not surprising, since health subcenters serve rural populations where there are fewer alternative (public or private) providers than in urban areas where health centers tend to be located.   In fact, the price elasticity of the demand for health center care is close to unity whereas it is well below one for subcenters, suggesting that little revenue will be mobilized by raising health centers fees, but that a lot will be mobilized by raising subcenter fees.

Similarly, Cretin et al. (1992 and 1996) reports results from a rural health insurance study in two rural Chinese countries in which copayments, another form of user fee, were experimentally varied to estimate price elasticities of demand. During 1989 and 1990, 26 villages in two rural counties of Sichuan Province, China participated in an experimental longitudinal study to provide an analytic basis for developing sound health care financing mechanisms in China. The experiment assigned each village two different health insurance plans, one to operate in 1989 and one in 1990. A total of eight different plans were assigned, with outpatient and inpatient coinsurance rates ranging from 30 percent to 75 percent. Three of these plans emphasized the coverage of outpatient care; three emphasized the coverage of inpatient care; and two represented a "balanced" coverage of outpatient and inpatient care. Although participation in the insurance plans was voluntary, each household had to enroll as a unit and participation rates were over 95 percent.

As expected, for outpatient services (used by about two-thirds of the population each year), higher coinsurance rates were associated with significantly lower probability of use and significantly lower expenditures. For inpatient services (used by only 3 percent of the population each year), the higher coinsurance also led to less utilization and less expenditures, although the

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[2] For example, if fees are set low in areas where people have serious illness problems, the observed correlation between prices and utilization reflects both the fact that sicker individuals use more health care and the effect of price on utilization. Alternatively, if facilities are located closer to urban areas where individuals are wealthier, then the correlation between travel costs and utilization reflects both the relationship between income on utilization and the effect of travel costs on utilization. In both cases, the price elasticity estimates are biased, since they are confounded with other omitted factors related government policy choices.

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decrease was not as strong. The results suggested that the demand outpatient services is more price elastic than the demand for inpatient services. Since more serious illnesses are treated by inpatient hospitalization, these results are consistent with the hypothesis that the demand for medical care is less price sensitive for more serious illnesses. This is somewhat reassuring in that it suggests that reductions in utilization from price increases are likely to be for less serious illnesses.

Manning et al. (1987) and Newhouse (1995) report the results of a large health insurance experiment (The HIE) in the United States conducted in the late 1970s. over 20,000 individuals in six sites were randomly assigned to one of 14 health insurance plans that had different co-payment structures. This experiment was different than the Indonesian and Chinese experiments in that it used controlled random assignment of a large number of individuals as its design. While the Asian experiments were controlled, individuals were not randomly assigned. Rather the intervention was at the community level. Randomization at the individual level provides a better design and more robust design (Newman et al., 1995).

The HIE was one of the first scientifically valid studies that convincingly documented that medical care individual's medical care utilization decisions were influenced by prices. The results indicated that prices had more influence on the decisions to initiate treatment than on the amount obtained once treatment began. Overall, the report price elasticities of about -0.2 and the price elasticity increases as the coinsurance rate increases. Moreover, demand for acute care and inpatient services were found to be less sensitive to price than chronic care and outpatient care. This is consistent with the Chinese results, and with the hypothesis that the demand for the treatment of more severe illnesses is less sensitive to price.

3.2 The Willingness to Pay for Better Quality and Access.

There is some empirical support that individuals are willing to pay at least a share of the cost of improvements in access and quality, especially for drugs (See Alderman and Lavy, 1996 for a review of the literature.) For example, a few studies of cross-sectional household data show that individuals are willing to pay at least some of the cost of improving access to medical care as measured by the distance they have to travel to reach the closest public facility (e.g. Gertler and Van der Gaag, 1990; Lavy and Germain, 1994). In addition, four studies that analyze cross-sectional data find that a number of structural quality indicators, especially drug availability, significantly affected demand in Ghana (Lavy and Germain ,1994), Nigeria (Akin, Guilky and Denton, 1995), Kenya (Mwabu and Ainsworth, 1993), and the Philippines (Hotchkiss, 1993).

The magnitudes of the estimated quality effects are quite large. For example, in Ghana, Lavy and Germain (1995) estimate that if the percentage of public facilities with drugs increased from its present 66 percent to 100, utilization of public facilities would increase by nearly 44 percent. Simultaneous improvements in drugs, infrastructure, and services would increase the use of public facilities by 127 percent. However, much of the increase in utilization comes from substituting public care for private care. The same quality improvements that increase public utilization by 127 percent only reduce self-care by 14 percent. Therefore, the net effect on utilization is quite small. However, users of public services now have higher quality than before. Since most of the effect of quality improvements is in the choice among providers rather than whether to obtain treatment, the net effect on health outcomes is determined solely through the increase in quality to exiting public sector patients and not through increased access.

These studies all use estimated parameters from demand models to calculate the willingness to pay for the quality and access improvements. Methodologically, this is equivalent to asking the question, how much would the fee have to increase to offset the increase in utilization from the improvement in its quality or access?[3] Gertler and Van der Gaag (1990) found that given the geographic distribution of individuals in Peru and Cote d'Ivoire, they are willing to pay on average about 20 percent of the cost of operating a health facility to reduce the distance from two hours travel time to zero to go to public health centers. However, the poor were willing to pay

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[3]Strictly speaking, the authors compute the compensating differential which is the amount of income the individual would be willing to give up for the quality improvement so that there is no change in welfare.

substantially less than the wealthy. In Ghana, Lavy and Germain (1994) found that individuals were willing to pay on average half the cost of improved access, with the poor again willing to pay substantially less. Therefore, if the government asked consumers to pay the "average willingness to pay" for improved access, utilization of the non-poor would increase while utilization of the poor would decline.

While these studies do demonstrate a significant statistical correlation between quality and utilization, there are questions about the direction of causality for several reasons. First, they used cross-sectional household data to investigate the effects of price, travel time, and quality on utilization and then use the estimated models to simulate the effects of price and quality changes on utilization. Thus, they suffer from the same problem as the cross-sectional demand studies discussed earlier: The results confound the effects of prices and quality on utilization with the effects of utilization on government geographical pricing and quality policy.

There are a number of longitudinal studies that do not suffer from this methodological problem of the cross-sectional studies. The first is a field experiment in the Adamaoua province of Cameroon where Litvack and Bodart (1993) investigated the willingness to pay for drugs. In a treatment area, facilities charged user fees to finance a revolving drug fund which increased drug availability. They found that utilization increased in the treatment relative to utilization in a control area. The conclusion is that the consumers in the treatment area were willing to pay for the drugs and, hence, their utilization increased. Using a similar methodology, Yazbeck and Leigfhton, (1995) investigated the effect the introduction of fees to finance better quality prenatal care in Niger. They found that prenatal care enrollments in programs in the treatment area increased relative to the control area, and that the increase was greater among the poor. However, in an analysis without a control group, Haddad and Fournier (1995) found that user fees led to a fall in utilization in Zaire, despite the fact that the drugs supply and the physical condition of the facility were increased at the same time.

A problem with all of this work is the measurement of quality itself. Most of the studies use structural measures of quality, such as the availability of drugs, personnel, physical infrastructure, and equipment. However, its not what you have--it is what you do with it that matters. Indeed, several studies show that process measures of quality are better predictors of health outcomes than structural measures (e.g., Peabody et al., 1995). Moreover, the most important measure, the availability of drugs, confounds supply and demand effects. Facilities may have shortages of drugs because they are of high quality and have high utilization that depletes the drug stocks.

3.3 The Effect Of Fees On Access and Health Outcomes.

The discussion in section 3.2 through 3.3 focused on the budgetary implications of alternative user fees policies in terms of trying to measure the extent to which fee changes are able to mobilize resources and the flexibility in subsidy allocation. This analysis characterizes the budgetary tradeoffs among policies. While knowing the own price elasticity of the demand for public facilities is needed to forecast expected revenues, it is not sufficient to evaluate the impact on individual welfare. As a step towards this, we review the empirical evidence on the effect of prices and quality on access to medical care and health outcomes in this subsection

The first question regards the effect of price increases on overall access. In other words, did the individuals who chose to no longer obtain treatment at public facilities switch to self-treatment or switch to treatment from the private sector. To measure the effect of price increases on access, we examine the effect on the utilization of all providers, both public and private.

In their research in Indonesia, Gertler and Molyneaux (1996) examined effect of public health center fees on total visits including visits to all public and private providers. The second row of numbers in Table 2 reports the elasticity of total demand with respect to an increase in public health center fees. The total demand price elasticities are less than health center demand price elasticities, implying that some individuals did indeed switch to other providers as opposed to self-treatment. Similarly, Bennett (1989) reports that after a fee increase in Lesotho, about half the reduction in public sector utilization was a reallocation to private facilities.

Returning to Indonesia, in urban areas, where there are more private sector alternatives, the total visit elasticity is about half of the health center elasticity, implying that about half of the reduction in utilization switched to other providers and about half to self-treatment. In rural areas, the total elasticity is about two-thirds the health center elasticity, implying a much larger percentage switched to self-treatment than in urban areas. These results suggest that public-sector fee increases reduce access more in rural areas where there are fewer private-sector alternatives.

Table 2:

OWN AND TOTAL PRICE ELASTICTIES IN INDONESIA

The % in … With a 1% Increase in Health Center Fees	Children		Adults		Seniors	
	Urban	Rural	Urban	Rural	Urban	Rural
Visits to Health Centers	-1.07	-0.63	-1.04	-0.01	-0.45	-0.47
Visits to All Providers	-0.48	-0.49	-0.70	-0.0	-0.22	-0.39

Source: P. Gertler and J. Molyneaux (1997)

Simulating the effect of public fee increases on public facility on total utilization also requires information on how competing private-sector providers respond to the increased prices charged at government facilities. When government providers raise their prices, some patients may shift to the private sector, which may lead private providers to respond to the demand increase by raising their prices. The extent of the price response depends on the extent of the increase in demand and slope of the private-provider supply curve. The larger the private-sector price response, the fewer the number of people who will switch to the private sector, implying that more individuals will choose self-treatment or remain in the public sector.

Private-sector price responses are likely to be very important. When public user fees were increased experimentally in Indonesia, Gertler and Molynueax (1996) found that while the fee increases caused some of the individuals to substitute self-treatment for care at public facilities, the increases caused others to turn to the private sector instead. The resulting increase in demand caused private doctors and private nurse/paramedics to increase their fees in response to the increased demand.

Table 3 reports the percentage changes in private-provider fees in response to a 100 percent increase in public health center and subcenter fees. The results are stratified by market type: urban areas where only health centers are available, semi-urban areas where both health centers and subcenters are available and rural area where only subcenters are available.

Table 3:

PRIVATE PROVIDERS' PRICE RESPONSES TO PUBLIC-SECTOR FEES IN INDONESIA

	Urban Areas: Health Center Only	Semi-Urban: Both Center & Subcenter	Rural Areas: Health Subcenter Only
Change In Private Doctor Prices In Response To A 100% Increase In . . .			
Health Center Fees	4.4%	18.4%	--
Health Subcenter Fees	--	3.5%	20.1%
Change In Private Nurse/Paramedic Prices In Response To A 100 % Increase In . . .			
Health Center Fees	23.8%	9.5%	--
Health Subcenter Fees	--	16.7%	57.9%

Source: P. Gertler and J. Molyneaux (1997)

Both private doctors and private nurse/paramedics increased their prices in response to the increase in public-sector fees. In general, the private-sector responses where greater in semi-urban and rural areas, where there is more direct competition between the public and private sectors. Similarly, private nurses/paramedics, who are closer substitutes to public primary care facilities, had larger relative price responses than private doctors. The price elasticity estimates reported in Table 2 reflect both the fee increases in public sector and the consequent fee increases in the private sector.

These reductions in total utilization associated with the fee increases can have negative health affects. In the Indonesia user fee experiment, Gertler and Molynueax (1997) show that the observed reductions in utilization were not only for minor illnesses, but for medical problems that measurably affect health status indicators. The fee increase caused increases in illness symptoms associated with infectious diseases and the duration of illness for all age groups. These results that an important channel by which prices hurt health is by delaying treatment to the point of reducing the efficacy of medical intervention. An extreme case of this may be in delaying seeking help for emergency care. In addition, the fee increases reduced older Indonesians' (age 50 plus) ability to function physically as means by a series of Activity of Daily Living measures and increased days of restricted activity due to illness. Dow (et al., 1997) shows further that the increase in the fees had a large enough negative effect on health that it reduced labor force participation among women.

In addition, there is empirical evidence that suggests that increases in access and quality do improve health outcomes. In a cross-sectional analysis of household data, Benefo and Schultz (1994) found that child mortality was lower among families that lived closer to government health facilities in Cote D'Ivoire and in Ghana. They also found that a doubling of drug prices was associated with a 50 percent increase in child mortality. Thomas, Lavy, and Strauss (forthcoming) found in an analysis of cross-sectional data from Ghana that improving drug supplies significantly improved the nutritional status of children. In an analysis of cross-sectional data from Jamaica, Peabody et al., (1996) found that the birthweight of babies was 500 grams higher in communities that offered better prenatal care services using process measures of quality.

However, as with the cross-sectional studies of demand, one is not sure how much the associations between health outcomes and quality of care reflect the impact of quality and access on health outcomes or the effect of outcomes on the government policy toward to the geographical allocation of facilities and quality. One of the few explicit attempts to sort out the direction of causality is Frankenberg (1996) who used longitudinal data from Indonesia to show that infant mortality was lower in families located closer to public health centers.

These results suggest that there are real returns to public programs and public subsidies in terms of health outcomes. Raising fees thereby lowering subsidies can have negative health consequences. If governments choose to raise fees, then, unless the freed subsidies are reallocated to more efficacious programs, health outcomes may deteriorate. There is evidence to suggest that investing the subsides in better access and quality can improve health outcomes.

5. HOW SHOULD GOVERNMENTS SET FEES?

While the above analysis suggests that governments may be able to mobilize private resources to co-finance public programs, it does not provide guidance on how to choose the optimal combination of user fees and allocation of public subsidies across programs. Optimal policy needs to be based on what is best for furthering social objectives subject to the limits imposed by medical, behavioral, and economic constraints. There are three general groups of objectives often cited: improving health status, improving equity in terms of access to medical care, and improving individuals' insurance against the risk of large financial losses due to expected ill-health (Hammer and Berman, 1996). In many cases, the policy prescriptions that best further each of these objectives individually conflict with one another. Therefore, because

resources are constrained, governments must make trade-offs in financing programs and base those decisions on the relative values it places on each of the objectives.

Regardless of the objectives a government is pursuing through its involvement in the health sector, most countries have limited public resources to invest in health. In allocating their limited budgets government officials and program managers must use the resources wisely and get as close as possible to their goals within a fixed budget. Above, we considered the possibility of charging user fees to generate revenue generation to supplement the public subsidies allocated from general tax revenues available to finance public programs. Here, we consider the joint problem of how to set user charges and allocate the total budget (public subsidies plus user fee revenues) while maximizing government objectives. In this section, we consider optimal policy when health outcomes as the single objective of public policy and discuss how the policy would be adjusted when equity and insurance considerations are added.

4.1 What Do Prices Do?

One of the key messages of this paper is that level of fee charged determines the degree to which a particular program (or group) is subsidized. Much of the user fee is couched in terms of whether governments should raise fees closer to the cost of providing the service. To help guide optimal fee policy, we turn this question around and ask when should government subsidize services so as to lower prices bellow the cost of providing the service.

For most commodities, there is a certain "rightness" about the level of use (demand) when consumers face a price reflecting the true resource cost of producing it. People ask themselves "is it worth buying the commodity?" given all the other things they can do with their money. If the answer is yes, then they get more value out of it than it costs society to produce it. If not, then they decide to spend their money on something else that they think is more worthwhile for the price. Individuals don't purchase good or services whose prices exceeds the value the person places on it. Similarly, if someone is in a position to provide a good or service, they will do so only if the price exceeds the cost of their making it. So prices tell both producers and consumers how much something really costs to produce and how much people really value it.

Several examples of the way prices can help guide resources efficiently in the health sector follow. People often bypass lower level clinics to go to hospitals even when the clinic could have handled their problem because they will get better care at the hospital and if they are both free, or have the same price, why not? If prices reflected the cost of the service, then hospital prices would be higher than clinic prices and only those who valued the hospital service more than its unit cost would bypass the clinic. A second example is to limit use of services if people do not think their health problem is not serious enough to be worth the trouble and cost of seeking help. Seeking help takes up real resources in terms of the time of trained professionals as well as increasing congestion and waiting time for others. If prices are less than the cost of providing treatment, then treating minor problems whose value is less than the cost is inefficient. The main point is that prices serve to make people's choices efficient—putting resources where they are most valuable to them.

What's wrong with this picture? For any of several market failure reasons[4] the amount demanded, or the value placed on goods may not be "right". The value to society for seeking care or providing a service may be higher than that privately judged by the individual. If this is the case, then society benefits if more people use the service more than would based on individuals' private benefits and this justifies public subsidies to lower the price. How much of a subsidy depends on the degree to which the social value exceeds the private value. How much benefit can be improved with subsidies also depends on how responsive to prices consumers are. The more price elastic the demand, the greater the social benefit from a given subsidy.

Allocating government subsidies, as with government intervention in any sector, needs to be justified in terms of the benefit the investment would have for society above and beyond what would have happened without public intervention. The way to assess the benefit of a proposed public intervention is to identify the failures of private markets and quantify the loss from these

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[4] As will be argued below, which of these several reasons matters in the design of the appropriate policy.

failures. Priorities should be based on the degree to which the subsidy ameliorates these losses, and the importance governments place on the types of losses and the individuals who incur the losses. Important market failures in the health sector that justify public subsidy are public goods, inequity in access to medical care, and insurance market failure due to asymmetric information.

4.2 Improving Health Status.

In most countries, Ministries of Health try to improve health through spending on public health activities and delivering health care services in public health centers and hospitals. This is why policy-makers become concerned when fee increases lead to big reductions in utilization[5].

One of the major policy levers by which MOH can improve health status is to encourage or discourage utilization by the way it sets the price of health care services. MOH may want to stratify its price subsidies to encourage utilization of specific services (e.g., immunizations, prenatal care) and by specific groups (e.g., the poor). However, not all increases in utilization are from new utilization. Some may be substitution for private-sector services (or other less public services) that have been substituted for by the subsidized public services. The degree to which the increased utilization improves health depends on the efficacy of the additional health care consumed. By additional care consumed, we have to subtract any reduction in private-sector services for which the individual would have purchased had there been no subsidy.

However, the MOH does not have unlimited public resources with which to spend on its various activities. The MOH has a fixed budget which it can relax only by charging fees for its services. While price increases may generate substantial revenues, they also deter individuals from seeking care who might have sought the treatment when it was priced lower.

In order to translate this discussion into a set of policy rules, we need to establish the link between policy levers and objectives of policy. Therefore, since MOH's objective function is in terms of health and its policy levers are in terms of prices which determine both the level of private resources and the allocation of public subsidies, we need to establish the linkages between health and prices. By altering prices, governments affect the utilization of medical care and the amount of money spent on public health activities. Utilization of medical care and public health programs influence health outcomes.

With improved health as the objective and the links between policy and objectives established, we are able to identify four pricing principles that need to be balanced for the government to get the most health out of its available budget for subsidies.[6]

1. *Subsidies should be higher for those services where public care is better than private* — i.e. for those services that yield the best health outcomes compared to peoples' alternative source. If the alternative to public care is a traditional healer of dubious quality, fees should be raised with great caution. If the alternative is a reasonable private sector (in Indonesia, the private sector consists of public providers in their afternoon hours), then fees may make more sense. Obviously, if health is the objective, then it is better to encourage the use of the most productive services through subsidized prices.

2. Subsidies should be higher for those services for which total (public and private) demand is most elastic with respect to fees in public facilities. Governments cannot mandate the use of health care. They can only provide incentives for use. Subsidies encourage use of a service by lowering the price. The more price elastic is demand, the larger the increase in utilization from a given price subsidy. However, demand may be more price elastic for less efficacious services. Therefore, the subsidies should be higher for those services which produce the most health. These services are most

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[5] However, it is interesting to note that this runs counter to an economic notion of welfare. A fee (price) rise hurts all consumers though it helps all producers. The amount of harm to the individual is proportional to the amount they consume. If individuals are able to find other goods and services that are close substitutes, then they can mitigate welfare loss from the price rise by moving reducing consumption of the now higher and increasing consumption of close substitutes. This implies that fee increases have lower welfare effects when demand is price elastic.

[6] See Hammer (1996) and Gertler and Hammer (1996) for formal derivation and detailed of the pricing rules.

successful in producing the most health because of the combination of efficacy and of the volume of patients generated by the introduction of the subsidy.

3. *Subsidies should be higher for those individuals whose demand is more price elastic.* For similar reasons as in (2), subsidies produce more health for groups of individuals for whom the subsidy is more likely to encourage use. This implies that subsidies should be higher to poor individuals whose demand is more price elastic. An interesting implication of this pricing principle is that it is optimal to lower prices to the poor even if the government is ***not*** concerned with equity nor with welfare but is concerned with health status per se.

4. *Subsidies should be higher for those services and in those areas where there are limited private sector alternatives (competition).* Subsidies will produce substantially less health if they only cause individuals to substitute out of the private sector into the public sector. The most health will be produced when subsidies encourage new utilization so that illnesses that would not otherwise have been treated are now treated. This implies that certain types of preventive services and health care services in rural areas should be more heavily subsidized because there are fewer private sector alternatives.

The first three principles argue that setting prices for services or for particular groups must balance two competing needs: (1) limiting the adverse health effect from a reduction in utilization, and (2) mobilizing resources that can be used to subsidize other activities or groups and provide more services. Services or groups for which prices discourage large numbers of individuals from getting treatment (price elastic) should have lower prices. Conversely, when demand is more price inelastic, higher prices mobilize more revenue that can be used to cross-subsidize other beneficial activities and affect health status less. The basic idea in setting prices is to push the public subsidies as far as it can go in achieving health gains. This implies that price subsidies need to be assessed in terms of their effect on health outcomes and their impact on the budget, rather than relative to the resource costs of service delivery.

The first and last principle point out that the interaction between the public and private sectors is critical in setting prices. If the private sector offers comparable quality services and individuals are willing to pay the private sector price, then the government subsidies will not improve health. All they will do is cause individuals to substitute public-sector care for private-sector care. In this case, MOH should not provide the care or at least price the services so that few subsidies are absorbed. This is clearly the case for VIP rooms in hospitals since the only group that uses VIP rooms are the wealthy and these services are usually available in the private sector.

When the public sector lowers its prices because of subsidies and draws patients away from the private sector, it is in essence competing with the private sector. The availability of subsidies to public-sector providers lowers the profitability of private-sector providers. Public subsidies affect the prices that the private sector can charge and raise speculation on whether it is profitable to locate in the same area. The fact that there are no private providers in an area is not necessarily an indication that the area would not be served by private providers if there were no public services available. It is only a statement that the private sector does not currently find the area profitable. As the public sector raises its prices, however, the competitive constraints on the private sector are eased. As a result, we may see the private sector raise its prices and possibly new private sector entry into the market. These supply responses will affect the demand for public- and private-sector services and, therefore, affect health outcomes and resource mobilization. Therefore, these supply responses need to be factored into the setting of public sector prices.

One clear message is that the government should subsidize services that the private sector is unlikely to provide. The most obvious candidates are public goods. A pure public good is one for which a private market cannot exist at all because beneficiaries cannot be made to pay for benefits (non-excludable) and one person's benefits are not reduced by others' benefiting as well (non-rivalrous). In the health sector, the best examples would be some forms of vector

control (e.g. draining swamps), some forms of sanitation, especially in urban areas and the provision of health information and education for activities such as washing hands which have no product associated with them which advertising would promote. Research, epidemiological surveillance and monitoring food and drug safety are other examples. A health service has a positive eternality if its use generates benefits to society above and beyond the benefit to the private individual. The most common eternality in the health sector comes from prevention and the treatment of infectious diseases. For example, in The Gambia, the use of pesticide-treated bed-nets reduced the incidence of malaria even among those who do not use such bed-nets suggesting that the societal benefit from bed-nets was greater than the private benefits (Tropical Disease Research Program, 1995).

Left to their own devices, individuals will prevent and treat infectious diseases less than is socially optimal. Many individuals are not willing to pay the full cost of immunization because they know that they will be protected if enough other people get immunized.[7] Even with worthwhile medical benefits to individuals, the cost may impede seeking treatment soon enough to prevent the spread to other individuals or from completing the full course of treatment. The consequence of not completing drug therapies may not only lead to a resurgence of the disease, but also to an increase transmission and the risk of promoting resistance to known drug therapies. For example, tuberculosis is a virulent, communicable disease, and although the drug therapy is both available and effective, it is expensive. Individuals feel better after partial treatment and tend to want to stop treatment long before the course of drugs is completed. They remain a public hazard as they can still transmit the disease.

To get individuals to obtain the proper levels of prevention and treatment, the government needs to use public subsidies to lower the price of these services so as to encourage utilization. In some cases, the government must fully subsidize the activities.

Some countries so indeed fully subsidize the prevention and treatment of communicable diseases. For example, Creese and Kutzin report that Ethiopia, Ghana, Jamaica, Mali, Niger, PNG, and Zimbabwe do not charge for the treatment of tuberculosis. And all of these countries, except PNG, do not charge for the treatment of STDs. There is evidence that subsidizing the use of public good programs leads to improvements in utilization. In Zambia and China, child immunization rate fell dramatically after the introduction of user fees (Booth et al., 1995; Sheng-Lan et al., 1994).

Taiwan, China provides an example of huge increase in health status indicators through public health investments while at style at low levels of income. In the 1950s Taiwan, China was faced with extreme poverty with a per capita income of below $150 in today's terms. Associated with this low living standard were widespread incidences of infectious and parasitic diseases. In 1952, the major causes of death were gastritis, duodententis, enteritis, clotitis, pneumonia and tuberculosis. About 1.2 out of a population of 7.8 million were infected with Malaria. In 1962, 383 cases of Cholera were reported. Approximately 90 of the population were infected with hepatitis B by age 40, and around 15 to 20 percent were hepatitis B carriers. The infant mortality rate was about 45 per thousand live births and a maternal mortality rate of about 197 per 100,000 live births. The Government reacted to these problems with extensive public health improvements in water supply and sanitation, disease control programs, and immunization campaigns. Free vaccinations against the major infectious diseases were made available to infants and preschool children. In order to expand immunization, health education and treatment, the government also setup primary care facilities throughout the country.

These efforts in combination with improving living conditions were able to control infectious diseases by the mid-1960s. There have been no cases of smallpox or rabies since 1959. In 1965, Taiwan, China was declared Malaria free by WHO. By 1970, Taiwan, China had achieved health status close to that in most developed countries today. Life expectancy increased from 55 years in 1951 to 69 years in 1970. Neonatal mortality fell by more than half between 1955 and 1970. Infant mortality decreased by about two-thirds over the same period, and maternal

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[7] Transmission of an infectious disease is affected mostly by the number who are immunized. Individual immunization thereby confers benefit to those who are not immunized

mortality had similar improvements. It is critical to note that these successes were achieved at very low income levels. In 1970, real per capita income in 1993 dollars was $389 which would place 1970 Taiwan, China among the poorer countries in today's world.

Table 4: Health Status in Taiwan, China, 1950 to 1993

Year	GDP Per Capita (1993 US $)	Life Expectancy at Birth	Neonatal Motility Rate	Infant Mortality Rate	Maternal Mortality Rate
1955	---	61	18	45	159
1960	$ 158	64	15	35	106
1965	$ 218	67	9	24	75
1970	$ 389	69	7	17	40
1975	$ 987	71	5	13	25
1980	$ 2348	72	3	10	19
1985	$ 3,247	73	2	7	10
1990	$ 7,916	74	2	5	12
1993	$ 11,464	75	2	5	9

Source: Health and Vital Statistics I and II, Department of Health, Taipei.

A second clear message is that governments should not expand resources where a market exists and is functioning well. If the private sector provides an acceptable and affordable alternative to a public service, there is little justification for the public sector to be involved in subsidizing that specific service. This situation is most likely to exist in the market for outpatient services and drugs for treating non-communicable diseases. In this case, the benefits of treatment accrue mostly to the individual and therefore there should be a private market for these services. Moreover, this is a justification to shift more subsidies to rural areas where there are fewer private alternatives.

A possible role for government in the market for individual (non-public good) health care services such as curative care is that case where private providers have market power to set prices above marginal (incremental unit) costs such as in the case of monopoly[8]. When private prices are above marginal costs, utilization is lower than would be warranted by the cost of providing the service and there is (deadweight) loss in economic efficiency. In this case the government could either try to regulate private sector prices or directly provide them through the public sector priced at cost.

A third message is that prices should be used to direct individuals to the most efficient treatment location. Illnesses and prevention activities that can be efficiently treated at cheaper health clinics should not be treated at hospitals. Because the demand for the treatment of more serious illnesses is less price elastic, increasing the price of hospital care relative to health center care will induce individuals with less serious illnesses to not bypass health centers in favor of hospitals. Such cascading systems of charges do exist in a number of countries including Kenya, Indonesia, Namibia, Zambia, and Zimbabwe (Barnum and Kutzin, 1993; WHO, 1994). Criel and Van Balen (1993) reported that these prices structure did indeed move individuals out of hospitals into health centers in Zaire. However, in Zambia and Zimbabwe, hospitals are still overcrowded and health centers still underutilized. This implies that either the price differential is too low or that there are few services of real value provided at the health centers—i.e. the centers have no drugs and few qualified medical personnel. In the later case, the quality adjusted price differential is too low and, in any event, there is no health benefit of sending individual to health centers. This would require improvements in quality to justify keeping health centers open.

A fourth message is that governments should not use across the board consultation fees that are the same for each diagnosis and demographic group. The prevention and treatment of illnesses that have large public health externalities and for which demand is most elastic should

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[8] Another reason for government to intervene in the market for individual health care services arises when the private provider has more information about the patient's illness than the patient and the provider is not a perfect agent for the patient. By perfect agent, we mean that the provider cares about more things than the patient's health. In this case, the provider could induce the patient to buy more services than he or she might otherwise buy.

have lower fees—i.e. higher subsidies. Across the board fee increases in Kenya led to a reduction in the treatment of STDs by about 40 percent and similar results were found in Zambia (WHO, 1994). Similarly, across the board fee increases led to reductions in child immunizations in China (Sheng-Lan et a., 1994) and in Swaziland (Yoder, 1989). Also, there is strong econometric evidence that children's demand for medical care is more price sensitive. This in addition to the importance of prevention and treatment early in life suggest that higher subsidies should go to young children. A similar price elasticity argument can be made for directing more subsidies to the poor. However, charging the poor a lower fee is administratively a difficult problem to address somewhat in the next sub-section.

4.3 Adjusting Policy to Improve Equity.

Most countries recognize that poor individuals may not be able to afford health care and therefore subsidize their access to care. In countries where health care is delivered through public delivery systems, subsidies are used to keep user charges low so that even the poorest families can afford medical care. Support for this use of public subsidies are often based on the idea that nobody, regardless of income, should be denied access to basic minimal health care. While these commitments are not boundless, they are pervasive throughout the world. This has important implications in that redistribution policies are inseparable part of health care policy. Unless private health care and insurance markets are able to guarantee universal access, governments will intervene and subsidize certain services and groups to varying extents.

Before we begin, it is important to emphasize that the health sector is not a good vehicle for general poverty alleviation. Studies of the demand for medical care show it to be an income elastic good (e.g. Gertler and Van der Gaag, 1990; Baker and Van der Gaag, 1995)[9]. This means that the rich spend a higher fraction of their income on health care than do the poor. Therefore medical care subsidies accrue more to the rich more than the poor. There are other goods which are more income inelastic (e.g. food) that would be better vehicles for general poverty alleviation.

Much of the concern over user fees is based on the concern that increasing fees may reduce utilization by the poor—a reasonable concern given the strong empirical evidence that the poor's demand for medical care is more price elastic discussed in section 3.1. Moreover, this extents to the case where fees are used to generate revenues that finance improvements in the quality of and access to curative care. The extent to which this policy improves welfare depends on how willing individuals are to pay for the quality and access improvements. If individuals are willing to pay the full cost of the improvement, then the improvements can be fully financed through increased user fees without reductions in utilization. However, if the wealthy are willing to pay but the poor are not, then this policy could lead to a reallocation of public subsidies from the poor to the wealthy. Thus, equity proponents are concerned that increased user fees would become a financial barrier to the poor and reduce their access to care (e.g. Cornia, Jolly and Stewart, 1987; Gilson, 1990). In this case, there is a tradeoff between using subsidies to pursue equitable access to medical care and overall improvements in health.

Under the current situation needs to be remedied because most of the curative public expenditures go to the care of the non-poor. Moreover, the poor actually pay higher prices than the non-poor when transport and other time costs are taken into account. This is because the current geographic distribution of public facilities implies that the poor must travel significantly further than the non-poor. These higher prices are in part responsible for the poor having low utilization rates and obtaining only a small share of public subsidies.

In this section, we consider pricing policy in the context of the government expanding its objectives beyond health to include equity concerns in its objectives for pricing policy. We begin with the common approach of using across the board subsidies, which are used by many countries, and then move to price discrimination strategies that try to exempt the poor from paying fees.

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[9] The best candidates for redistribution via subsidies are goods and services that have low or negative income elasticities of demand—i.e. those goods and services whose use does not increase with income. These are the things that poor people tend to consume relatively more than other things.

Across the Board Subsidies. Many governments try to promote equity through subsidizing the public health care system. Because low income countries have trouble implementing means of testing (i.e. identifying the poor individually by examining their financial resources), they keep fees low for everyone. This amounts to across the board subsidies from the average taxpayer to the average user of health facilities. If the average user is poorer than the average tax payer then there is a net redistribution of income.

However, many countries allocate most of their public subsidies to the services used least by the poor—i.e. hospital services. These services are expensive and are rationed by prices, travel time, and social status rather than by clinical need. As a result, public subsidies tend to benefit the wealthy more than the poor. Governments can better target subsidies to the poor by more heavily subsidize services used by the poor.

Indonesia is typical of countries that try to subsidize the poor's access to medical care through low-fee public health care systems. Figure 1 presents the percentage of public subsidies that accrue to families in each income quintiles. The subsidies are calculated as number of visits made to each public facility times the subsidy (unit cost less the user fee). The wealthiest quintile captures about 29 percent of total government health care subsidies, whereas the poorest quintile obtains only about 12 percent of total subsidies. This is in part due to the fact that wealthy use hospital services in much greater rates than the poor. One reason for this is that hospitals tend to be located in urban areas closer to the wealthy and far from the rural poor. That the wealthy capture more subsidies is not only due to the fact that they have much higher utilization of hospital inpatient and outpatient services than do the poor, but also that hospital services are subsidized at much higher levels than are health center and health subcenter services[10].

A similar story is told for Viet Nam (World Bank, 1995). The allocation of public subsidies increases with income. The overall results is driven by the fact that the wealthy capture a much greater share of both hospital inpatient and outpatient subsidies. This is because they use hospital services more and hospital services receive the highest unit subsidies. While the poor use commune health centers at much greater rates than the non-poor, this has little impact on the benefit-incidence distribution because the public subsidies to commune health centers makeup a very small portion of total public expenditures.

With across the board subsidies, a major cost of subsidizing the poor is the subsidies that leak to the non-poor. The greater the income elasticity of demand, the higher is this cost of targeting. Jamaica, like in Indonesia and Viet Nam, heavily subsidizes hospital care. In order to target one dollar to the poor, the government must give the non-poor about $3.25 in subsidies (Gertler and Sturm, 1997). Similarly, Van der Gaag (1995) shows that while exposing equity as a goal, countries such as China, Cote d'Ivoire, Peru and Tanzania also provide higher subsidies to services used by the wealthy. Solon (1991) shows that high income individuals in the Philippines receive much more in public health care benefits than they pay in taxes.

Figure 1: Percentage of Public Subsidies by Income Quintile, Indonesia 1992

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[10] In fact, the subsidies were Rp. 206,000 for a hospital inpatient visit, Rp. 8,100 for a hospital outpatient visit, Rp. 3,400 for a health center visit, and Rp. 2,200 for a health subcenter visit (World bank, 1993a). In contrast, subsidies through health center and subcenter facilities are much more equitably distributed, because utilization rates of these facilities are more evenly distributed across income groups.
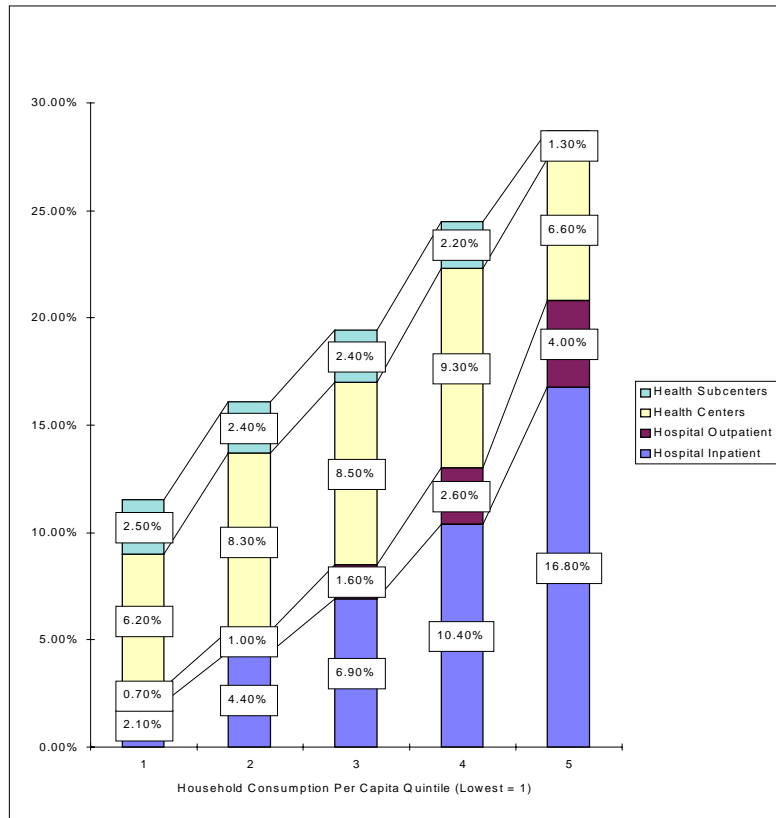
Source: Indonesia Public Expenditures, Prices, and the Poor, World Bank, Washington DC, 1993.

Price Discrimination. The extent to which the government is able to price discriminate and only raise fees that the non-poor pay, mitigates the severity of this health-equity tradeoff[11]. To improve equity, the government needs to develop practical policies that lower the price paid by the poor relative to that paid by the non-poor by even more than is indicated by the optimal pricing policies developed in the last section. There are a number of ways to do this

How well the government is able to implement a pricing policy that maximally improves health and redistributes subsidies towards the poor depends on its ability to identify the poor in order to price discriminate and target programs. Here, we consider four common types of targeting (individual means testing, geographic, self-selection, and indicator targeting). The targeting effectiveness of criteria:

- *Type I error*: Failing to exempt someone who should be exempted. The greater the type I error, the fewer the number of poor protected by the price discrimination method. An extreme example of type I error would be if facilities charged everyone the full cost of delivering the service. In this case, type I error would be 100 percent.

- *Type II error*: Exempting someone who should not be exempted from paying the fee. The greater the type II error, the greater the leakage of potential revenues from the non-poor and the lower the subsidies that reach the poor. An extreme example of type II error would be if everyone were given free care. In this case, all potential revenues would be lost and type II error would be 100 percent.

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[11] As discussed in the last section, even if the government is not concerned with equity, there are still good reasons related to the desire to improve health to price discriminate in favor of the poor.

- *Administrative costs:* The costs of identifying the poor and implementing price discrimination can swamp all of the gains from price discrimination. There are clearly diminishing returns to making price discrimination methods more precise. Administrative methods vary from inexpensive procedures such as geographic price discrimination and targeting by age and gender to costly procedures such as a sliding fee system with social worker verification. The additional benefits of better targeting methods need to be compared to the additional administrative costs of implementing them.

Individual price discrimination based on means testing is the ideal method for minimizing the revenue loss from protecting the poor. However, administrative costs and past practical experience make it ineffective in most countries. For example, in both Indonesia and Viet Nam's the poor can get the fee waved through an affidavit of indigence. Financially indigent persons can request that their local headman to issue an affidavit which exempts them from paying fees for health services at all public health facilities and schools. However, few people seem to take advantage of the opportunity (World Bank, 1995 and 1996). It is not clear why the systems are failing. Several possibilities exist: people may just not know about the benefit; prices are so low that the benefit is not worth the opportunity cost of obtaining it; local officials may be charging a fee to issue the affidavit; facilities may charge a fee to accept the affidavit; and there may be a social stigma associated with using it.

The problem is how economic well-being can be measured in an economy where the majority of the population pays no income tax and where a good portion of economic resources are home produced. Without accurate, fast and administratively simple methods of identifying poor individuals, an individual exemption mechanism may exempt too many people and consequently sacrifice substantial revenues. More importantly, identifying the poor when they come from treatment is costly and extremely difficult to do. It is certainly beyond the ability of health sectors to do so, and is not practical method outside the context of a general government-wide means testing program. The general consensus in the literature is that facility based individual exemption programs in the health sector are too costly, very difficult to administer, and typically are not good at identifying the poor across all regions of the developing world (e.g. Booth et al., 1995; Chaulagai, 1995; Ensor and San, 1995; McPike et al., 1991; Mwabu et al., 1995; Nolan and Tubat; Richardson, 1992; Stinson, 1982; and Vogel, 1988).

An alternative method of implementing a pricing policy which protects the poor is **geographic targeting**. This policy aims to tailor the fee structure to the socioeconomic composition of the population served by each facility. The first issue is that if the poor live in more rural than in urban areas and facilities are located more in urban areas than in rural areas, then poor face higher access costs than the non-poor with uniform fees. The first principle of geographic targeting is to locate more facilities closer to where the poor live. Otherwise, the fees at facilities that serve the poor must be lower in order to compensate for the higher time costs so that the price of access is the same for poor and non-poor.

With this in mind, facilities that serve primarily poor households would charge zero or near-zero fees, and facilities that serve primarily non-poor households would charge larger fees. The fee charged by a facility would rise with the average economic status of the households in its service region. Indeed, facilities in wealthier areas could charge fees equal to or in excess of unit costs. A facility-level fee schedule increasing with the economic status of the households in the facility's service region would imply that government subsidies are pro-poor in that they are largest in the poorest areas.

While in principle the idea of geographic price discrimination is straightforward, its implementation is quite complex. Populations within a region will not be homogeneous. Every region will have some households whose income is below the government's definition of poverty. In those regions where a large percentage of the population are poor, the government can keep fees low enough to protect the majority of the poor without experiencing high levels of Type II error. However, in regions with a low percentage of poor, the government would have to choose between forgoing substantial revenues from those able to pay in order to protect a small number of poor, or failing to protect the poor in order to reduce revenue loss from the non-poor. In this

case, it would be cost-effective to screen the poor at the facilities or employ an individual discrimination method.

Using geographic price discrimination in rural areas where the poor are concentrated is a promising method to protect the poor without a large sacrifice of revenues. Long travel times prevent people living in wealthier areas from switching to the lower fee facilities in poorer areas once fees in the more affluent areas have been increased. However, the method has limited potential in urban areas where the poor are intermixed with the non-poor and most facilities are easily accessed by both poor and non-poor.

Differential Pricing by Level of Service and Self-selection. An alternative approach to protect the poor in urban areas is through differential pricing by level of service. The notion is to have low subsidies for services valued and used more by the non-poor, and high subsidies for services used mostly by the poor. These are the services for which demand is income inelastic.

One method is to shift subsidies to the prevention and treatment of infectious diseases. Since the poor tend to suffer proportionally more from infectious diseases, subsidizing their treatment and prevention not only meets public health objectives but also improves the distribution of public subsidies across income groups. For example, Table 4 shows the distribution of mortality by different causes across different income groups among adult women in China. While poorer women have higher mortality rates from all causes, the poor die from infectious diseases proportionately more than do other income groups. The ratio of the poor who die from infectious diseases relative to the rich is 3.5, while the ratio of poor to rich who die from non-communicable diseases is only 1.3. Basic principles of targeting (Besley and Kanbur, 1989) suggest that, if the costs of treatment are the same, then reallocation subsidies from non-communicable diseases to the prevention and treatment of communicable disease would better target public subsidies to the poor.

Table 4: Female Adult Mortality Rates Per 100 By Cause of Death and Income in China

Income Quartile	Infectious Diseases	Non-communicable Diseases	Injuries
Richest	.4	6.7	1.2
2	.4	7.9	2.0
3	.6	7.6	2.4
Poorest	1.4	8.9	2.7

Source: Adapted from Murray et al (1992)

As a general rule, the government should subsidize services for which demand is income inelastic. Services for which demand is inelastic means that demand does not increase much with income and that these services are used more by the poor. For example, in Viet Nam the demand for commune health centers is highly income inelastic, while the demand for hospital care is income elastic (Gertler and Litvack, 1996). This means keeping subsidies high at health centers, and low for hospital outpatient services will better target subsides to the poor.

The Viet Nam results are likely to be true in most countries—i.e. that the demand for health center care is the most inelastic with respect to income, especially in rural areas. This suggest that increasing subsidies for health centers in rural areas best targets subsidies to the poor. It also suggests a general pricing structure in which fees are lower (and subsidies higher) if the patient enters the system at the lowest level, and progressively higher the further up the system the patient enters. If an individual first goes to the commune health centers and requires a higher level of care at the hospital, the registration fees are waived (or at least lower) at the

hospital. Thus, this pricing structure provides an affordable portal of entry into the health care system through the commune health centers and allows those willing to pay to bypass the commune health center and go directly to higher levels of care. Since it is the non-poor who are willing to pay to bypass the lower levels, they will be charged higher prices and receive lower subsidies.

Policies can take advantage of self-selection if a wider range of instruments are considered. If the adequacy of medical treatment is maintained, government facilities may deliberately offer fewer amenities so that only the poor would choose to use them. This requires accepting different quality levels of service (at least from the consumers' satisfaction stand point) in order to concentrate more resources on the poor.

Indicator Targeting. Finally, one method of charging those most able to pay at least the full cost of care is to target identifiable groups. One specific group that may be able to afford care is the insured population. Insurance status is a good indicator of those most able to pay because the insured are wealthier than the general population. For example, in Indonesia civil servants are covered by insurance and almost all civil servants are in the top half of the income distribution (World Bank, 1995). However, the insurance company pays less than the full cost of care so that public system still subsidizes the wealthy insured population. This situation exists in most countries with mixed public private systems. By charging the full cost of care to insured patients, public systems reduce subsidies to the non-poor allowing them to reallocate them to services used by the poor.

4.4 Adjusting Resource Allocation to Insure Against Financial Risk

The classic reason for most developed countries to intervene in health markets is the inherent uncertainty in health status (Arrow, 1963). No one knows what tomorrow will bring. Seemingly healthy individuals can be struck by cancer, injured in accidents or experience bouts of severe diarrhea. The uncertainty is compounded the longer one looks into the future and the less one knows about one's current health. While most families are able to finance routine care out of their own budgets, most are not able to finance the rare but expensive incidents. In fact, in all countries, expenditures on health care are extremely skewed in that a quite small proportion of the population accounts for a large fraction of total expenditures. Therefore, while most families have only small expenditures in a given year, a relatively small number have very large expenditures.

Given aversion to risk individuals would prefer to have predictable health care expenditures. Predictable health care expenditure relieve the worry of how one will finance costly unexpected illnesses and allow families to better plan other consumption. Thus, individuals will seek to insure themselves against the financial loss associated with uncertain illness. Without formal health insurance individuals would have to informally finance the losses out of accumulated savings, transfers from relatives and friends, credit markets, or help from charities.

However, informal insurance seems to be inadequate. Using household panel data from Indonesia, Gertler and Gruber (1996) show that these informal sources of insurance are not sufficient for Indonesians to be able to fully finance the costs of severe illnesses. They find that when illnesses are severe enough to affect labor supply and income, the economic costs of illnesses are in part financed by reduction in the family's consumption of non-medical goods and services. As a result, there is demand for insurance for both the medical and income costs associated with illness.

Despite the demand, most individuals are unable to buy insurance from private sources due to market failure from adverse selection (Rothschild and Stiglitz, 1978). Adverse selection arises from insurers not being able to observe heterogeneity in the population regarding health status. Individuals are born with different genetic makeup's making them more or less predisposed towards illness, and have different life course experiences with respect to exposure to environmental contagion and accidents. For both reasons there is substantial variation in the propensity to become ill. Because insurers do not observe each individual's propensity to become ill, they cannot write individual-specific contracts, but rather are forced to offer the best community-rated insurance plans. The terms of these contracts can be quite unfavorable to

relatively healthy individuals. The good risks tend to subsidize the bad risks, and the value of the insurance to the goods risks, or healthy people, drops significantly. The incentive is for the good risks to drop out of the market, leaving the bad risks to insure among themselves thereby substantially driving up the cost of insurance, making if a financially bad deal for both insurers and beneficiaries. Frequently, they are so bad that the market fails to exist at all.

The opposite problem is "risk-rating" or "cream-skimming" which occurs when individuals of poor health *are* observable. Competing on their ability to select good risks leads insurers to avoid insuring individuals with "pre-existing" conditions such as cancer or AIDS who are "certain" bad risks who will have predictably high medical care expenditures. Insurers do not want to provide these individuals with coverage at the community rated (average) premiums. Instead they either explicitly deny coverage or effectively deny coverage by charging a premium approximately equal to the cost of care. In many high risk cases, the actuarially fair cost of insurance (expected expenditures plus a loading factor to cover administrative costs) may be prohibitively expensive and these individuals are effectively uninsured[12].

Insurance market failure due to adverse selection occurs when insurance is voluntary rather than compulsory. The problems of adverse selection and cream-skimming do not occur when everyone is in the insurance pool. Most countries correct the insurance market failure through either a universal public system with subsidized low prices or through compulsory social insurance in which the poor's enrollment is subsidized.

In public systems, heavily subsidized public hospitals provide insurance against large financial loss associated with a catastrophic illness. However, public systems provide lower levels of insurance if they provide lower quality than what could be bought in the private sector with social insurance funds.

The debate over whether to increase user fees in hospitals has ignored the crucial role public subsidies serve as *insurance*. Subsidies can reduce risk in two ways. First, they can make the costs more predictable by spreading the medical care costs of uncertain illness across healthy and sick times. Taxes incurred in all states of health finance medical care purchased when sick. As a result, raising user fees in a world of imperfect consumption insurance has an important welfare cost: Higher user fees "tax families while they are down," imposing higher costs at exactly the point where the marginal utility (value of the next unit) of consumption is highest. Second, subsidies may help mitigate the loss of income from the illness by financing the use of medical care that improves health and productivity. In essence, the public subsidies relax credit constraints on the purchase of medical care that may help one get back to work faster.

Public subsidies for medical care can correct failure in the insurance market, because private markets are unlikely to supply adequate insurance because of adverse selection. Insurance principles suggest that the subsidies should go to the services that provide care for the rare, high-cost illness that wreak the most havoc on family budgets.

