

CMDR Monograph Series No. - 41

Changes in Health Care Infrastructure Manpower and Performance in Three States During Economic Reforms

V. B. Annigeri

As part of the Project :

ECONOMIC REFORMS, AND HEALTH SECTOR IN INDIA

Under the aegis of

United Nations Development Programme (UNDP)

and Government of India

CENTRE FOR MULTI-DISCIPLINARY DEVELOPMENT RESEARCH

Jubilee Circle, DHARWAD-580001, Karnataka, India

Ph : 091-0836-447639, Fax : 447627

E-mail : cmdr@sancharnet.in

Changes in Health Care Infrastructure Manpower and Performance in Three States During Economic Reforms

V. B. Annigeri

ABSTRACT

*This monograph tries to present the status of health sector for the states of Maharashtra, Karnataka and Orissa, in terms of financial and physical and performance indicators. The budgetary expenditures on Revenue Account are examined for these three states in respect of Medical & Public Health and Family Welfare Programmes. Simultaneously private household expenditure is also analyzed using two rounds of NSSO data, one prior to the 1993 period and the other during latter years of the current structural adjustment period. Thirdly health sector related indicators are also analyzed over the period of time in the three states depicting different levels of development. All these three segments of analysis may probably throw some light on the performance of these states towards fulfilling some of the goals set in the national health policies from time to time. Discussion in the monograph is presented in the following manner **

- I. Introduction
- II. Budgetary Health Expenditures in selected states
- III. Household Expenditure on Medical Care
- IV. Health Input and Output Indicators and linkages
- V. C o n c l u d i n g observations

* Acknowledgements : Thanks are due to Miss. Seema Hegde and D. R. Myageri for providing statistical assistance

I. Introduction:

Consumers demand the commodity 'health' because of its consumption and investment features. Good health is also one among many precious assets. Everyone wishes to be away from disease, disability and premature death; on the positive side everyone desires to live, to be well and to maintain full command over one's physical and mental faculties. Health is treated as a merit good based on the Musgravian approach (Musgrave, 1959). In the recent past it is also being considered as a durable good (Grossman, 1992), which keeps on depreciating over the period of time. This depreciation needs to be compensated in the form of medical care expenditure.

The interest generated by World Development Report 1993 (World Bank, 1993) on treating health expenditure as an investment has been responsible for attracting funds for the promotion of health world over. The debate, which was the outcome of this report, has also been

responsible for the reforms in general, and in health sector in particular that could improve the equity and efficiency of resource uses.

As India is a signatory to the Alma-Ata declaration there is a need to evolve such policies, which would strive to achieve the health for all goal. When a mention is made about the goal, one would certainly ask the question as to what would be the financial implications for attaining this goal.

In the Indian context both public and private sectors carry out the provision of health care services. Private sector's involvement may be based on both for 'profit' and 'non-profit' motivations. In the wake of economic policy changes that are being initiated in the recent years, one cannot expect an increasing role from the public sector in view of the compression and withdrawal of public resources for the provision of health services. Being a merit good the compression of resources for

health sector is not fully endorsed by researchers (Hicks and Kubisch 1983), but it is very much evidenced in the Indian context (Panchamukhi 1993, Tulsidhar 1993).

In this background the paper attempts to examine the following broad objectives.

- ❖ Analysis of budgetary expenditures on Revenue Account for these three states in respect of Medical & Public Health and Family Welfare Programmes
- ❖ Analysis of expenditure by households on medical care (from NSSO data for two different rounds i.e., 1993 and 1999)
- ❖ Analysis of the trends of input and output indicators of health sector over the period of time and their linkages

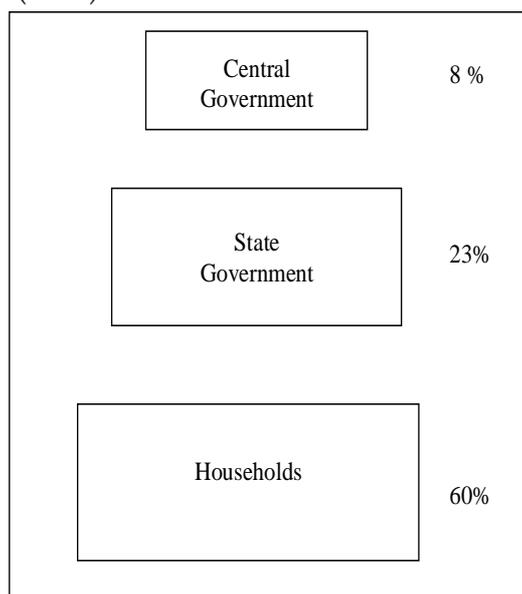
1.1. Health Expenditures in India:

If the achievement of 'Health for All' is based on the Alma-Ata philosophy of primary health care; under the existing resource base we

need to search for innovative methods for the best use of available resources. Apart from this, even the extent of available resources in a given region needs to be analysed for its effectiveness, an exercise which would help in planning of health service development in future.

The pattern of flow of resources for the health sector in India resembles the following picture.

Adapted from Berman Peter (1991)



* The squares represent major source of funds approximately proportional to their relative size of contribution. The figures do not add up to 100 per cent due to the fact that other minor shares from corporate bodies and local governments have not been depicted in the picture

World Development Report 1993 has stated that the private sector in India has more than 50 percent share in the health care delivery system of the country. However some of the Indian studies, which have addressed to this issue have come out with estimates of much larger share for the private sector. Survey findings on utilization patterns indicate the high dependence of health care seekers on the private sector (Duggal and Amin 1987). The study by Chatterjee (1988) has indicated that despite widespread infrastructure, a higher proportion of health service is provided by the private sector than by the government facilities. Jesani and Anantaram (1989) estimate that private sector accounts for as much as 70 percent of the total health expenditures in the country. The same estimate was to the tune of 82 percent from a district of Maharashtra (Duggal and Amin 1989). A study by IIM Ahmadabad in 1987 estimated this to be around 63 percent. The message that emerges from this is that the presence of private sector is

quite significant in the health sector of our economy. This fact is even substantiated by the NCAER study (1992), which estimated that 55 percent of the illness cases received private treatment.

The recent attempts, which have tried to analyze health care financing in the Indian context, do provide some basis for the compression of resources through public sources. A paper by Seetha Prabhu (1999) tries to show that; the series of measures being implemented in the economy with IMF-World Bank assistance have affected union government finances. There seem to be two different phases in the response of the union government. First, comprising the first two years of adjustment, when the government was seriously concerned with reducing the fiscal deficit, and second, the subsequent two years when, the fiscal discipline was lax. The data presented in the paper does not cover the subsequent periods of the current reforms.

No doubt, there has been an increase in central government revenue expenditure on social sector, but its share in total revenue expenditure has declined in the first two years of adjustment and subsequently it has increased its share (Seetha Prabhu, 1999). She also finds that the structural adjustment programme being implemented and consequent fiscal compression at the central government level have further affected the finances of state governments. Her findings show that states have suffered on account of deceleration of tax revenues, and plan and non-plan grants from the central government. The stringency in finances of the states has usually led to deceleration in social sector expenditure in general and real per capita health expenditure.

Kadekodi (CMDR Monograph No. 38) while discussing about the status of Medical Care in India observes that, the Central budgetary allocations in real terms have not been reduced in health sector, be it at per capita level, or per GDP or even

as a total revenue budgetary allocations. However he observes that states' budgetary allocations have declined as a share out of total revenue budget, and in terms of per capita seem to be going up very slowly.

Rama Baru (1999) has tried to examine the health sector scenario using the 42nd round of NSSO data during the year 1989. Her paper shows that, in economically backward states like Bihar, Orissa and Uttar Pradesh, there has been very little growth of hospitals in rural areas. In few states like Kerala, Maharashtra, Gujarat and Andhra Pradesh there is a higher proportion of institutions and beds in the private sector. Based on the NSSO data she concludes that majority of non-government institutions are located in urban areas. She also concludes that it is the relatively more developed states that have a higher concentration of private and voluntary services. But in majority of the states including the backward states, public sector continues to be

the major provider of services especially in the inpatient care. Her findings show that poor people utilize public institutions in Karnataka and Maharashtra, while rich people utilize public facilities to a greater extent in the state of Orissa. Thus, she calls for the continued support of public health services without making any financial cuts on them, because, evidence shows that with the cut back of public services, the private and voluntary sectors will not immediately move in to fill the gap.

Krishnan T.N. (1999) also analyzes the NSSO data for the years 1986 and 1992, while examining access to health and burden of treatment. His findings show that, at the all India level, 60 per cent of the inpatients get treated at government health care institutions. The proportion is similar in both rural and urban sectors. Broadly speaking about 80 per cent or more of inpatients receive treatment from public health care system in the less developed states while the corresponding proportion is 40 per

cent in the more developed states. Private health care institutions account for a much smaller proportion of illness treated in backward states. For example percentage of patients treated in public hospitals for rural areas in Maharashtra is 40 per cent, about 50 per cent in Karnataka and in Orissa about 90 per cent. The respective figures for urban areas are 42, 43 and 80. He concludes that, cost and burden of treatment are closely tied to access to health care and cost of treatment and growth of public health infrastructure are inversely related. Burden of treatment seems to be higher for the poor. Increase in BPL population across the states especially in rural areas puts greater burden on the families on account of morbidity. Thus, he also cautions against privatization of health care services in the Indian context.

We may observe from the above discussion that, there seem to be a declining trend with regard to the public resources towards health sector, and greater dependence of

poor people on public health services. Thus, there seems to be a demand for enhancing the public role in the delivery of health care services. In the monograph, the following major health sector related issues are raised in respect of three specific states.

The states chosen for analysis are Maharashtra, Karnataka and Orissa. In terms of status of overall development Maharashtra falls under the category of a developed state, Karnataka as a medium and Orissa as a low developed one.

The paper tries to address the following major questions

- What is the pattern of budgetary expenditures on health in each of these states?
- Is there any pattern of such expenditures prior to the reforms and during the reforms period?
- What is the growth pattern of Human Resources for health for the periods prior to the reforms and during reforms?
- Similarly, what is the status of

health infrastructure development in these states for these two periods?

- Considering the inputs indicators in terms of manpower and infrastructure, how the output indicator of health status is influenced in these states?

II. Budgetary Health Expenditures in Selected States:

2.1 The state level budgetary expenditures have been examined for the period 1980-81 to 1998-99. The period from 1991-92 has been considered as the reforms period and 1980-81 to 1990-91 is considered as the period prior to reforms. Budgetary expenditures in these states have been examined in the following manner.

- Total Revenue Expenditures (all sectors) as percentage of SDP - indicates total spending effort on revenue account.
- Total Revenue Expenditures on Medical and Public Health (MPH) as percentage of SDP - indicates

- spending quantum on health.
- Total Revenue Expenditures on MPH as percentage of total revenue expenditure – indicates priority attached to MPH spending within the revenue account.
 - Total Revenue Expenditures on Family Welfare Programme as percentage of total revenue expenditure – indicates priority attached to FWP spending within the revenue account.
 - Per Capita Revenue Expenditure on MPH and FWP at constant prices – indicates population based norm of spending.

The total revenue expenditure on all sectors as a percentage of SDP for the state of Orissa shows that, from 1980-81 to 1981-82 it has declined marginally and again increased in the immediate next year. For the period 1983-84 to 1989-90 it has marginally increased and just one year prior to reforms it has shown moderate increase. Throughout the reforms period, it has almost remained stable with an ultimate decline for the year

1998-99. Thus in a less developed state like Orissa, the overall spending effort by the state has not been very encouraging especially in the current reforms period. The same indicator for Karnataka has shown slowly increasing trend prior to the reforms period. During reforms, it has marginally declined in the early stages and finally for the year 1998-99, it has indicated a further declining pattern. We can also note that the overall spending efforts are not so encouraging. In Maharashtra the spending effort on the revenue account has steadily increased up to 1986-87. From then onwards, it has been steadily declining with a marginal increase for the year 1998-99. In a developed state like Maharashtra we can note that as the reforms have progressed the state is trying to increase its overall spending effort.

If one looks at the expenditure on MPH as a percentage of SDP, the following picture emerges. Prior to the reforms period the expenditure on MPH as percentage of SDP has

remained fairly constant in Karnataka and seems to be declining in Maharashtra and there is a slight improvement in Orissa. But during the reforms period the same indicator has marginally shown decreasing trends for Maharashtra and Orissa, while it has remained fairly constant in Karnataka.

In the second level of data analysis the expenditure on MPH and FWP is considered as a percentage of total revenue expenditure. We can observe here that for all the three states this percentage has shown a decline prior to the reforms period. But during the reforms, only the state of Maharashtra has shown a decreasing pattern though marginally and in the states of Orissa and Karnataka the expenditure's on MPH have shown marginal improvement. We can also note that the state of Maharashtra is spending less on MPH as compared to Orissa and Karnataka both during and prior to the reforms period.

With regard to the expenditure on FWP as a percentage of total revenue spending the state of Orissa has spent more resources on FWP as compared to the other two states. This is true for the period prior to as well as during the current reforms. We may also note that resources on FWP have shown a declining trend in the reforms period for the states of Maharashtra and Orissa, while in Karnataka there is a somewhat insignificant improvement.

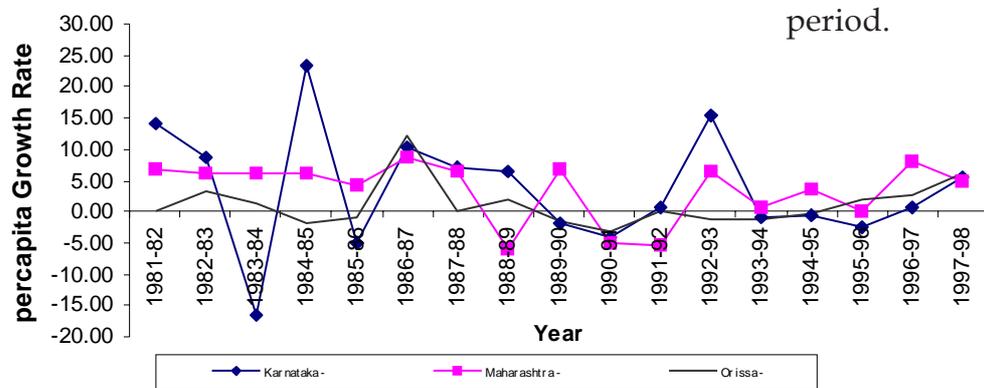
If we look at the per capita expenditure on MPH, we can see that Orissa is spending less as compared to Maharashtra and Karnataka. This is true for the reforms as well as prior to the reforms period. However with regard to the per capita expenditure on FWP, we can note that Karnataka is spending more, followed by Orissa and Maharashtra. But in the reforms period all the three states have shown declining trends with regard to the real per capita expenditure on FWP, which is definitely a cause for concern.

2.2 Growth Rates of Real Per Capita Expenditures:

The growth rate of real per capita expenditure on MPH for these states shows that there is a lot of variation over the years. Just after the beginning of the reforms period we can note that the growth rate has been negative for all the three states. The growth rates have improved for Maharashtra and Karnataka after 1995-96 and for Orissa it has shown improvement after 1996-97. But on the whole improvement seems to be very marginal. In the pre reform period, Karnataka had registered negative growth rates for several

The growth rates of real per capita revenue expenditure on FWP show that for the states of Maharashtra and Karnataka they showed negative trends well before the reforms period. The situation slightly improved immediately after the reforms were introduced and again in the latter period of reforms the negative growth has occurred. But in the state of Orissa after 1985-86 the growth seems to be fairly constant with few exceptions, where we see negative growth. Karnataka has been consistently showing widely fluctuating growth rates with quite often negative in the pre reforms period.

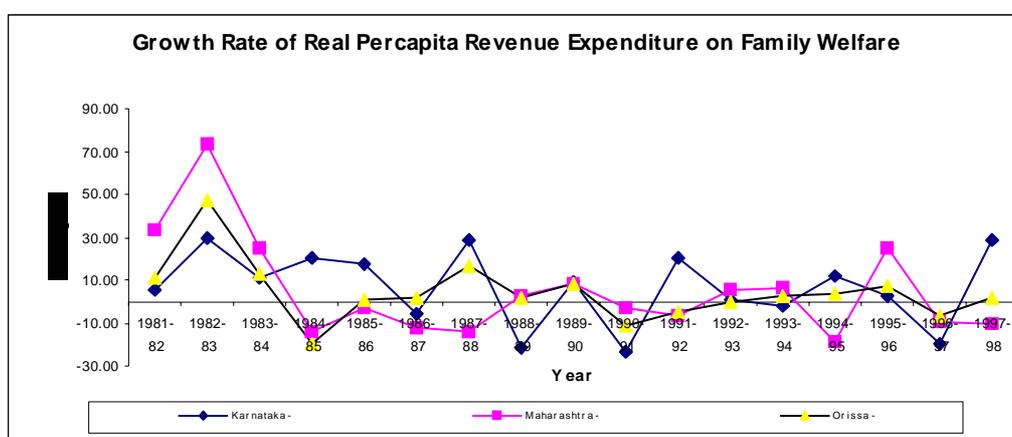
Growth Rate of Real Percapita Revenue Expenditure on MPH (2210)



The message that emerges from the discussion is that, though a state is spending more on revenue account with increasing trends over the period of time, it does not necessarily mean that expenditures on health are also going up. Priority attached to MPH in the state budgets show that less developed state like

Orissa. In the ultimate analysis, the population based norm does indicate that higher the level of development, more would be spent in per capita terms on health.

The observations made here are graphically presented in the graphs in appendix



Orissa has given lesser priority to this component as against Karnataka and Maharashtra. However, developed state like Maharashtra has reduced importance to FWP in the total spending and a less developed state of Orissa has increased its spending on FWP. The real per capita expenditures on MPH show that, the better off states like Maharashtra and Karnataka are spending more than

III. Household Expenditure on Medical Care

Here an attempt is made to examine the private expenditure on medical care using the NSS data for the period of 1993 to 2000 (50th to 55th round of NSSO) Discussion on different facets of household expenditure is presented in the following pattern.

- Medical expenditure of the households in the Total Private Consumption Expenditure (TPCE).
- Average Monthly Per Capita Expenditure on Medical care and TPCE.
- Institutional and Non-institutional per capita Medical Care Expenditure.
- Elasticity of Medical Care Expenditure by households.
- Medical Care Expenditures for people below poverty line and people in the top 10 per cent expenditure class.

3.1 Based on the data on total consumer expenditure from the above surveys, we have tried to look at the proportions of resources spent on medical care by the households. The analysis pertains to the per capita private expenditure on medical care, and total consumer expenditure. The average expenditure for the reference period from 1993 to 2000 reveals the following picture:

Medical Expenditure as Percentage of Total Consumer Expenditure
Average for 1993-2000

Table - 1

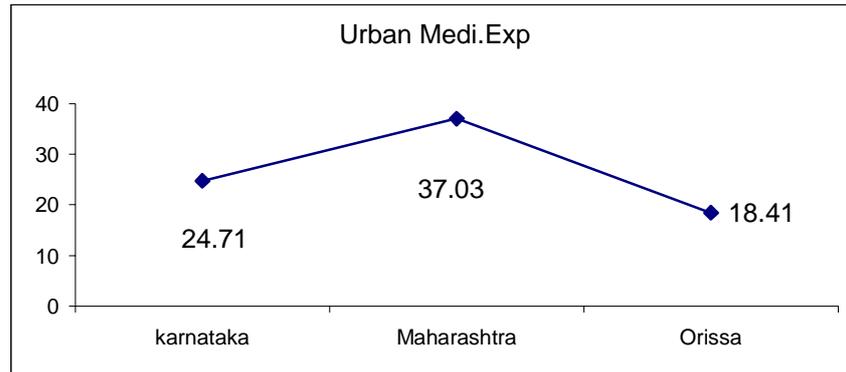
State	Rural	Urban
Karnataka	3.7	3.9
Maharashtra	6.8	4.8
Orissa	5.9	3.0

A look at the proportions of resources spent on medical care by the households shows that people in Maharashtra spend more on medical care both in rural and urban areas. In rural Orissa they spend higher than the people in rural Karnataka. However in urban areas people in Karnataka spend more than the people in Orissa. Range of medical care expenditure in these three states lies between 3.0 to 6.8 per cent, in the total expenditure.

3.2 If we look at the average monthly per capita medical care expenditure, it is clear that people in Maharashtra spend double the amount as compared to the people of urban Orissa. In rural areas people spend less in Karnataka as compared to Orissa and Maharashtra.

We can also note that people in a developed state spend more on medical care than the medium medical care for rural and urban areas in the three states.

Graph 3
Average of Monthly Per Capita Expenditure on Medical Care



developed and less developed states. This may reflect on greater spending capacity as well as good network of health care facilities available to the people in more developed states. Graphs below show the average of monthly per capita expenditure on

3.3 Institutional and Non-institutional Expenditures:

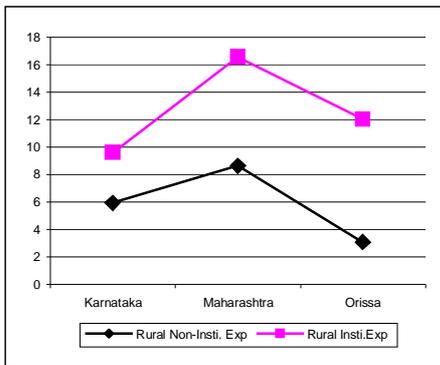
We may notice that in all the three states institutional expenditure is greater than non-institutional expenditure. Among the three states

people of Maharashtra incur high institutional expenditure on medical care. Perhaps this reflects on the availability of better facilities and infrastructure. Orissa spends less on institutional medical care expenditure. This may probably

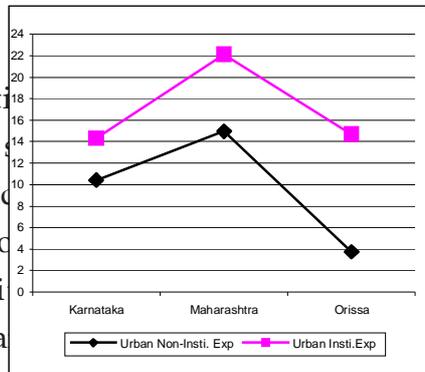
less costs to the patients in case of hospitalisation. Higher costs would also reflect on the private sector's role in the delivery of health care services, which is reflected in the state of Maharashtra. Graph below indicates such expenditures.

Average of Monthly Per Capita Institutional & Non- Institutional Expenditure on Medical Care during 1993-94 to 1999-2000: Rs

Graph 5



Graph 6



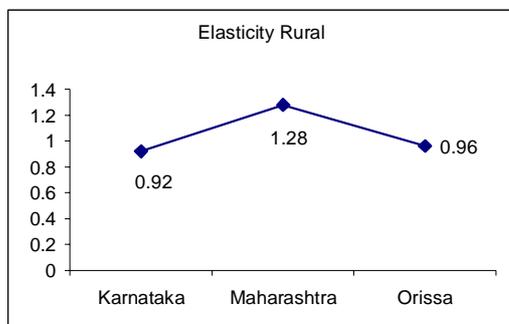
Expenditure
The graphs show the average of monthly per capita expenditure on rural and urban states for the period 1993-94 to 1999-2000.

regions. This is not so in case of Karnataka, which probably indicates

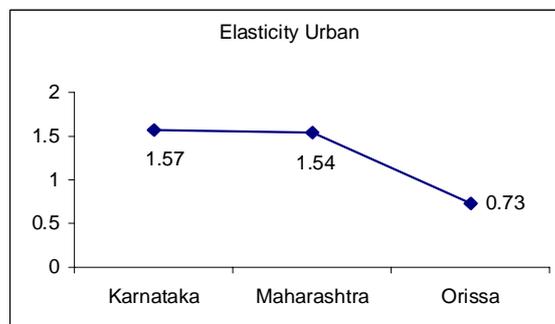
Source: NSS "Sarvekshana" Series and NSS Reports

Average Elasticity of Expenditure on Medical Care of Rural and Urban Regions of Three States for the Period 1993-94 to 1999-2000

Graph 7



Graph 8



Source: NSS "Sarvekshana" Series and NSS Reports

From the graphs we can note that rural people of Maharashtra spend more elastically on medical care as compared to the other two states. More developed a region with greater opportunities for earning income would facilitate people to spend more on medical care. We can note that elasticity of expenditure is greater in urban areas except in the state of Orissa where it is higher in rural areas. Lower degrees of elasticity would probably indicate lower levels of meeting the needs of the people with regard to utilization of medical services. This may also probably reflect on the willingness of the people to pay for medical care services.

3.5 Share of medical care expenditure to total consumer expenditure for two distinct income groups:

With a view to understand the pattern of private expenditure by people with different income levels, we tried to analyze the NSSO data from 50th and 55th rounds. Using the data from these rounds the percentage share of monthly per capita expenditure on medical care to total consumer expenditure is calculated for two groups of households as shown below.

- a. people below poverty line
- b. for the people of top 10 percent expenditure class

Table 3
Pattern of Private Expenditure on Medical Care in 1993-94

Karnataka			Karnataka		
	Rural	Urban		Rural	Urban
% of People Below Poverty Line	29.88	40.14	Top 10 % of the Expenditure Class	10	10
Average Per Capita Monthly Expenditure on Medical Care (Rs)	4.29	6.73	Average Per Capita Monthly Expenditure on Medical Care (Rs)	47.30	83.36
Average Per Capita Monthly Total Consumer Expenditure (Rs)	147.6	216.7	Average Per Capita Monthly Total Consumer Expenditure (Rs)	621.5	1053.54
% Share of Medical Expenditure to Total Consumer Expenditure	2.91	3.11	% Share of Medical Expenditure to Total Consumer Expenditure	7.71	7.91
Maharashtra			Maharashtra		
% of People Below Poverty Line	37.93	36.16	Top 10 % of the Expenditure Class	10	10
Average Per Capita Monthly Expenditure on Medical Care (Rs)	6.81	10.06	Average Per Capita Monthly Expenditure on Medical Care (Rs)	74.95	125.17
Average Per Capita Monthly Total Consumer Expenditure (Rs)	145.8	234.6	Average Per Capita Monthly Total Consumer Expenditure (Rs)	705.8	1449.7
% Share of Medical Expenditure to Total Consumer Expenditure	4.64	4.29	% Share of Medical Expenditure to Total Consumer Expenditure	10.62	8.63
Orissa			Orissa		
% of People Below Poverty Line	49.72	41.64	Top 10 % of the Expenditure Class	10	10
Average Per Capita Monthly Expenditure on Medical Care (Rs)	3.64	7.45	Average Per Capita Monthly Expenditure on Medical Care (Rs)	61.82	91
Average Per Capita Monthly Total Consumer Expenditure (Rs)	147.2	215.5	Average Per Capita Monthly Total Consumer Expenditure (Rs)	478.7	964.68
% Share of Medical Expenditure to Total Consumer Expenditure	2.45	3.46	% Share of Medical Expenditure to Total Consumer Expenditure	12.91	9.43

Source: NSS "Sarvekshana" Series and NSS Reports and Planning Commission Report on Poverty Estimates 1999-2000

The data from the survey show that the percentage of poor has declined in all the three states except in rural Orissa. Reduction in poverty seems to be quite significant in both Karnataka and Maharashtra. In rural Karnataka it got reduced to 17.3 from 29.8 and the respective figures for Maharashtra are 23.7 and 37.9. In urban areas the percentage of people below poverty line came down to 25.2 from 40.1 in Karnataka and in Maharashtra it got reduced to 26.8 from 36.1. Unfortunately for a less developed state like Orissa the reduction in poverty estimates were not very significant in urban areas (49.7 to 48.0). However in rural areas

of Orissa it actually increased marginally from 41.6 to 42.8. Tables below would give us the pattern of private expenditure on Medical Care, People below the poverty line and People in the Top 10 per cent expenditure class.

The percentage share of medical expenditure to total consumption expenditure for the BPL population in these states shows that its share has increased in rural Orissa during 1993 to 2000. For both the rounds of NSSO periods, poor people of Maharashtra in rural areas are spending more on medical care than the people in Karnataka and Orissa. However, for BPL population in urban areas the share of medical care expenditure in all the three states has come down though very marginally. People of Maharashtra are spending higher proportion of money on medical care.

If we look to the data for the share of medical care expenditure with regard to the top 10 per cent expenditure class, the following picture emerges. In rural Orissa the

share has come down from 12.9 to 9.7 and for Maharashtra and Karnataka it has remained more or less the same. But in urban areas it has decreased in Orissa and Karnataka.

This shows that urban poor people were required to spend more on medical care as compared to rural poor in all the states. The greater burden was in the state of Maharashtra. The percentage increase with regard to the average per capita monthly expenditure on medical care in total consumption expenditure over the period throws some light on the pressures the families below poverty line are facing to finance the medical expenditure.

For the people belonging to top 10 percent expenditure class, in rural areas, the percentage of average per capita medical care expenditure in total expenditure was 56 in Maharashtra, 64 in Karnataka and 19 in Orissa. For urban regions the respective figures were 56,78 and 38.

This may probably indicate that rich people were to spend more

in Karnataka and Maharashtra. Poor people were required to spend more in 1999-2000 as compared to the expenditure in 1993-94.

One may infer from the foregoing analysis that the pressures on poor people in less developed states are more with regard to the financing of medical care expenditure. The increasing expenditures on medical care especially by poor people show that as the time is progressing the pressure on poor to buy medical services is increasing. The budgetary expenditures indicate that by and large the public spending on health is not so encouraging in these states. The private expenditure shows that, the poor people are spending more on medical care. Such financial inputs are likely to influence the health sector indicators measured in terms of inputs and outputs. The following discussion presents the analysis of input and output indicators in these three states.

IV. Analysis of Health Inputs & Outputs:

The public expenditure as well as private expenditure and a host of other factors are likely to be relevant in analysing the performance of the health sector. Such indicators would help us to understand our progress towards achieving better health status of the community. Here an attempt is made to look at the input indicators as well as output indicators. Number of health care institutions and Human Resources for Health have been taken as input indicators influencing the health status. Some of the demographic indicators and other health status related indicators have been considered as output indicators. The behaviour of such indicators and their interpretations over the period of time would help us to know the probable impact of expenditures on health status of the community. As inputs and outputs, a number of indicators are estimated for the period 1983-1997. The Indicators have been grouped in the following manner.

1. Health Infrastructure

Indicators (HI): An aggregated index of the health infrastructures is constructed using the data for the period 1983- to 1996. Different indicators used here are

1. No of Dispensaries
2. No of Hospitals
3. No of Subcentres
4. No of PHCs
5. No of hospital Beds

2. Health Man Power Indicators

(HM): Likewise another aggregated index has been constructed using the data for the same reference period based on the following indicators.

1. Doctors at PHC
2. Health workers – Male
3. Health workers – Female
4. Pharmacists
5. Health Assistant Male
6. Health Assistant Female
7. Lab Technicians
8. Nurse / Midwives

3. Health Performance

Indicators (HP): An aggregated index of health performance is constructed for the period 1985-1996. Different

inputs for this indicator are

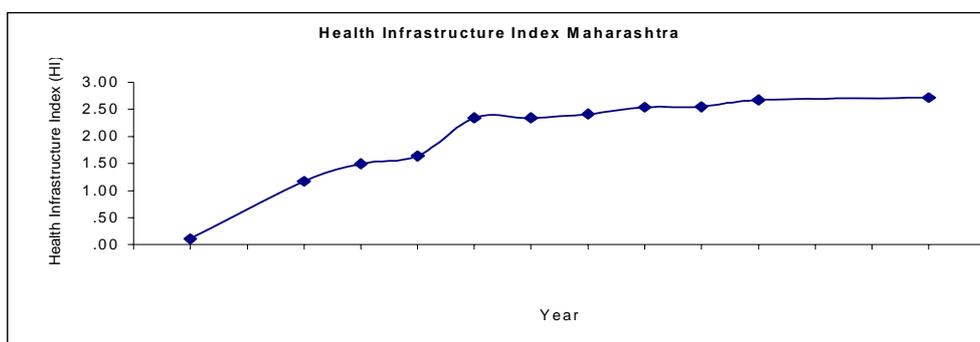
1. Crude Birth rate
2. Crude Death rate
3. Net Growth rate
4. Infant Mortality rate
5. Total Fertility rate
6. Couple Protection ratio

The aggregated indices for the above set of three groups of indicators were worked out by transforming some of the indicators in such a way that all the indicators become uni-directional in nature. Using the factor scores for different set of indicators, the aggregated indices have been worked out. These indicators are analyzed in the ensuing discussion.

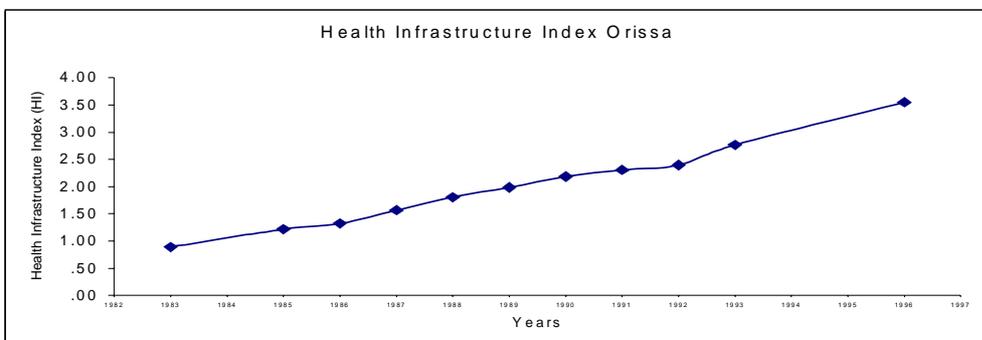
4.1. A look at these sets of indicators shows that in the case of Maharashtra the aggregate health infrastructure indicator has shown a rising trend till 1986 and then onwards it has almost stabilized. This is indicative of the growth of infrastructure for the delivery of health service not having improved especially during the reforms period. In Karnataka also it

improved till 1990 and then onwards declined and remains stable in the reforms period. But interestingly in the state of Orissa this indicator has shown a study improvement throughout. This may indicate that even during the reforms period Orissa state has been able to maintain its growth in health infrastructure. There is every likelihood that in addition to revenue expenditure, the state of Orissa must have spent more on capital account, which might have resulted in the steady increase in health infrastructure.

Graph 9



Graph 10



4.2 The aggregative health manpower indicator increased sharply in Maharashtra from 1986 -87 and from 1988 onwards it remained stable till 1993 and suddenly then onwards it has been showing a declining trend. This is indicative of continued

weightage given to health care in their budgeting. From this one may infer that the input indicators have shown encouraging development in a backward state while they have shown declining trends in medium and developed states.

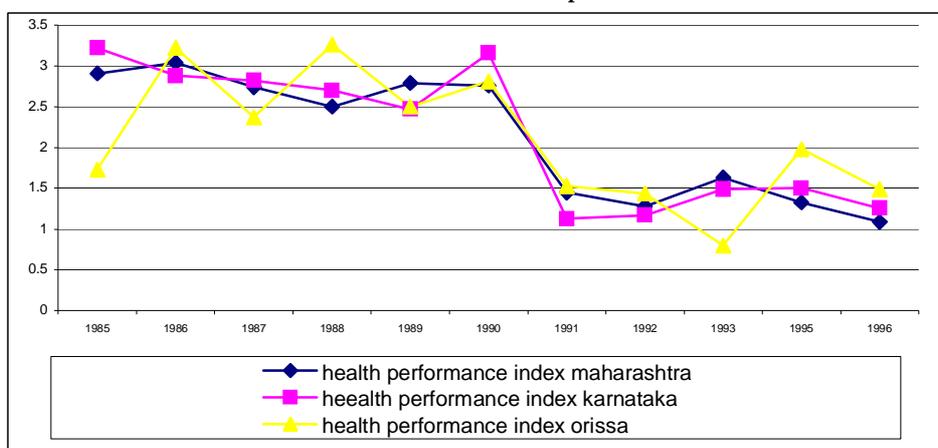
shortfall of manpower for the provision of health care services in the state in the recent period. In Karnataka also it has declined from the year 1989 and it has never improved its position from 1992 onwards. But in the state of Orissa though it declined prior to reforms, in the current reforms period it has considerably improved. Once again, this can be attributed to higher

4.3 In the background of such messages coming from input indicators, if we examine the health performance or out put indicators we may observe that in Maharashtra, especially during the reforms period the aggregate indicator of health performance has been declining which is causally related to declining manpower and infrastructures. In the state of

Karnataka also we can notice that the health performance indicator has been swinging up and down for the early years but finally it has shown a declining trend. Surprisingly enough, for the backward state of Orissa also the health performance indicator has behaved somewhat

performance. But in the background of overall resource compression during the reforms and more so in the health sector, one finds distinct declining trends of health care input indicators. This in turn has its effect on the status of health sectoral performance of the states.

Graph 13



erratically and finally showing a declining trend. The message that emerges from this analysis of output indicators is that health sector has not been performing so encouragingly especially during the reforms period, be it a developed state or a backward state. However, it may not be possible to attribute economic reforms directly to the declining trend of health sectoral output

In order to understand the relationship between all these indicators and per capita expenditure on Medical & Public health and Family welfare an attempt was made to link them under certain assumptions.

For the purposes of further analysis, the productivity of health infrastructure is taken as a major

indicator of performance of the sector. This depends upon the inputs such as health manpower and infrastructure, both of which are dependent upon the revenue and capital budget allocation.

As has already been analyzed by Kadekodi (CMDR Monograph No. 38, pp. 25), before the 1990s there was a phase of high growth of health infrastructure (HI) at the all India level; the trend reversed in favour of health man-power (HM) growth during the current reforms period. In other words, there has been some degree of substitution between these two major health sector related inputs. Stated the other way, the ratio of health man-power (HM) to health infrastructure (HI) is an indicator of this substitution possibility, quite often referred to as *scale factor* in health productivity performance (HP). Likewise, the amount of public spending (PC) per unit of health sectoral infrastructure (HI) is an *allocative efficiency factor or variable* to be reckoned with. Both the scale and the allocative efficiency factor can explain the performance of the health

sector (HP).

With this analytical background, the following sets of new variables are defined for the purpose of estimating the productivity models for the three states, using the time series-wise estimated composite indicators of HI, HM, PC and HP.

Definitions of the variables:

- Input Scale Factor (ISF) = Health Man-power/Health infrastructure (HM/HI);
- Health performance scaled (HPI) = Health performance/health infrastructure (HP/HI);
- Budget allocative efficiency (PCHI) = Per capita spending on health /Health infrastructure (PC/HI); in addition, the HP and PC are also used as additional variables.

Two types of econometric models have been attempted:

- (1) $HPI = a + b ISF + c PCHI$
- (2) $HP = a + b ISF + c PC$

These models estimated (using OLS methods, with linear and log-linear specifications) are analyzed, and the relevant ones are presented in Table 5. The coefficients of the input related variables tell the story of their relevance and relative importance. Using these estimated models, the implied elasticities of health performance with respect to per capita budget allocation and the scale or efficiency factor are worked out, and presented in Table 6.

As can be seen from the estimated models, the role or relevance of the scale factor is lowest in Maharashtra, followed by Karnataka and quite high for Orissa. This gives the impression that in terms of efficiency in the use of manpower and infrastructural developments in the public health delivery systems, the developed states are ranking the lowest as

compared to the less developed state such as Orissa. Secondly, in terms of allocative efficiency of public expenditures, once again, as compared to the less developed state of Orissa, developed state such as Maharashtra or medium developed state such as Karnataka have much lower returns. The elasticity of performance of the health sector with respect to the budget allocation is quite high at 5.561 for Orissa, as compared to 1.005 for Karnataka or Maharashtra of 1.865. The health sectoral performance is however very inelastic with respect to the scale factor. This suggests that public sector management of the health sector, though responds quite well to budget allocation, suffers from its internal management problems, of balancing the manpower and infrastructural development, a finding also observed in Kadekodi (2002).

Table 5
Health Performance- Productivity model
Karnataka

Dependent Variable= HPIK

unstandardised coefficients			Standardised Coefficients	t	Sig
	B	Std.Error	Beta		
(Constant)	-0.513	0.461		-1.111	0.303
ISFK	0.755	0.435	0.457	1.737	0.126
PCHIK	0.055	0.028	0.519	1.975	0.089

R- Square= 0.903

Maharashtra

Dependent Variable= HPIM

unstandardised coefficients			Standardised Coefficients	t	Sig
	B	Std.Error	Beta		
(Constant)	-1.232	0.309		-3.981	0.005
ISFM	0.444	0.342	0.143	1.300	0.235
PCHIM	0.084	0.010	0.936	8.477	0.000

R- Square= 0.915

Orissa

Dependent Variable= HPO

unstandardised coefficients			Standardised Coefficients	t	Sig
	B	Std.Error	Beta		
(Constant)	-10.340	3.109		-3.326	0.013
ISFO	1.175	0.305	0.076	3.857	0.006
PCO	0.346	0.090	0.702	3.839	0.006

R- Square= 0.777

Table 6
Health Performance with input factors

States	Elasticity of Health Performance/ Health Infrastructure (HPI) with respect to	
	PCHI= Percapita Public Spending on Health Infrastructure	ER = Health Manpower Health Infrastructure
Karnataka	1.0046	0.3756
Maharashtra	1.8647	0.1965
States	Elasticity of Health Performance (HP) with respect to	
	Percapita Public Spending on Health (PC)	ER = Health Manpower Health Infrastructure
Orissa	5.561	0.3304

V. Concluding Observations

In this study a modest attempt in understanding the budgetary expenditures on health in the selected three states is made. The real per capita expenditure on MPH and FWP have marginally increased in the current reforms period. But the growth rates of these expenditures have shown negative signs, which is a cause for concern. As the reforms have been progressing the revenue expenditures on health seem to be declining relatively. On the whole it may be noted that the budgetary support for health either has stabilized or marginally declined in the reforms period, except for the backward state of Orissa.

This trend in public sector seems to have been made up by the growth in private health care system. Household expenditure on health based on NSSO data shows that people in economically better states like Maharashtra and Karnataka spend more on health care than the people in Orissa. Institutional expenditure is greater than Non-

Institutional expenditure in all the three states, be rural or urban. However, income category wise expenditures show that poor are required to spend relatively more over the period of time. Thus the burden of expenditure on medical care during the current reforms period for the poorer segments of the society seems to have increased.

The analysis of input and output indicators of health sector in these states reveals that over the period of time, the health infrastructures have not shown signs of improvement in developed states like Maharashtra and Karnataka. In Orissa, it has not worsened over the period of time, but at the same time it has also not shown considerable improvement. Provision of health manpower has also been declining in Maharashtra and Karnataka, but interestingly it has improved during the reforms period in a less developed state like Orissa. The effect of these two inputs on the health status shows that the health performance has more or less exhibited a declining trend in

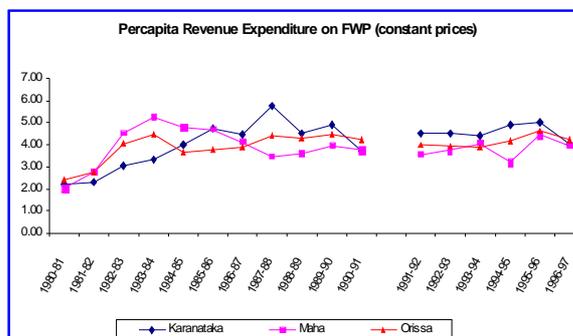
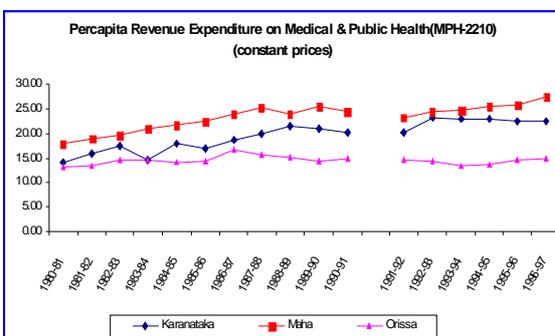
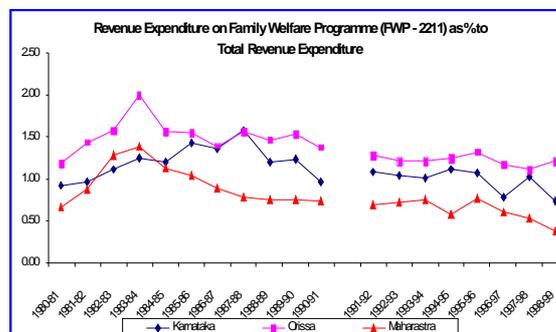
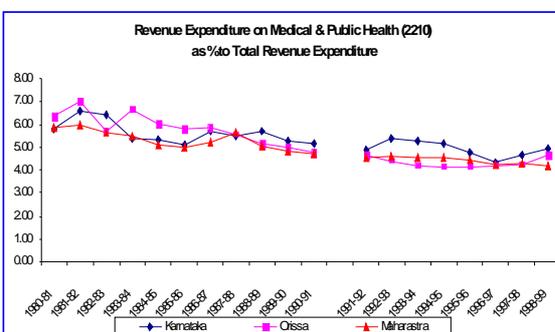
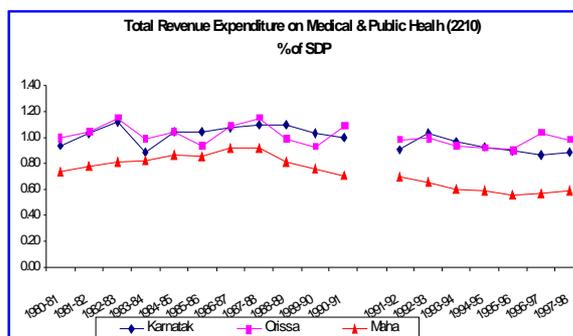
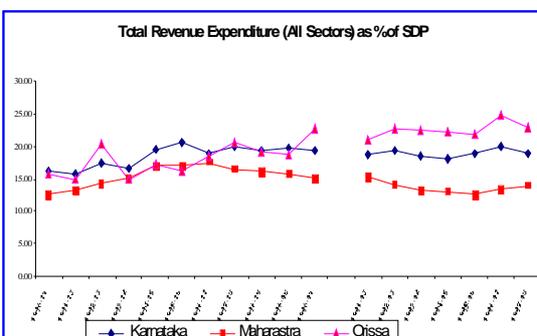
both Maharashtra and Karnataka. But in the case of Orissa, though the health care inputs did not show any significant decline, the health performance has registered a declining trend. This suggests the need for strict maintenance as equally important as creation of health care facilities and infrastructure. One may say that the health performance is likely to be affected by a host of other factors, requiring improvements. There is also a need to properly plan the development of health infrastructure and health manpower inputs so as to get better results in health performance.

The manpower and infrastructure input mix in public health delivery system needed some fresh thinking and management interaction. The more advanced states seem to have much lower concern about efficient use of such

public health inputs. Even the returns (measured in terms of health performance) to budget allocations are much lower than in less developed states such as Orissa. Monitoring budget allocation, deployment of manpower and balancing of infrastructural and manpower growth are much needed policy interventions.

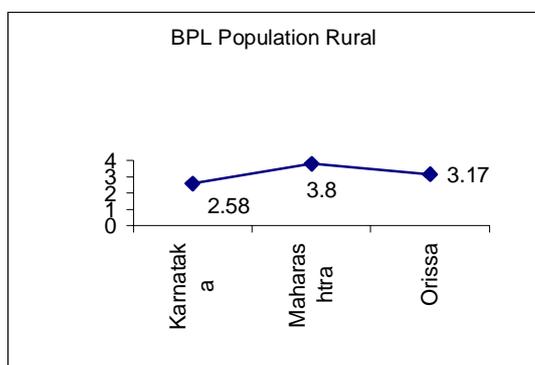
In order to bring a turn around in the declining health performance indicator in these states, there is need to reexamine the budgetary support for health so as to protect the poor. This is considered important in the background of the fact that poor are spending more than rich on medical care needs. Coupled with this, better and efficient use of inputs in terms of adequate manpower backup to health infrastructure created would also result in bringing improvement in the health status of the community.

APPENDIX

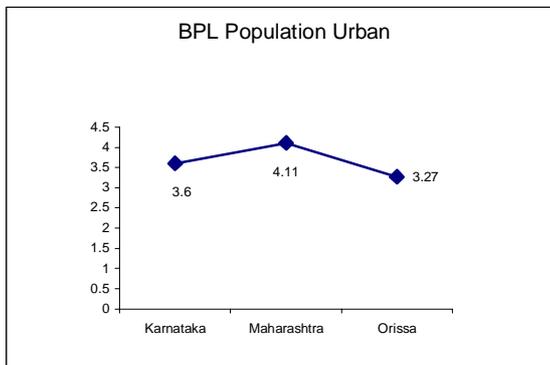


Share of medical care expenditure to total consumer expenditure BPL- 1999-2000

Graph 24

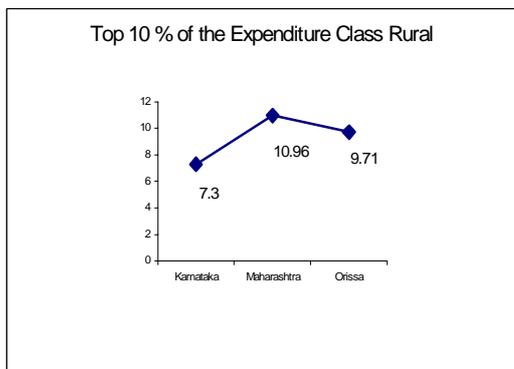


Graph 25



Share of medical care expenditure to total consumer expenditure- Top 10% Expenditure Class 1999-2000

Graph 26



Graph 27

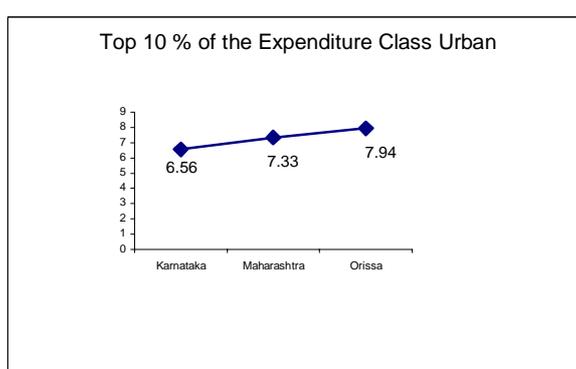


Table 9

Health Manpower Index Maharashtra								
DOCTORS	HWMALE	HWFEMALE	PHARMACISTS	HAMALE	HAFEMALE	LABTEC	NURSEMID	HM
4852	7125	5426	2220	2836	1045	1124	1665	0.57
5488	7684	5820	2220	2950	1239	1124	1665	0.55
3041	7929	10826	2220	2888	1062	1124	1665	1.39
3058	7929	10826	2220	2888	1062	1124	1665	1.39
2504	7835	11005	2220	3428	999	1098	1771	1.42
2947	7967	11185	2242	3734	1179	1082	1779	1.36
2853	7589	11142	2181	3238	1182	1409	2225	1.33
2741	7349	10852	2181	3390	4156	1409	1806	1.57
2741	7349	11158	2181	3450	4156	1409	1806	1.58
2771	4325	12386	1847	3878	1894	502	2445	-0.08
2771	4325	12386	1847	3878	1894	502	2445	-0.08

Table 10

Health Manpower Index Karnataka									
DOCTORS	HWMALE	HWFE MALE	PHARMACISTS	BEE	HAMALE	HAFEMALE	LABTEC	NURSEMID	HM
2720	8301	7201	1670	319	2825	2187	709	397	1.8
3071	8301	7201	1670	334	2947	2311	709	397	1.85
3071	5873	7928	1818	294	1127	1020	507	397	1.05
3071	5873	7928	1818	294	1127	1020	507	397	1.05
3071	3095	4687	1818	244	877	1165	770	1216	1.76
1104	4762	8443	1437	340	678	1286	344	317	0.32
1104	4762	8443	1437	340	678	1286	344	317	0.32
1104	4958	8053	1497	298	689	1910	498	317	0.76
1104	4958	8053	1497	298	689	1910	498	317	0.76
1354	3253	7699	1165	298	799	979	513	2950	0.66
1354	3253	7699	1165	298	799	979	513	2950	0.66

Table 11

Health Manpower Index Orissa									
DOCTORS	HWMALE	HWFE MALE	PHARMACISTS	BEE	HAMALE	HAFEMALE	LABTEC	NURSEMID	HM
1741	4256	2530	714	312	1373	400	416	433	1.818
1889	4457	3870	714	312	1373	443	416	433	1.727
945	4457	4850	714	319	1223	837	416	433	1.23
905	4457	4850	714	319	1223	837	416	433	1.223
905	4532	4887	878	319	1135	762	416	1920	1.28
548	4223	5225	878	316	1135	808	416	1920	1.172
418	708	5731	248	329	170	760	108	386	0.21
418	708	6241	248	329	170	859	108	386	0.124
418	535	6241	1416	329	170	859	108	386	0.22
2351	337	6944	1735	284	168	998	338	386	0.999
2351	337	6944	1735	284	168	998	338	386	0.999

Note: HWMALE = Health Workers male
 HWFEMALE = Health Workers Female
 LABTEC = Laboratory Technicians
 NURSEMID = Nurses/Midwives
 HM = Health Manpower Index
 BEE = Block Extension Educa
 HAMALE = Health Assistants Male
 HAFEMALE = Health Assistants Female

Table 14
Health Performance Index Orissa

YEAR	CBR	CDR	NGR	IMR	TFR	LIFEX	CPR	TRLIFE	TRCPR	COMINDEX	HP
1985	30.70	14.00	16.70	132.00	3.80	53.00	32.80	47.00	67.20	-.27	1.73
1986	32.50	13.00	19.50	123.00	4.20	54.40	34.70	45.60	65.30	1.22	3.22
1987	31.00	13.10	17.90	126.00	3.70	54.40	36.40	45.60	63.60	.37	2.37
1988	31.90	12.30	19.60	122.00	3.80	54.40	37.50	45.60	62.50	1.26	3.26
1989	30.50	12.70	17.80	121.00	3.60	54.40	39.60	45.60	60.40	.50	2.50
1990	30.00	11.70	18.40	122.00	3.50	54.40	40.70	45.60	59.30	.81	2.81
1991	28.80	12.80	16.00	124.00	3.30	56.50	41.00	43.50	59.00	-.47	1.53
1992	27.80	11.70	16.10	115.00	3.10	56.50	40.30	43.50	59.70	-.56	1.44
1993	27.20	12.20	15.00	110.00	3.10	56.50	38.10	43.50	61.90	-1.20	.80
1994	28.00	11.20	16.80	103.00	3.30	56.50	39.00	43.50	61.00	-.23	1.77
1995	27.80	10.80	17.00	103.00	3.30	56.50	40.60	43.50	59.40	-.02	1.98
1996	27.00	10.80	16.20	96.00	3.10	56.95	40.60	43.05	59.40	-.51	1.49
1997	26.50	10.90	15.60	96.25	3.03	56.95	39.50	43.05	60.50	-.89	1.11

Note: CBR= Crude Birth Rate
 CDR= Crude Death Rate
 NGR= Net Growth Rate
 IMR = Infant Mortality Rate
 TFR = Total Fertility Rate
 CPR = Couple Protection Ratio
 LIFEX= Life Expectancy at Birth
 HP = Health Performance Index

REFERENCES

- Baru Rama V (1999) 'The Structure and Utilisation of Health Services'. An Inter State Analysis in Mohan Rao (ed) *Disinvesting in Health*, Sage, New Delhi
- Berman Peter (1991) *Health Economics, Health Financing*, The Ford Foundation, New Delhi
- Chatterjee M., (1988) *Implementing Health Policy*, Manohar Publications, New Delhi
- de FERRANTI (1985) *Paying for Health Services in Developing Countries*, World Bank Staff Working No.721, The World Bank, Washington.
- Duggal R. & Amin (1989) *Cost of Health Care: A Household Survey in an Indian District*, Foundation for Research in Community Health (FRCH), Bombay.
- Grossman M. (1972) *The Demand for Health: A Theoretical and Empirical Investigation*. National Bureau of Economic Research (Columbia University Press) New York.
- Hicks N & Kubisch A (1983) *The Effects of Expenditures Reduction in Developing Countries*, World Bank, Washington D.C
- Jesani A. & Ananthram S. (1989) *Private Sector and Privatisation in Health Care Services*, Foundation for Research in Community Health (FRCH), Bombay.
- Kadekodi G.K - Monograph No. 38, Centre for Multi-Disciplinary Development Research (CMDR), Dharwad
- Krishnan T.N (1999) *Access to Health and the Burden of Treatment in India: An Interstate Comparison in* Mohan Rao (ed) *Disinvesting in Health*, Sage, New Delhi
- NCAER (1992) *Household Survey of Medical Care*, National Council of Applied Economic Research (NCAER), New Delhi
- Panchamukhi P.R (1993) *Fiscal Components of New Economic Policy and the Social Sector: Some Reflections*, Monograph No. 8, Centre for Multi-disciplinary Development Research (CMDR), Dharwad.
- Seeta Prabhu K (1999) *Structural Adjustment and the Health Sector in India*, in Mohan Rao (ed) *Disinvesting in Health*, Sage, New Delhi
- Tulasidhar, V.B. (1993) "Compression of Health Sector Outlays", *Economic and Political Weekly*, October 1993
- World Bank (1993), *Investing in Health*, World Development Report 1993, World Bank, Oxford University Press.

