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STATUS OF HEALTH AND MEDICAL CARE IN INDIA
A MACRO PERSPECTIVE

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As part of the Project :
ECONOMIC REFORMS, AND HEALTH SECTOR IN INDIA
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ECONOMIC REFORMS AND HEALTH SECTOR IN INDIA

1. Macro-economic aspects of Health and Medical Care Sector: The context of Economic Reforms in India.

The Economic Reforms Process was set in motion in India since 1991. In a widely circulated document from the Ministry of Finance, Bhagwati and Srinivasan (1993) summarized the rationale for such a reforms process for the benefit of the public. Some excerpts are important to note.

'*The economic reforms initiated by the government in June 1991 have an excellent rationale. The 'macroeconomic' situation, both external (the balance of payments) and internal (the fiscal deficit), was unsustainable……The cutting of developmental expenditure appears to us to be little beyond what appears prudent: growth later may be compromised by this, so the government needs to examine this question carefully. On the other hand, the Finance Minister has been accused of cutting 'Social Expenditure", thus stabilizing the economy at the expense of budgetary cuts in spending on the poor.' (pp. (ii) of the report).*

While arguing for the much needed economic reforms, Bhagavati and Srinivasan have cautioned on the need for maintaining long term development expenditures. This was followed by a major study by Joshi and Little (1996). After arguing in favour of what all went in during 1991 to 1996 in terms of reforms in India, they seem to agree that some thing must be done for the poor. To quote their own words:

'However, the major reforms we have applauded or advocated may have serious differing effects on different social and economic classes. These, especially the effects on the poor, cannot be ignored. Indeed the objective of any reform must be to benefit society, and this surely precludes reforms which harm many poor people belonging to that society.' (pp. 219)

'In the long run, expenditure on primary education and primary health care may be more poverty-reducing than other more immediate measures-provided always that the economic, social, and legal systems are not biased against employment.' (pp. 243)

The tone of the emphasis on process of economic reforms as the pace setter in development has been changing over the last one decade. This debate is very widely documented in various studies and publications (Guhan,1996; Gupta,1995; Seeta Prabhu, 1994; Ahluwalia and Little, 1998; Srinivasan, 2000) In particular, on the effects of the reforms process on the social sector in general and on the health sector in particular, once again a number of scholars have exercised their mind (Sengupta, 1996;Duggal, 1997;EPW Editorial, 1992; Panchamukhi, 2001 " Refashioning the New Economic Order"). One of the most recent view on this link between economic reforms and the health sector is best available from the following excerpts from Dreze and Sen (1995):

'…Bhagwati and Srinivasan's (1993) lucid discussion of the challenge of economic reforms is entirely silent on the subject of education and health….Education and health can be seen to be valuable to the freedom of a person in at least five distinct ways: Intrinsic importance, instrumental personal role, instrumental social role, instrumental process role, and empowerment and distributive role': Extracted from Dreze and Sen (1995), pp.13-14.

No wonder, Srinivasan (2000) in his most recent book writes that 'we cannot any longer afford to exclude health and education from the reform agenda. **They have to become an integral part of it'**(pp. 45, underlined by us). Therefore, this study is aimed to put the health sector back in the mainstream of reforms process in India. That is why the role of the government, the growth of privatization, the macro-links between the health and other sectors are all looked into.

Talking about macro-economic links and activities, 'Health and Medical' is treated as a social sector, just as several others like Education, Real estate and housing. According to Central Statistical Organisation (CSO) it includes all medical and health services, as deliverable to people. The sector is made up of activities emanating from professional and research institutions, hospitals, and clinical services rendered by the medical professionals for the better health care of people of the country. Drug and Pharmaceuticals is another sector, which is very closely linked to the Health sector. It is defined as manufacture of drugs and medicines-including allopathic, ayurvedic, unani, homoeopathic and others. Basically this sector deals with production of drug intermediates, formulations, medicines and medical accessories (and not retailing)[1] . Both these sectors (leaving away the retailing) are very closely linked to several other macro-economic sectors in the following ways.

- Both these sectors require inputs from various other sectors of the economy (including themselves) in their production and service activities, or in maintaining activities

such as providing advocacy, preventive, curative and promotive health services. The inputs into these sectors basically include chemicals, herbal and medicinal plants and animals, human capital in the form of medical professionals and practitioners, medical workers, technicians, scientists, and infrastructures such as hospitals, laboratories, medical instruments, bio-chemicals, radiological equipments and so on. Broadly speaking all these can be grouped as (1) intermediate inputs, (2) capital inputs and (3) human resource inputs.

- Both these sectors provide services and products to many other sectors of the economy, in the form of medical and health care to the people.
- These sectors depend upon the external (i.e., trade) sector for the imports of materials and technical skill and other knowledge.
- They may also be exporting drugs and pharmaceuticals, and medical assistance and technical/medical skills.

All these sectoral links are symbolically shown in Box 1.

Box 1: Matrix of Macro-structural Linkages

Health related Sectors	Receiving Inputs from	Providing Inputs and services to	Importing items such as	Exporting item such as
Medical and Health Services Sector	Sectors such as Drugs and Pharmaceuticals; Transport; Electricity; Communication; Trade; Electrical appliances; Medical Human Resources and so on	Treating People and providing health and medical care; providing services to a large number of other production sectors such as Railways, Defense, etc.	Chemicals and drugs; electronic and electrical items	Medical man-power such as doctors, nurses and physiotherapists.
Drug and Pharmaceutical Sector	Trade; