Health Sector Reform in Tamil Nadu: Understanding the Role of the Public Sector

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I. Introduction

In 1978 India was a signatory to the Alma Ata declaration, undertaking to provide "Health for All" by the year 2000. With that deadline at hand, the country can in fact point to significant improvements in health status. Life expectancy, for example, has risen from 50.2 in 1974 to 64.8 in 1999, and infant mortality rates have declined from 132 per thousand in 1974 to 71 per thousand in 1998.[1] Evaluating where India lies on the road to this noble if intangible goal, is however, necessarily a matter of both record and interpretation. One of the first questions we are faced with is whether health for all should be interpreted in relative or absolute terms. The above statistics point to strong relative improvement even while other indicators suggest that basic health needs continue to go unmet for large segments of the population.

In the case of Tamil Nadu, once again, relative indicators are positive. When compared with All-India statistics, health status in Tamil Nadu is considerably above average and has also seen significant improvement, as can be seen from the health statistics shown in Table 1. Infant mortality rates have declined in the last ten years from 80 per 1000 in 1980 to 53 per 1000 in 1997, considerably lower than the All-India rate of 71 per 1000. Total fertility rates have also shown a rapid decline, from 3.8 in the mid 1970s to 2.0 in 1997, and Tamil Nadu's population growth rate has dropped from 1.5 percent in 1991 to one percent in 1999 compared with 1.8 per cent for India as a whole. State government expenditure on health is relatively high at 5.6% of total revenue expenditure in 1999-2000 (Table 2). Health infrastructure in Tamil Nadu has also been fairly good compared to other states, and this has had a benefit in terms of relatively low costs for outpatient treatments.[2]

There have been recent attempts by the government of Tamil Nadu to further develop health infrastructure through investments in the construction of Primary Health Centers (PHCs), or extended hours of certain PHCs.[3] These investments are easy to measure, and they clearly represent important contributions to the strength of Tamil Nadu's health care system. However, the focus on such tangible assets may in fact hide weaknesses in other, less tangible factors. This paper argues that it might ironically be these other factors, such as quality of service provided, that while harder to measure may in large part determine the ability of the health system to serve the needs of the population. Based on an evaluation of utilization patterns we argue that demand for publicly provided health care is, in fact, the best indicator of the strength of public health care system. An assessment of utilization patterns of public and private health care providers in Tamil Nadu shows that despite the provision of free or low-cost services at government health facilities, demand for public sector outpatient services are low even amongst that part of the population that falls below the poverty line. The poor are increasingly turning to private providers, even for treatment of infectious disease such as TB and malaria, which are designated as primary responsibilities of the public health system. The high

[1] United Nations Population Division 1998.
[2] Krishnan 1994
[3] Athreya and Chukath 2000

percentage of outpatient curative services sought from the private sector, even by the lowest income quintiles of the population suggests that the public health system is not adequately fulfilling the health needs of the poor. Further, a recent study of the distribution of government health subsidies finds that public health subsidies disproportionately benefit higher quintiles.[4] While this imbalance is less pronounced Tamil Nadu than in many other states, it is a clear indication of the need for health care reform.

The next section examines the role of the public and private sectors in health care. It begins by describing the rationale for public sector involvement, going on to discuss the changing perception of the role of the government as health care reform becomes a focus in many developing countries. It then describes some of the recent attempts at reform in Tamil Nadu, and explores avenues for further reform efforts. Section III looks at the current health care system in Tamil Nadu, using various data sources to examine utilization, access, and quality. This section, like other studies of the Tamil health system, finds a high demand for private outpatient services, and argues that health care utilization patterns are being determined primarily based on issues of quality rather than access. Section IV explores specific goals for health care reform, while section V goes into further detail on a particular reform strategy, the creation of a system of social insurance. Section VI suggests next steps on the road to health care reform.

II. Public and Private Roles in Health Care

Health care in many developing countries is seen primarily as a responsibility of the government and there are good theoretical reasons for the government to take on at least part of this role. There are four main rationales for government involvement in the health care sector.[5] The first is as a means of providing a safety net for the poor, promoting equity and alleviating poverty. The Alma-Ata declaration had the effect of moving access to basic health care in the direction of a fundamental human right. However, with 40% of Tamil Nadu's population living below the poverty line, the poor cannot always afford to pay for their own health care. Government subsidization of health care is one of the most important factors in improving the welfare of the poor. Not only does publicly provided health care form a social safety net, it also serves indirectly as a means of poverty alleviation, as the most important asset of the poor is generally their labor. In this framework, basic health care can preserve and promote the use of this asset, raising productivity levels and thereby income.

The second reason arises from market failures that are characteristic of health insurance markets, in particular adverse selection and cream-skimming. Health represents a unique type of consumption in that various forms of health care expenditures may be concentrated, unforeseen and difficult to smooth over time. Health insurance is therefore an important market response to deal with the risk represented by catastrophic illness. However, there is a basic asymmetry of information between the consumer and the

[4] Mahal et al. 2000
[5] See for example World Bank 1993

insurer, in that the consumer generally has better information about his or her own health status. If insurance is priced based on a mean value of health status, it will represent a better deal for individuals with below average health status, who are therefore likely to buy a greater amount of insurance. This "adverse selection" has the effect of raising the overall cost of insurance, further disincentivising individuals with higher health status from purchasing insurance. Insurance companies, on the other hand, have an incentive to indulge in "cream-skimming", i.e. the practice of trying only to insure the healthy. Together these lead to ever-higher premiums and lower coverage. The combination of these problems is often sufficient to inhibit the development of effective health care insurance markets, and it falls to the government to institute regulations to control these market failures.

The third reason involves efficiency considerations that arise from the public good aspect of certain health care expenditures. Health care has been characterized as a 'merit good' in that it generates value to society above and beyond its utility to the private individual. For example, immunization against infectious diseases provides benefits to the individual, but also provides a benefit to society because it reduces the spread of disease to others. In such cases, rational individuals will often purchase less of the service than is socially optimal. It is therefore efficient for the government to subsidize such goods, thereby lowering their price and encouraging greater use. In the case of pure public goods, where no one can be excluded from consumption, such as vector control to prevent such diseases as malaria or schistosomiasis, it is generally efficient for the government to take on the full cost.

Finally, another important role that falls to the government is the regulation of the private market for health care. Once again, this is a function of asymmetric information, this time on the part of the supplier. Individual consumers are often not in a position to fully evaluate the quality of care being provided and it falls, therefore, to the government to guarantee quality through certification procedures and to enforce standards of care.

Based in part on these reasons the governments of many developing countries undertook the establishment of extensive systems of public health care in the 1950s and 1960s. In India the concept of "health for all" was been an inherent part of the government's approach since the Bhore Committee Report of 1946.[6] Acting on the recommendations of this report the Indian government set up a comprehensive health care system, providing care at primary, secondary and tertiary levels. The 1980s, however, saw a number of financial crises in the developing world, and many of these countries were faced with structural adjustment programs leading to considerable budgetary pressures. In response, there was a shift in international thinking on the role of government in the health sector, with an increasing dissatisfaction with what were perceived as bloated and ineffective public health care systems. The call for health care reform from international donor agencies increased pressure for a critical evaluation of public health care delivery and a greater impetus to involve the private sector in the process.[7]

[6] Uplekar and George 1994, Chatterjee 1988
[7] Bennet, Mills and McPake, 1997

A major focus of the framework developed to think about health care reform has been an attempt to separate out two different aspects of the government's role in the health sector, namely, the distinction between the financing and provision of health care. In the past, governments have tended to finance and provide services, with financing coming for the most part from general tax revenues. The private sector has generally offered private delivery of higher-quality services at higher cost. As is the case in Tamil Nadu and the rest of the country, the prevalent belief is that the private sector is more accountable to consumers, more cost-effective, and uses better management techniques and more innovative approaches than the public sector. As a reaction to large, inefficient, public health care systems, the basis of health care reform in many countries has been to develop public-private partnerships in provision and financing of health care. Table 3 shows different combinations of financing and provision that can be undertaken by the public and private sector.

Table 3: Public and Private Provision and Financing of Health Care

		Provision	
		Public	**Private**
Financing	**Public**	I Government funding and provision, free at point of use: national health services.	II Services contracted to private providers.
	Private	III Supplementary direct user charges: private beds in public hospitals.	IV Private health care funded by private insurance or direct fees for service: health maintenance organizations.

Source: reproduced from Bloom (1999)

The health care system in Tamil Nadu traditionally falls into squares I and IV, with a large private sector despite the provision of free or low cost health care services in the public facilities. Recognizing weaknesses in the public health care sector, Tamil Nadu undertook a set of health care reforms in the early 1990's, and this attempt pursued different aspects of the combinations shown above. In particular, there were two approaches that were experimented with: contracting out and the development of autonomous bodies. Contracting out combines government financing with private provision, attempting to take advantage of the benefits of market systems to promote efficiency. Attempts to do this have been fairly small scale, with hospitals contracting out for services such as catering and laundry. While there has been some success with this approach, there have been a limited number of bidders, in part because of the government's reputation for delayed payments.[8]

[8] Bennett and Muraleedharan, 2000b

The government has achieved more success with the development of autonomous bodies. In particular, there are three such bodies in Tamil Nadu: the Tamil Nadu Medical Supply Corporation (TNMSC), the Tamil Nadu Blindness Control Society (TNBCS), and the Tamil Nadu State AIDS Control Society (TNACS). The latter two organizations have primarily been created as a way to enable the government to facilitate the work of non-profit organizations (NGOs) and to bypass regular government bureaucracy to finance the activities of NGOs. While it is still early for a comprehensive assessment, they appear to be fairly successful at working with NGOs and achieving their mandate. The TNMSC was created in part to deal with recurring drug shortages and quality concerns. It serves as a central clearinghouse for purchase, storage and distribution of drugs, and has proved successful in facilitating the distribution of drugs to PHCs. It is able to procure quality-controlled drugs at competitive rates, and has installed a computerized system for processing, placement and distribution of orders of drugs to PHCs and dispensaries. The system appears to be effective in controlling quality and preventing drug shortages.

Bennett and Muraleedharan (2000b) point out that the greater financial and managerial flexibility afforded autonomous organizations like TNMSC have formed the basis for their success. For example, the reputation of the government as a late payer did not carry over to the TNMSC, and it was therefore able to work more effectively with the private sector to negotiate competitive rates for drugs and supplies. However, these authors also note that rather than representing a true reform of the health care system, such autonomous organizations are simply mechanisms by which to bypass the system, and hence may simply delay necessary restructuring of a more fundamental nature.

These initial attempts at health care reform have been reasonably effective, and indeed represent a positive step. They are, however, limited to small segments of the health care system, and the approach of simply bypassing government structures is not one that can be easily scaled to affect more wide-ranging reform. Rather, an effective reform of the health sector will require a much more fundamental change in government structures, and a reassessment of the basic goals of the public health sector. In particular, when assessing the reform needs of Tamil Nadu's health care sector, it is important to understand the current role of publicly provided health care and how it relates to the primary goal that the government has set for itself, namely the widespread access to basic health care.

The reform model discussed above was developed primarily in response to the bloated public health care systems found in many developing countries that often had the effect of crowding out the private sector. An assessment of utilization patterns in Tamil Nadu's health sector shows that rather than being highly dominated by the public sector, health care in Tamil Nadu is primarily private. While tapping into the efficiency advantage of the private sector is certainly something that could benefit the public health system, the standard reform model of shifting health care provision or financing further to the private sector does not appear to be a solution tailored to this situation. In the case of Tamil Nadu, we would argue, this might instead have the effect of limiting the government's ability to fulfill its commitment to the provision of basic health care to the population, and in particular poorer segments of the population. Rather than privatization, we argue

here that the main approach should be greater *marketization* of government health care provision in order to take advantage of the efficiency and quality advantages of the private sector while still striving to achieve its commitment of access to basic health care for all.

While we argue that the primary goal of the health care reform process needs to be an improvement in publicly provided primary health care services, public-private partnerships such as those suggested by Table 3 also represent an important means to achieving a more effective health care system, and, to the extent that such reforms do not shift a greater financial burden of health care to the poor, they can form an important part of the reform process. The vast private health sector in Tamil Nadu represents an important resource and cannot be discounted. In fact, in order to incorporate the private sector in the process it is vital that the government begin to develop better systems of regulation and enforcement. Only then will it be possible to effectively pursue partnerships in financing and provision.

While the efficiency gains of a marketization approach will improve the ability of the government to achieve its goals, ensuring access to high quality basic health care for all should be expected to require a greater commitment of resources towards the primary care sector. A high percentage of the government health budget is currently being targeted at tertiary care, and as discussed in the next section, this results in large subsidies to the wealthy. We focus in section V on a particular type of public-private partnership, the development of social insurance systems, as a way of involving the private sector in both provision and financing of health care, relieving budgetary pressures on the government while still protecting the poor.

III. Understanding the Health Care System in Tamil Nadu

The four basic objectives of a health care system are equity, access, quality, and efficiency. In order to evaluate the health care system in Tamil Nadu we use data on public-private utilization of health care services as a basis by which to assess these criteria. The primary source of data we use is an All India household survey of 33,000 rural households conducted by the National Council for Applied Economic Research in 1994, focusing in particular on Tamil Nadu data. Along with general household characteristics this survey has data on short term and long-term illness, including type of provider, health expenditures, and access to health care, and it forms the basis for our regression analysis. We also draw on other studies, such as a report of utilization using National Sample Survey data gathered in 1996/97,[9] and focus group discussions with health care users in Tamil Nadu.[10]

a) Utilization

The basis of the Alma Ata declaration was an acceptance that the most effective way to develop a cost-effective and equitable system of health care was to focus on the delivery

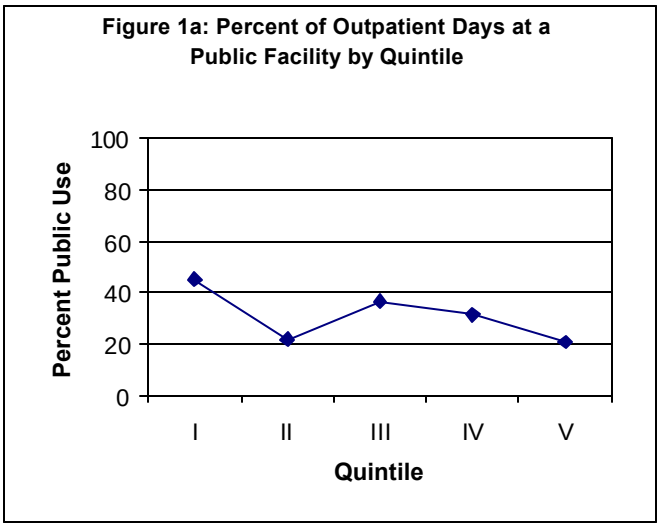
[9] Mahal et al. 2000
[10] Rakodi 1998

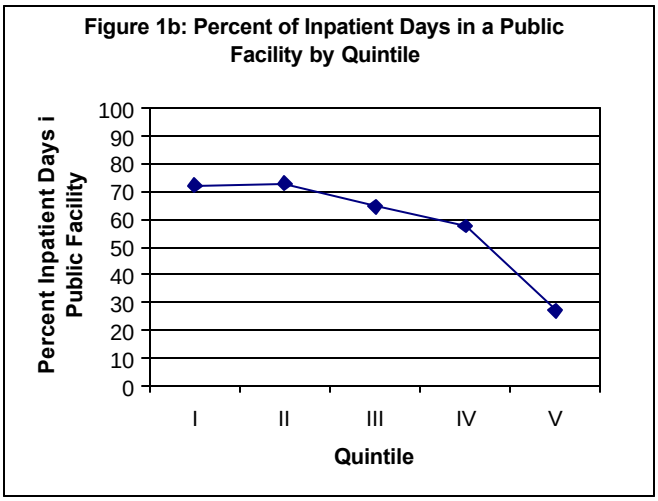
of basic health services. The cornerstone of the Indian system of health care delivery in rural areas has been the network of Primary Health Centers. PHCs are designed to provide basic health services and to serve as a referral system for tertiary health services that are provided at public hospitals. Under the current system in Tamil Nadu, PHCs are expected to provide 12 basic services. These include outpatient services, deliveries, inpatient services, minor surgeries, ambulance services, anti-rabies vaccinations, administration of anti-snake venom and tetanus toxoid, contraceptive services, services relating to medical termination of pregnancies, special clinics such as antenatal clinics, under-5 clinics and ophthalmic clinics, and laboratory services.[11]

In order to understand the role that the public sector is playing in delivering basic as well as tertiary care to the population we begin by looking at the NCAER data to understand the provider choices that are being made by individuals for both short term and long term illnesses in cases involving outpatient treatment and hospitalization. Table 4 shows choices for public and private treatment in the case of short and long illnesses. The NCAER survey contains data on three types of short illness: acute respiratory infection (ARI) i.e. coughs and colds; fevers; and diarrhea. As shown in the table, ARI's are by far the most common illness. The table shows that in case of outpatient treatments for both short and long illnesses, patients are far more likely to visit a private practitioner (56%) rather than public (27%). Of the patients who did not receive treatment (17%), the most common reason was that the illness was not serious enough. Table 5 shows that there is some differential across quintile, with the poor being more likely to use public services than the rich. However, as we see in Table 6, despite the fact that total expenditures are significantly higher for the poor if they choose to visit a private practitioner rather than a public facility, even the poor are 20% more likely to choose private service over public. This preference is especially pronounced in the case of outpatient treatment. The decision to use high cost private services when public services are technically available at little or no cost is one that can represent a significant financial burden, especially for poor households. Table 7 shows health care expenditure as a percentage of total household expenditure by quintile for India as a whole and for Tamil Nadu in particular.

The 1996/97 NSS data, analyzed by Mahal et al., explores this differential further. Figure 1a shows the percent of visits at a public facility as opposed to a private facility for outpatient care by quintile. While it is somewhat higher for the poorest quintile it is still low: the odds of visit a public facility for outpatient care were only 45% even for the poorest quintile. Figure 1b shows that in the case of inpatient care it is not the same situation. The poor are considerably more likely to use public facilities for inpatient care, with 72% of the inpatient visits of the lowest quintile being to public facilities.

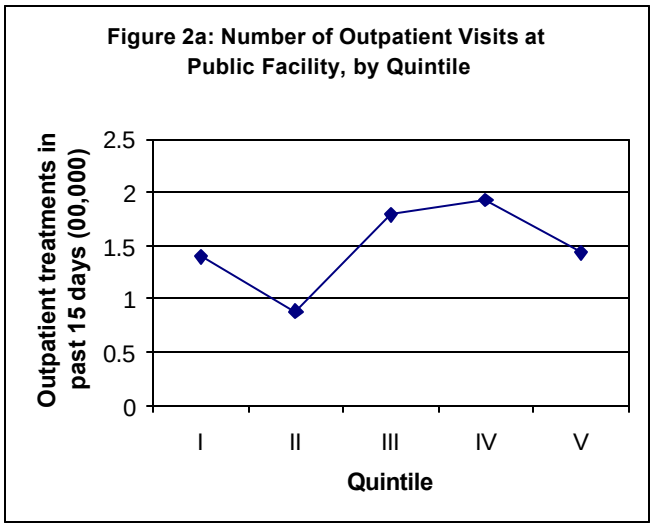
[11] Athreya and Chunkath 2000

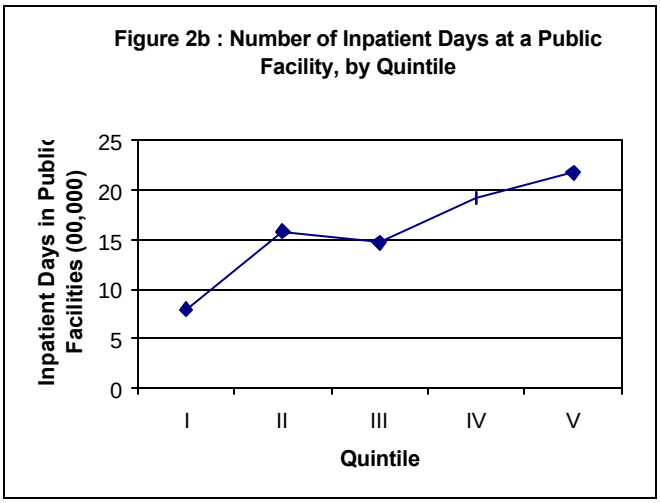




As is well known, consumption of health care is positively correlated with household income. Therefore, in the case of both outpatient and inpatient care, while wealthier individuals have a greater tendency to utilize private facilities, their consumption of public facilities is higher in absolute terms. Figure 2a and 2b show the actual utilization of public facilities for outpatient and inpatient care. In the case of outpatient care, there is a slightly greater utilization of services by the upper quintiles than the lower quintiles, based on the fact that those in the richest quintile are almost twice as likely to have had outpatient treatment as those in the lowest quintile. The discrepancy is considerably greater in the case of inpatient care. The data show that hospitalization rates are strongly positively correlated with income. A more significant effect is that the average length of stay is significantly higher for the rich than the poor. As is shown in figure 2b, even though 72% of inpatient days of the lowest quintile are in public facilities as opposed to only 27 percent in the upper quintile, actual utilization of inpatient services is much

higher amongst the rich based on the fact that the number of inpatient days for the highest quintile was almost eight times higher than the lowest quintile.





Utilization patterns form the basis of any assessment of equity characteristics of government spending. Based on utilization patterns of public facilities for outpatient and inpatient care, Mahal et al. calculate government subsidies for health going towards each quintile. They find that public subsidies disproportionately favor the wealthy. While Tamil Nadu does better than All-India averages on this front, the authors find that 21.4% of health subsidies go to the highest quintile as compared to only 14.6 to the lowest quintile. The distribution is particularly skewed in rural areas. The driving force responsible for this differential is the distribution of care, both inpatient and outpatient, provided at public hospitals, as hospitals demand the greatest share of the health care budget.

This difference between the choice of the poor to use public facilities in the case of inpatient care and private facilities in the case of outpatient care is a direct result of quality issues. As is discussed in Section IIIc, the quality of care in public hospitals is considered quite high. However, the public perception of quality at PHCs or sub-centers is generally quite low. As a result of this, individuals are choosing to visit public hospitals even for outpatient care that should fall within the purview of PHCs. Table 8 shows NSS data on the distribution of outpatient treatment by type of public facility. Hospital visits make up 75% of total outpatient treatments at public facilities. This is only slightly higher in urban areas (27%) as in rural areas (23%). As is discussed in the next section, this quality differential has impacts in terms of cost efficiency.

b) Access

While health is primarily a State subject in India, there is a normative framework for public health infrastructure that has been developed at the central level based on population norms. For rural care it is expected that there will be a Community Health Center (CHC) for every 100,000 population. Under each CHC the norm requires four Primary Health Centers (PHCs) serving approximately 25,000 people each, and 24 Sub Centers (SCs) serving four to five thousand people each. States are also expected to set up hospitals and dispensaries to provide care in both urban and rural areas[12].

Tamil Nadu has a comparatively advanced health infrastructure relative to other states. However, when viewed by the standard of the norms discussed above, there is a fairly large shortfall. The estimated population of Tamil Nadu as of March 1st 2000 is 61,775,000. The following table shows the number of public health facilities that would be necessary to fulfill the norm compared to the actual number of health facilities.

	Norm	**Actual**
Community Health Centers	618	59
Primary Health Centers	2,471	1,414
Sub Centers	12,355	8,682

The staffing norms suggested for every PHC is two doctors, seven paramedical staff, and seven administrative staff. [13] There are currently 2,263 doctors and 22,000 paramedical personnel in the primary system.[14] This indicates a shortfall in staffing of PHCs that is likely to have impacts on the quality of care provided. This will be discussed further in the next section.

Tamil Nadu also has 11 teaching hospitals, 26 district headquarters hospitals and 227 taluk and non-taluk hospitals, with a total of 8000 doctors and 28,000 paramedical personnel. Overall, access in urban areas is considerably better than rural areas as health facilities are highly concentrated in urban areas. Uplekar and George (1995), found in 1986 that 83% of inpatient beds were in urban areas.

[12] See Vartharajan 1999 for a further discussion of the gap in infrastructure norms in Tamil Nadu.
[13] World Bank 1995
[14] Athreya and Chunkath 2000

While there is certainly a need for greater investment in developing health infrastructure, Tamil Nadu has in fact improved this infrastructure considerably over the last few years. Tables 10 to 14 show the results of regression analysis using the NCAER data that looks at the impact of access to public health facilities on health care and choice of health care providers. Table 10 shows the determinants of infant mortality. The first several variables control for household characteristics that are believed to have an impact on the infant mortality rate. For example, the education level of the mother is one of the strongest determinants of infant mortality. Access to safe water and sanitation also play a very strong role.[15] We then use village level variables to assess the impact of access on infant mortality rates. These include transportation infrastructure variables, such as whether or not a village has a pucca road or a bus stop, as well as access to health care facilities. We have included dummy variables for each of the following levels of access: Hospital 1: if there is a hospital within the village or hospital/CHC/PHC within 5 km and sub center within the village; Hospital 2: if there is a hospital/CHC/PHC less than 5 km and no sub-center within the village; and hospital 3: if there is a sub center and health worker within the village and hospital/CHC/PHC greater than 5 km. The excluded dummy, Hospital 4 includes those villages where there is no sub-center within the village and the hospital/CHC/PHC is greater than 5 km away. The other access variables included are whether or not there is a dispensary in the village; whether or not there is a pharmacy; the distance to a doctor; and the distance to a health worker (see Table 9).

The most robust effect on infant mortality rates is that of the distance from the health worker. Village health workers are often the primary source of ante-natal and post-natal care for rural women. They are attached to PHCs and SCs, and visit each village at regular intervals in order to provide general Mother and Child Health services. These village health workers play a role in the immunization program and provide treatment for minor ailments. It is clear from the regression analysis that having a well-developed network of trained health workers is one of the most effective health services the government can provide to improve infant mortality rates.

The second observation is that the public facility variables (Hospital 1, Hospital 2 and Hospital 3) do not have a significant effect on infant mortality rates. In part this may due to the impact of transportation infrastructure. The regressions show a robust and significant impact of the two variables that capture this, i.e., whether or not there is a pucca road or a bus stop. In Tamil Nadu in particular though, the access variables may not be dominant because the villages tend to be large and generally have fairly good access to public health facilities. For example, of the 1500 Tamil villages in this data set, only 104 do not have a sub-center within the village or a hospital/CHC/PHC within 5 km. More than half the villages (789) fall into the Hospital 1 category, i.e., a hospital within the village or hospital/CHC/PHC within 5 km and sub-center within the village.

Table 11 and 12 attempt to explore the reason for the utilization patterns of public and private facilities discussed in the previous section by assessing the impact of access variables on choice of provider. Table 11 looks at the impact of access variables on

[15] See Singh, 1999 for further discussion of the determinants of infant mortality in India.

outpatient treatment in Tamil Nadu, showing odds ratios for choosing private over public services for each of the variables. The results of this logistic regression suggest that access does, to some extent, play a role in the decision. First, it is interesting to note, that improved transportation infrastructure makes individuals more likely to opt for private treatment. On the other hand, the presence of a dispensary in the village increases the likelihood of choosing public treatment. Further if there is a hospital within the village or hospital/CHC/PHC within 5 km and sub-center within the village, individuals are more likely to utilize public services. They are significantly less likely to do so for either long or short illnesses if that is not the case. In the case of inpatient treatment, seen in Table 12, access variables are less likely to have a significant impact.

While these regressions show that there is some impact of access in Tamil Nadu, it is not robust and the magnitude of the impact is not large. This is brought out in focus group discussions, where Rakodi (1998) finds that access does make a difference in choice of provider but that it is not a very severe constraint in Tamil Nadu, in part because there has been an investment in infrastructure and there is fairly good access. Improving access has in fact been a major target in health sector improvement in Tamil Nadu over the past few years. However, the above analysis suggests that access is not a major determinant of the choice of provider amongst rural populations. In fact, none of the explanatory variables in the above regressions are able to appreciably explain the differences. This suggests that it much of the variation might in fact be a result of other choice factors that are not standardly measured in household surveys. In particular, we focus in the next section on indicators of quality, the other major goal of health care provision, for which standard approaches of data collection generally do not provide adequate indicators.

c) Quality

While quality appears to be the fundamental determining factor for the utilization of public health services, it is, unfortunately one of the aspects of health care systems that is hardest to monitor and measure. Standard indicators for structural quality that have been suggested are: existence of national standards for professional qualifications of manpower; proportion of health workers possessing basic professional qualifications; existence of national facility standards including enforcement mechanisms, and the presence of a national quality assurance program, including trained staff and established procedures for quality design, monitoring and improvement. Process indicators include such things as proportion of clinics in which services are fully integrated as per national standards; proportion of referrals made and consummated in accordance with national guidelines and standards; proportion of clients who know and understand essential actions needed to complete treatments and avoid future preventable conditions; and client satisfaction.[16]

These indicators are, in general, far more difficult to gather than indicators of efficiency or equity. It is perhaps for this reason that they tend to be ignored when assessments are made of the health care system. Somewhat ironically, it is perhaps these factors more

[16] Knowles, Leighton and Stinson, 1997.

than anything that are the determining elements in the decision by most individuals, including the poor, to turn to private sector provision for outpatient services.

Household surveys seem particularly ill suited to capture less tangible quality variables such as client satisfaction. In order to better understand the role that quality plays in choice of provider and hence in the government's role of equitable provision of health care services, we turn to focus group studies that attempt to understand quality issues from the perspective of users. Primarily, we focus on a study by Rakodi (1998), which relies on focus group discussions (FGD) with health care users in Tamil Nadu, conducted in seventeen villages and one town, across rural, semi-urban and urban districts.

Rakodi finds that users are increasingly shifting towards private practitioners and facilities except in the most remote areas. In discussing the reasons why, FGD participants seemed less concerned about structural issues such as location and quality of buildings, reinforcing the point suggested in the previous section, i.e. access to government facilities was not considered to be a major problem. It was, rather, process quality which participants emphasized most strongly. A major complaint was the lack of available staff, and in particular, doctors. As discussed in the previous section, it is difficult to find doctors willing to serve in rural areas due to lifestyle issues including a lack of facilities such as good housing or good schools. Doctors who do work at rural PHCs often choose to live in more urban areas and commute, reducing the time they have available. In order to increase incentives for doctors to staff PHCs, Tamil Nadu, unlike many other states in India, allows private practice for government doctors. While this may make it easier to recruit medical personnel, it drastically reduces the incentive of doctors to stay at the public facility. In fact, doctors were often reported to be available for no more than one or two hours a day.

An attempt is being made by the government to increase availability by upgrading block level PHCs to provide 24-hour service. Users in villages near a 24-hour PHC do report higher usage, acknowledging that if there are one or two people in attendance at night they are able to dispense drugs and admit women in labor. However, the type of service available is generally dependent on who is in attendance. In many cases necessary staff are not available to attend deliveries, and other patients may also be requested to return in the morning or be referred to the hospital.

Users expressed a fear of hasty and careless diagnoses and complained of careless treatment. Understaffing of primary care facilities as well as lack of monitoring means that staff often do not devote sufficient time or attention to individual patients. Users talked about serious negative outcomes from misdiagnoses. Inadequacies in care and treatment were also identified. There was a concern that injection needles were improperly sterilized increasing the likelihood of swelling and infection, and that the needles used were especially thick, leading to greater pain and discomfort. Further, users expressed the belief that PHCs could not assure a rapid and certain cure, in part as a result of the limited range of slow-acting drugs available. Perhaps the most widespread complaint was that of poor attitudes of the staff, and impolite and careless treatment of patients. Patients generally felt that time was not taken to explain treatments and

medication to them sufficiently. There was also a complaint of discrimination against lower castes.

Availability of drugs was also cited as a problem. While PHCs provide drugs for free, they stock a limited range, and sometimes have insufficient quantities. The Tamil Nadu Medical Services Corporation (TNMSC) was set up to deal with this problem in particular and has in fact proved quite successful in facilitating the distribution of drugs to PHCs. Medical officers now report prompt delivery of drugs upon placement of orders.[17] However each PHC is faced with a fixed budget of Rs. 70,000 to 75,000 a year to supply drug needs of it own and surrounding sub-centers. While they can apply for additional funds, the extent of those funds are also limited. Under this budget constraint PHCs cannot afford to purchase more expensive and in many cases faster acting drugs, and sometimes are faced with an insufficient supply.[18]

Perhaps the best explanation of the widespread use of private services, though, comes from user's descriptions of the costs involved in utilization of public services. PHC services are officially free, particularly for low-income users. However, there is a general understanding that there will be unofficial charges involved, either in payment to the staff or to purchase drugs or supplies. These charges are usually linked to the quality of service provided to the patient. For example, some users complained that in the absence of payment to the staff, injections were administered particularly brutally. Others discussed improved treatment for deliveries and other services with payment, and willful malpractice in the absence of payment. Unofficial charges, while less than the cost of receiving private treatment, combined with unreliable treatment to decrease the demand for public services.

While improving access through increased investment in medical infrastructure and longer hours is indeed a positive step, what this section elucidates is that in order to be fully effective, such investments need to be complemented by quality improvements. In the absence of such concomitant investments in total care, we find that the poor are still forced to turn to the private sector to fulfill their health care needs.

IV. Reforming the Role of the Public Sector in Health Care Delivery

a) Improving the Quality of Publicly Provided Primary Health care Services

In any system in which there is an observed preference for the private sector provision of goods and services that appear to duplicate public sector offerings, the question is raised as to why people would choose to pay for services that they can receive at little or no cost at public facilities. The choice to utilize private providers for those health services offered by the government health care system raises such a question. There are a number of possible explanations that could explain such behavior, such as accessibility or convenience. In focus groups however, the primary reason given by participants for

[17] Visaria 1999
[18] Rakodi 1998.

preference of private providers over public providers was the quality of treatment provided.

The quality of health care can be seen as a function of two broad categories of factors. First is the quality of facilities, equipment and drugs available. This set of factors clearly plays a role in decisions to choose private over public providers in Tamil Nadu. The focus group discussions describe public facilities as being less clean, utilizing poorer equipment, and stocking less effective, slower acting drugs. In cases where drugs necessary to treat a particular ailment are expensive (such as snakebites or dog bites), PHC's have simply decided not to stock them, despite this being one of the services they are mandated to provide.[19] The second category of factors, which appeared to ultimately dominate the choice of provider, was the quality of service provided by health care practitioners. The previous section has described the issues around non-availability of physicians, poor staff attitudes, and demands for unofficial payments.

In order to understand what it would require to improve quality in the public sector it is perhaps helpful to understand the reasons for private sector quality standards in service provision. In fact, the primary factor underlying the differential in service quality between the private and public sector is accountability. In a field where reputation and repeated business are the keys to success, the cost of poor quality treatment in the private sector is the loss of patients, and a resulting loss of profit or employment. In the public sector there is no comparably direct relationship between performance and pay or job retention. In the absence of such a link, there are very few incentives for public sector employees to perform at a high level.

Bennett and Muraleedharan (2000b) point to the creation of incentives as part of the program of "New Public Management" that is being attempted for health care reform in Tamil Nadu. In fact, the shift towards the creation of market incentives must form the basis of improvement in quality of public health care provision. In a system where there is no monitoring and minimal consequences for poor performance or even malpractice, the poor quality and corruption described in the previous section must at some level be expected. The first step in remedying such a situation is to link performance with personal outcomes.

Implementing such incentives will require first and foremost an effective system of monitoring. There has been a preliminary attempt to set up a system of monitoring for PHCs under the DANIDA-TNAHCP initiative.[20] However the focus of this system of monitoring is not primarily quality of care. Setting up effective quality monitoring will require the development of innovative new approaches that involve the community to whom the health facility should eventually be accountable. The monitoring system will need to be backed up by effective enforcement mechanisms. To the extent that there are limited consequences attached to poor performance there is little incentive to improve staff attitudes and care. It is necessary, therefore, to create both positive and negative systems of incentives through linking performance with both pay and job retention.

[19] Rakodi 1998.
[20] Athreya and Chunkath 2000

The institutions of monitoring and incentive systems carry two distinct kinds of costs. First, there is an administrative cost for the system of monitoring and enforcement. The magnitude of this cost will be a function of the complexity of the system instituted. Involving the community may be a valuable way of ensuring effective monitoring at lower cost, as consumers of the health services provided will have access to some of the best information on performance.

The second set of costs is the necessary compensation to make the employment offer attractive to health care workers. If current wages are set at an efficient level, it would imply that the expected value of the job for a government health worker is equal to the opportunity cost of their time, which may be represented by the wage they could expect to earn elsewhere. The expected value of the job will encompass a variety of factors, including the level of effort required, job security, and additional benefits such as unofficial charges that nurses or paramedics may demand from patients, or returns to private practices of government physicians. To the extent that a system of monitoring and enforcement is instituted, there will be a direct reduction in the expected value of employment at a public health facility, as an effective system will demand a greater level of effort, curtail unofficial payments, limit the time available to government doctors for their private practices, and reduce job security. The filling of staffing positions will therefore require additional compensation, either in terms of higher salaries or in bonuses or other benefits.

In the case of Tamil Nadu, as in much of India, salaries for government doctors are even now barely sufficient to fulfill this requirement, as is evidenced by the difficulty in staffing rural PHCs. Doctors complain that facilities in rural areas are inadequate, and that salaries are not high enough to compensate. The response of the Tamil Nadu government has been to allow government doctors to establish private practices. While the result of this policy has indeed been to increase the value of the job and make it easier to staff rural PHCs, it has come at the cost of increased absences of the doctors from the public facility, as it is generally more lucrative to spend time treating patients privately. If such a perquisite is to be removed by monitoring and enforcing attendance on the part of physicians, they will have to be compensated with higher salaries.

It is apparent, therefore, that an improvement of the quality level of public primary health care services is going to require an infusion of resources, accompanied by an effective system of monitoring and enforcement. This will enable an improvement at the level of equipment, drugs and facilities, as well as at the level of quality of care.

b) Improving Cost Effectiveness: Developing Referral Systems

One of the patterns that the data elucidates is that there is a high usage of hospital outpatient services compared to PHC services (see section IIIa). In general, patients would rather utilize hospitals than PHCs even for simple outpatient treatments, as the quality of care is far superior. This is primarily as a result of greater resources devoted to the tertiary sector. In 1996/97, 61% of the health care budget was devoted to medical needs and 39% to public health. Of the medical needs budget, 58% was spent on

hospitals and dispensaries. Of the 39% for public health less than a fourth was spent on PHCs.[21]

At an efficiency level, the cost of providing a unit of care at a hospital is considerably greater than providing it at a PHC. The perceived quality shortcomings of the primary health system therefore result in poor efficiency outcomes. In response there have been increasing demands for an effective system of referral, requiring that patients be seen first a PHC before having access to free or low cost care at public hospitals. Advocates of instituting such a referral system point out that there is no coordination between private and public providers or between various types of public providers. There is therefore inefficient provision and duplication of services.[22] Tertiary services such as hospitals are often overcrowded, while beds in primary care facilities may be underutilized. It has been suggested that instituting a compulsory referral system will improve allocative efficiency and reduce overall costs.

However, as discussed in Section IIIc, the foremost reason that the poor do not utilize primary care facilities is the low quality of care. Further, as Mahal et al.(2000) argue, under the current system, hospitals are the main level at which government subsidies for health care are effectively reaching the poor. Simply making these facilities harder to access is unlikely to appreciably improve efficiency, and will significantly affect welfare. It is important, therefore, to approach this efficiency problem by targeting the root cause, i.e. the quality problems at the level of primary health care. The incentive to visit hospitals for outpatient care will diminish if people feel that they have access to adequate quality health care at the primary level. This should be expected to facilitate the shift to a more cost-effective provision of services. While instituting an effective system of referral should be an eventual goal for health care reform, it should not be attempted before significant improvements in the ability of PHCs to provide high quality basic care.

c) Regulating the Private Sector

Although our emphasis so far has been the need for reform in the public sector, the private sector currently represents a majority of health care provision in Tamil Nadu, and will continue to be a major resource for individuals at all socio-economic levels. It is therefore a matter of great concern that such a critical sector currently functions with little to no regulation. The basic laws governing the medical profession are codified in the Indian Medical Council Act of 1956. This set of laws recognizes traditional systems of medicine and Indian systems of medicine such as Ayurveda and Siddha as being valid. As a result anyone can be legally licensed as a "Registered Medical Practitioner" (RMP) after a simple process of basic training. Once licensed there is little monitoring of practices or medications.[23]

While laws governing registration of physicians are more restrictive they have been poorly enforced. Laws on the establishment of private health facilities were only

[21] Bennett and Muraleedharan 2000a, Rakodi 1998
[22] Varatharajan 1999
[23] Kabra, 1997

instituted in 1997. There have been recent efforts to extend the Consumer Protection Act to cover health care, but these have faced strong resistance from medical practitioners. As a result, the private health care market remains largely unregulated, and the government capacity needed to regulate it will be considerable.[24] It remains, however, an important area of focus, and must be included in any larger health reform plan.

V. Social Insurance

The above framework has argued that the role of the government in the provision of health care is above all to provide a social safety net for the poor and act as a means of poverty alleviation. Based on this rationale, the argument has been that the government should focus principally on the provision of basic care, which is the most cost-effective way to increase Disability Adjusted Life Years.[25] A somewhat different perspective is put forward by Hammer and Berman (1995), who argue that the primary role of the government is to provide health insurance in case of failure of insurance markets. The catastrophic nature of some health care costs are, they argue, the most devastating, and the focus of the public health sector should therefore be to alleviate this burden, even though these services may not be cost effective. Rannan-Eliya (1996) claims that this was the basis of Sri Lanka's success in attaining high health status, pointing to the fact that 85% of primary health care in Sri Lanka is paid for privately, while 95% of inpatient care is publicly financed. McPake (1997) points out that this debate requires a trade-off between the "needs of the vulnerable section of the population who cannot afford even basic services" and the "needs of the majority who cannot afford more expensive services." While the Indian government has firmly asserted its commitment to the universal provision of basic health care, this does not negate its ability to promote systems of health insurance for those in a position to afford it.

An increasing number of countries in Asia today are exploring social insurance systems. In India currently the use of insurance is extremely limited. There are two major insurance schemes, the Employees State Insurance Scheme, which is a government subsidized insurance program for workers in the formal sector, and the Central Government Health Scheme, which provides comprehensive health care to central government employees. In all, though, government insurance covers about 4% of employees and Bhat (1993) estimates that in 1988 only 8% of health care expenditure was met from insurance.

Health care insurance is a way to pool risk across time and across individuals to alleviate the burden of catastrophic illness. In the case of social insurance, there is a compulsory contribution to a social insurance plan. The compulsory nature of health insurance avoids the two major problems that private insurance schemes face, adverse selection and cream-skimming (see Section II). Mandatory social insurance typically pools the risk across individuals although there are other forms. For example, Singapore has instituted medical savings accounts, which require individuals to invest money in a personal account that is available for use when health care is needed. Such accounts spread

[24] Bennett and Muraleedharan 2000a
[25] World Bank 1993.

individuals' risks over time, but do not provide much protection against catastrophic illness, as individuals are only covered to the extent of funds in their accounts.

Social insurance programs pay for privately provided health services through funds that are generally collected as an earmarked payroll tax. This allows individuals to access higher-quality private care, while freeing up government health care resources that provide public tertiary care services. These resources can then be shifted toward more cost-effective expenditures such as public health services and preventative care, or public tertiary care for the poor. Many of the wealthier Asian economies, such as the Republic of Korea and Taipei, China, already have universal social insurance coverage. The need to ease the budgetary burden of health care coverage and the desire to take advantage of the benefits of private provision is leading other countries such as the PRC, Indonesia, Malaysia, Mongolia, Thailand, and Viet Nam to evaluate the benefits of introducing social insurance systems.

Countries with successful social insurance systems instituted them when their economies were relatively advanced, with high degrees of urbanization and industrialization. The issues involved in implementing such a system in poorer, more rural economies such as Tamil Nadu, can be quite different. The collection of social insurance funds is considerably easier in the formal sector. Enforcement of premiums collection in the rural, informal sector will be extremely difficult and is unlikely to be cost-effective. Similarly, access to high-quality, privately provided tertiary services will be considerably greater for urban populations.[26] The function of instituting a system of social insurance in the case of Tamil Nadu will be primarily to ease the financial burden on the government of subsidies for tertiary care that are going to the rich.

There have been concerns expressed that the nature of social insurance systems are such that they will create a two-tier system of health care, with poor rural populations being limited to low-quality public services while urban populations have access to higher-quality private services. While there are certainly problems associated with the social insurance approach in poorer, more rural economies, the provision of high quality basic care is going to place an increased burden on government budgets. Developing innovative approaches for providing and financing these services is necessary to ensure universal access to high-quality health care to rural populations. The private sector can be an important resource in this endeavor, even if its primary role is to lift the burden of provision and financing in urban areas to free-up government resources for the rural sector.

VI. Moving forward

In assessing utilization of health care in Tamil Nadu, this study has confirmed the results of previous studies in Tamil Nadu and elsewhere in India that a majority of health care services are provided by the private sector. This is especially true in the case of outpatient services. In order to understand the reasons for choice of provider we assessed

[26] Gertler 1998

both access and quality issues. Despite gaps between the norms for number of CHCs, PHCs and sub-centers and the actual number in Tamil Nadu, health care infrastructure is relatively advanced compared to that found in other states. However, while access plays some role in choice of provider it does not appear to be the dominant factor.

Focus group discussions with health care users in Tamil Nadu show that the major factor in the choice to use private providers over public was the quality of care. A review of the research on quality of care at public primary care facilities shows that it is sadly lacking, and it is such factors as poor staff attitudes, equipment and drug availability at primary health care centers that lead even the poor to pay for private care rather than to accept free public services.

While the current trend in health care reform has been to involve the private sector in provision and financing of services, this does not seem like a sufficient solution in this case, where such a significant percentage of health care is already privately provided and financed. Rather than large-scale privatization, what we have suggested here is that the primary focus needs to be the improvement of public primary health care facilities through a process of 'marketization', i.e. the introduction of incentive structures in publicly health care systems to improve quality. Public-private partnerships do have a role to play, however, and can be developed through the implementation of institutions such as social insurance systems, which have built in safeguards to protect the poor from the burden of financing health care.

Developing any comprehensive health sector reform agenda will first require a detailed assessment of the Tamil Nadu health sector. Such an assessment needs to take into account the views and opinions of stakeholders at every level, including administrators, health care providers, and consumers of health care services. The main function of such an assessment will be to develop a set of goals for health care reform, including the relevant indicators to be targeted, appropriate target goals, and an evaluation of the resources necessary to achieve these goals. The analysis presented in this report suggests that the following factors should receive particular attention.

- Quality improvements: In order for investments in access to be fully effective in fulfilling the health care needs of the poor they will need to be complemented with investments in quality. We recommend that a full assessment be carried out of the resources needed at a practical level to provide the quality of basic health care services required to fulfill the needs of the poor.

- Monitoring and enforcement at the PHC and SC level: Providing high quality care at a primary level will undoubtedly require an increase in resources, for drugs and equipment as well as to ensure adequate compensation for health care providers. We have further suggested that in order to create an appropriate incentive structure and improve quality of care it will be necessary to link performance and pay or job retention. This will require the development of an effective system of monitoring and enforcement. Any attempt to develop such a system will need to involve stakeholders in the process.

- Development of an effective system of referral: this paper has strongly argued that while it would be an efficiency improvement to develop an effective system of referral, such a step should however only be taken after significant improvements in quality have been achieved in provision of primary health care services.

- Regulation of the private sector: with the private sector playing such a dominant role in the provision of health care it is essential that private providers be held to higher standards of accountability. There are currently numerous unqualified practitioners and there is little to no regulation of services provided. Regulating the private health sector is one of the most pressing health care issues in Tamil Nadu as well as the rest of the country.

- Develop a social insurance system: while the primary focus of the paper has been on the improvement of government provided facilities at the primary care level, the data on utilization also point out the mistargeting of government health subsidies towards the rich, especially through inpatient treatment at tertiary facilities. Developing structures that enable involvement of private sector financing and provision at this level will potentially free up government resources to make much needed quality improvements at the primary level.

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Table I: Health Indicators

State	Population ('000)		Life Expectancy	Infant Mortality (per 1000)		Fertility (per 1000)	
	1985	1997	1995	1985	1997	1986	1997
All India	765950	962380	60.3	95	71	32.9	26.4
Andhra Pradesh	57869	73170	61.55	83	63	31.6	22.5
Bihar	75587	97355	59.05	105	71	36.5	31.7
Gujarat	368285	45778	61.1	98	62	32.2	25.6
Haryana	14107	18522	63.5	85	68	35.3	28.3
Himachal Pradesh	4585	NA	64.4	84	63	30.6	22.6
Karnataka	40136	48897	62.25	71	53	29.0	22.7
Kerala	26754	31415	72.75	32	12	22.5	17.9
Madhya Pradesh	56655	73800	54.65	122	94	37.2	31.9
Maharashtra	67831	87959	64.55	68	47	30.1	23.1
Orissa	28112	35018	56.4	130	96	32.5	26.5
Punjab	17902	22539	67.25	71	51	28.7	23.4
Rajasthan	37772	49374	58.85	108	85	36.4	32.1
Tamil Nadu	51370	58968	63.35	80	53	23.8	19
Uttar Pradesh	120598	153240	56.65	140	85	37.5	33.5
West Bengal	58898	74713	62.15	77	55	29.7	22.4

Table 3: Government Expenditures on Health

State	Per Capita Net Domestic Product (In 1981 Rupees)		Government Expenditure on Health (Rupees Per Capita)		Government Expenditure on Health (Percent of total budget)	
	1985	1995	1985	1995	1985	1995
All India			35.52	227.24	3.29	2.63
Andhra Pradesh	1530	1973	30.66	68.91	6.61	5.63
Bihar	1074	1037	15.82	58.81	5.68	6.89
Gujarat	2186	3496	39.35	80.00	7.51	5.21
Haryana	2893	3686	40.89	76.22	7.00	2.90
Himachal Pradesh	1781	2395	69.02	227.24	7.89	8.19
Karnataka	1644	2454	33.81	103.84	6.60	6.39
Kerala	1507	2169	41.64	122.07	7.85	4.44
Madhya Pradesh	1409	1753	25.37	62.67	6.69	5.55
Maharashtra	2705	4274	38.09	77.87	5.97	4.67
Orissa	1442	1580	25.54	64.40	7.38	5.00
Punjab	3249	4122	45.55	105.03	7.24	5.33
Rajasthan	1338	2053	31.36	92.56	8.11	6.97
Tamil Nadu	1798	2767	36.25	100.75	7.70	6.59
Uttar Pradesh	1375	1646	29.74	52.02	9.75	5.38
West Bengal	1929	2601	32.89	71.90	8.92	6.58

Table 4: Choice of Provider for First Treatment by Illness, Tamil Nadu

	Outpatient		Inpatient		No Treatment
TYPE OF ILLNESS	Public	Private	Public	Private	
Short Illness	**239**	**586**	**54**	**90**	**220**
Diarrhea	*39*	*63*	*1*	*10*	*20*
Cough/Cold	*168*	*433*	*46*	*64*	*168*
Fever	*32*	*90*	*7*	*16*	*32*
Long Illness	**15**	**25**	**26**	**21**	**4**
Total	**254**	**611**	**94**	**111**	**224**

Table 5: Choice of Provider by Quintile, Tamil Nadu

Quintile	Public	Private	No Treatment
I	83	126	50
II	74	155	45
III	78	181	53
IV	65	123	31
V	68	192	45
Total	368	777	224

Table 6: Total Expenditure on Health by Quintile, Tamil Nadu

	OUTPATIENT		INPATIENT	
Quintile	Public	Private	Public	Private
I	192.61	588.57	340.83	1818.15
II	177.77	627.06	584.42	2360.80
III	144.92	672.26	307.24	1867.05
IV	146.47	602.98	763.57	2318.08
V	183.47	420.00	1401.39	2004.26
Total	168.51	575.84	656.67	2045.35

Table 7: Health Expenditure as a Percent of Total Household Expenditure, by Quintile

Quintile	ALL INDIA	TAMIL NADU
I	24.24	41.13
II	10.85	13.73
III	8.06	11.24
IV	5.77	9.92
V	3.15	3.87
Total	10.33	15.39

Table 8: Distribution of Outpatient Treatments in the Last 15 Days by Type of Public Facility

	Tamil Nadu						All India					
	I	**II**	**III**	**IV**	**V**	**Total**	**I**	**II**	**III**	**IV**	**V**	**Total**
Total												
Public Hospitals	72.5	70.9	74	86	68.2	558484	56.4	52.7	66.4	65.7	75.4	4386367
PHCs & Others	27.5	29.1	26	14	31.8	182667	43.6	47.3	33.6	34.3	24.6	2394239
Urban												
Public Hospitals	83.3	74.7	78.7	67	59.7	184001	83.9	77.8	81.9	79	76.7	1383664
PHCs & Others	16.7	26.3	21.3	33	40.3	68925	16.1	22.2	18.1	21	23.3	350402
Rural												
Public Hospitals	73	64.6	72	78	87	374483	55.9	44.7	56.1	65.6	66.8	3002703
PHCs & Others	27	35.4	28	22	13	113742	44.1	55.3	43.9	34.4	33.2	2043837

Table 9: List of Variables

Household Size	The number of individuals in the Household
Total Income	Total annual income of the household
Male	Dummy variable = 1 if individual is male, 0 otherwise
Age	Age of individual
Scheduled Caste/Scheduled Tribe	Dummy variable = 1 if individual belongs to a scheduled caste or scheduled tribe, 0 otherwise
Married	Dummy variable = 1 if individual is married, 0 otherwise
Education Level	Number of years of education of individual
Education Level of Mother	Number of years of education of mother
Number of Adult Females	The number of females in the family in the age group 15-60
Kitchen	Dummy variable = 1 if house has a separate kitchen, 0 otherwise
Ventilated Kitchen	Dummy variable =1 if house has a ventilated kitchen, 0 otherwise
Toilet	Dummy variable =1 if house has a separate toilet, 0 otherwise
Piped Water	Dummy variable =1 if house has piped water supply, 0 otherwise
Road	Dummy variable =1 if village has a drivable road, 0 otherwise
Bus Stop	Dummy variable =1 if village has a bus stop, 0 otherwise
Pharmacy	Dummy variable =1 if village has a pharmacy, 0 otherwise
Dispensary	Dummy variable =1 if village has a dispensary, 0 otherwise
Distance to Doctor	The distance to the closest doctor for residents of the village
Distance to Health Worker	The distance to the closest health worker for residents of the village
Hospital 1	Dummy variable =1 if hospital within the village or hospital/ CHC/PHC within 5 km and sub-center within the village, 0 otherwise
Hospital 2	Dummy variable =1 if hospital/CHC/PHC less than 5 km and no sub-center within the village, 0 otherwise
Hospital 3	Dummy variable =1 if sub-center and Health worker within the village and Hospital/CHC/PHC greater than 5 km, 0 otherwise

Table 10: Determinants of Infant Mortality Rate

Variable	IMR	IMR-Male	IMR-Female
Household Size	-.006***	-.007***	-.004***
Total Income	.000	.000	.000
Total Income Squared	.000	.000	.000
Education Level of Mother	-.009***	-.009***	-.009***
Number of Adult Females	.013***	.020***	.006***
Kitchen	-.009***	-.013***	-.009***
Ventilated Kitchen	-.004**	.002	-.007**
Toilet	-.011***	-.016***	-.004
Piped Water	-.005**	-.002	-.007**
Road	-.001***	-.001***	-.002***
Bus Stop	-.003***	-.001	-.004***
Pharmacy	.001	.004	.001
Dispensary	-.001**	-.000	-.000
Distance to Doctor	-.000	-.000	-.000
Distance to Health Worker	.001***	.001***	.001***
Hospital1	.002	-.002	-.001
Hospital2	.003	.001	.001
Hospital3	-.005	-.001	-.012*
Constant	.119***	.112***	.136

*** Significant at 1%
** Significant at 5%
* Significant at 10%

Table 11: Access as a Determinant of Choice of Provider for Outpatient Treatment: Odds ratios for the selection of private over public treatment.

Dependent Variable: Dummy=1 if treatment is private, 0 if treatment is public

Variable	Short Illness	Long Illness
Household Size	0.991	1.005
Income	1.000***	1.000***
Income Squared	1.000***	1.000**
Scheduled Caste/Scheduled Tribe	0.824***	0.839***
Male	0.95	0.942
Age	0.994	0.999
Age Squared	1.000	0.999
Married	0.961	1.096
Education Level	1.023*	1.076***
Diarrhea	0.644***	
Fever	1.286***	
Diabetes		0.877
Heart Disease		1.009
Leprosy		1.414
TB		1.253*
Cancer		0.555**
Road	1.248***	1.169**
Bus stop	1.106***	1.053**
Dispensary	0.869***	0.847**
Distance to Doctor	0.995***	0.995
Distance to Health Worker	0.998	0.993
Hospital1	0.881***	1.099
Hospital2	1.169***	1.348***
Hospital3	1.171***	1.392**

*** Significant at 1%
** Significant at 5%
* Significant at 10%

Table 12: Access as a Determinant of Choice of Provider for Inpatient Treatment: Odds ratios for the selection of private over public treatment.

Dependent Variable: Dummy=1 if treatment is private, 0 if treatment is public

Variable	Short Illness	Long Illness
Household Size	0.976	1.002
Income	0.999	1.00***
Income Squared	1.00	1.00*
Scheduled Caste/Scheduled Tribe	0.759**	0.797***
Male	1.045	1.006
Age	0.991	0.998
Age Square	1.00	0.999
Married	0.932	0.994
Education Level	1.007	1.034
Diarrhea	0.529***	
Fever	1.207	
Diabetes		0.427***
Heart Disease		0.818
Leprosy		1.954***
TB		1.535***
Cancer		1.013
Road	0.795*	1.184***
Bus stop	1.073	1.037*
Dispensary	1.232	0.931
Distance to Doctor	1.009	0.992**
Distance to Health Worker	0.979	1.016
Hospital1	1.099	0.896
Hospital2	1.34	1.09
Hospital3	1.218	1.463***

*** Significant at 1%
** Significant at 5%
* Significant at 10%

Table 13: Determinants of Total Expenditure, Outpatient

Dependent Variable: Total Expenditure per Episode

Variable	Short Illness	Long Illness
Public Treatment	37.497***	681.446***
Private Treatment	74.448***	922.273***
Household Size	-0.082	15.197*
Income	0.000*	0.002
Income Squared	0.000	0.000
Age	0.724***	-1.164
Age Squared	-0.008***	-0.050
Male	6.533***	104.597*
Scheduled Caste/Scheduled Tribe	-4.672**	-206.127***
Married	3.092	31.616
Education Level	-0.097	15.921
Diarrhea	-0.335	
Fever	2.762	
Diabetes		101.118
Heart Disease		-290.762**
TB		-628.648***
Leprosy		753.692***
Cancer		148.492
Duration of Illness	6.633***	2.270***
Road	6.703***	202.493***
Bus Stop	0.011	-53.166***
Hospital 1	-6.416*	-106.809
Hospital 2	-3.226	-142.194*
Hospital 3	-13.027***	-170.996
Dispensary	-5.754**	-89.460
Distance to Doctor	-0.191*	-4.864
Distance to Health Worker	-0.008	-6.686
Constant	-11.414**	-57.139

*** Significant at 1%
** Significant at 5%
* Significant at 10%

Table 14: Determinants of Total Expenditure, Inpatient

Dependent Va riable: Total Expenditure per Episode

Variable	Short Illness	Long Illness
Public	134.191***	131.833**
Private	258.650***	249.476***
Household Size	-9.342*	-8.659
Income	0.002**	0.002***
Income Squared	0.000	0.000**
Age	-3.92	-4.157
Age Squared	0.044	0.046
Male	84.457**	82.968**
Scheduled Caste/Scheduled Tribe	-42.874	-38.691
Married	92.791*	101.008*
Education Level	20.693**	20.546**
Diarrhea	63.887	
Fever	98.991**	
Diabetes		-57.583
Heart Disease		-61.326
TB		-526.767**
Leprosy		-71.850
Cancer		675.017
Duration of Illness	17.738***	17.744***
Hospital Days	15.390***	15.529***
Road	17.978	20.236
Bus Stop	-11.472	-13.554
Hospital 1	-44.401	-46.289
Hospital 2	-18.663	-20.196
Hospital 3	-65.033	-63.271
Dispensary	70.994	69.855
Distance to Doctor	-0.797	-0.784
Distance to Health Worker	10.438***	10.188***
Constant	-267.427	-225.103**

*** Significant at 1%
** Significant at 5%
* Significant at 10%