Given that the relatively wealthy disproportionately use hospital services under current systems, there is a distinct tradeoff between equity and efficiency in subsidized hospital care. This can be mitigated by enforcing strict referral rules requiring very high charges for those entering hospitals directly with generous exemptions for those who are properly referred.

The introduction of insurance carries with it another market failure called moral hazard: the insured may be induced to use more services that they would otherwise, because their price at the point of service is lower than without insurance. In this case, patients tend to consume medical care beyond the point where the additional benefit is greater than or equal to the additional cost. In this sense, too many resources are being allocated to the treatment. The greater the price elasticity of demand, the larger the welfare loss from moral hazard.

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[12] This problem is exacerbated given that insurance contracts are written for limited terms (e.g. one year). Over time as more and more high risk individuals contract serious illness, the number of high risk individuals able to obtain insurance declines. With population aging increasing the number of individuals with long-term chronic illnesses, and improvements in genetic testing and long-range diagnosis, the number of individuals denied coverage can only grow.

It is interesting to note that the implications for pricing policy the different forms of market failure in health are themselves quite different; indeed may be complete opposites. When adverse selection prevents the emergence of insurance markets, public policy should promote a pricing structure that protects against catastrophic loss. This will typically include significant copayments by the insured for small expenditures with stop-loss provisions (caps on the maximum out of pocket cost) for large expenditures. This takes care of the welfare loss from assuming too much risk. On the other hand, when moral hazard is a serious problem, people should face the true costs on the margin to limit overuse of services. The risk problem needs to be handled by relatively large, inframarginal payments (Zeckhauser 1970). The first problem leads to an optimal payment policy of a large copayment for small expenditure and none for large while the second argues for low (or zero) copayment for pretty much all of expected costs with a large exposure (full cost burden) beyond that point. Since such different policy conclusions follow from different institutional structures, a great deal of knowledge about the way markets work is necessary for good policy formulation.

The allocation of public subsidies in most countries is consistent with trying to ameliorate losses from private insurance market failure since the bulk of public subsidies is spent on hospitals. However, the level of public subsidy does not seem to be enough to adequately insure families against the risk of financial loss from unexpected ill-health. In fact, despite the large subsidy of public hospitals, individuals are still incurring large out-of-pocket expenditures. Moreover, Gertler and Gruber (1996) show that families finance the economic costs of illness by reducing consumption in Indonesia, a country with a heavily subsidized public health care system.

As a result, insurance motivations for government intervention are at odds with other values such as improving health outcomes or ensuring equity. Services that improve health outcomes the most are grouped as public health expenditures and include immunization campaigns and preventive care. Finding services that benefit the poor entails looking at what services they use and at the income elasticity of demand. Such services include the prevention and treatment of infectious disease and primary care delivered at health centers in rural areas. Protecting the poor from financial risk because of illness argues for subsidizing the network of public hospitals that already consume generous shares of the public sector's health budget. In essence, subsidies to hospital provide catastrophic health insurance.

5. USER FEES WITH PREPAYMENT (INSURANCE).

From the above discussion, we conclude that while there are ways to mobilize resources through user fees that improve welfare, there are still potentially large costs to such a policy. Specifically, the scope for mobilizing private financing for public expenditures is limited by the two costs: (1) reduced insurance coverage against the risk of financial loss from unexpected illness, and (2) reduced utilization and possible consequent adverse health outcomes, especially for the poor. However, these costs are much lower in health systems financed through Social Insurance (SI).

With SI, individuals are still insured against the risk of financial loss from illness when governments raise user fees. Under SI, individuals prepay their medical care expenditures (i.e. premiums) into a fund which is used to pay for their medical care if and when they becomes ill or injured. They thus avoid paying unexpected fees when ill and are therefore insured against the risk of financial loss from illness. With insurance, individuals medical care expenditures (premiums) are predictable and can be planned. Governments mobilize private resources by raising the fees charged insurance plans for health services provided by the plan's beneficiaries. Because increases in fees raise premiums and not the out-of-pocket charges at the time of treatment, there is no loss in the insurance value from raising fees. Raising fees still causes a loss in welfare as families must pay increased premiums at the expense of other consumption or savings, but that loss is predictable and can be spread throughout the year and across individuals.

The problem of equity in access to medical does not disappear without government subsidy with the introduction of SI. However, using government subsidies to improve equity in

access to medical care is fundamentally easier in the context of SI. The policy mechanism is for the government to subsidize the enrollment of the poor into the insurance plans. For this to be budget neutral, subsidies directly provided to facilities would have to be reduced to finance the enrollment of the poor in the insurance plan. Facilities would then recoup the lost revenues through providing care for insured patients and being reimbursed. In this way, public subsidies would be better targeted to the poor, and the facilities who get the subsidies would be the ones who care for the poor. The administration of this program would be easier than price discrimination by facilities at the time care is needed, because it would be centralized, because it would only need to be done periodically outside the pressure of having to treat an illness, and because it could be done by a trained dedicated staff that did not have other responsibilities.

While social insurance holds promise for correcting some of the problems created by resource mobilization policy, it creates a host of other problems that, if not addressed as part of insurance design, could outweigh its benefit. The most obvious problem, already raised earlier, is that SI cannot be voluntary. Voluntary insurance markets fail due to adverse selection. For SI plans to be financial viable, enrollment must be compulsory. This is not to say that they need to enroll the whole populations, but rather segments of the population such as the wage sector. In fact, most countries already have compulsory SI for civil servants, many expanded compulsory coverage to wage sector employees, and a few have achieved universal coverage. In addition to adverse selection, there are a number of other important design and administration issues that are beyond the scope of this paper.

6. CONCLUSIONS

- User fees are not yet but have the potential to be powerful means of improving efficiency in the health care systems of developing countries.

- Optimal fee structures can differ dramatically from one institutional setting to another. Countries differ significantly by the size and performance of the private sector, the nature of markets for insurance, credit and medical care and the administrative capacity of the public sector to run or regulate health services. Therefore, much more serious analysis based on real data is needed in order to define better policies.

- In many countries, public sector health budgets are determined reactively: demands for curative care must be honored and funds for population-based public goods are determined residually. In these cases, fees for curative care can conserve resources for use on these public goods, improving efficiency, health status impact of public expenditure and, due to the incidence of infectious disease, equity as well.

- Most countries have a relatively large private sectors providing primary health care. Effective use of public funds should complement rather than crowd out private activity. Large subsidies for relatively inexpensive services may add little to the net improvement of health status if they are strong substitutes for private care.

- In the many countries in which insurance markets are not going to be fixed in the near future, hospitals should remain an important expenditure item for the public sector. This is a way to protect people from catastrophic loss in the absence of formal insurance systems. The skewness of demand for services, with relatively few people requiring very expensive care, implies that hospitals will be a large part of the budget.

- Many countries will find that the optimal allocation of health subsidies will involve large public subsidies for non-clinical public good, fees at primary health care facilities to conserve public resources for these goods, and large per unit subsidies to hospital services with a proper referral system. Such a system entails patients referred on the basis of clinical need and very high fees for those using hospitals as the first point of contact. Note this is almost the exact opposite price and subsidy scheme as that implied by current emphasis on Primary Health Care.

- In those countries in which social insurance or adequately regulated private insurance markets exist, optimal policies would involve very few subsidies to hospital services. These would be covered by actuarially fair pre-payments.

- Retention of revenue at local levels is essential for quality improvement effects of user fees.

- Uniform price rises will reduce use of facilities more for the poor than for others. To the extent that this is socially undesirable, adequate protection for the poor must come from targeted interventions, as imperfect as current methods of targeting may be. Health care is highly income elastic and any uniform subsidy system is likely to be regressive.

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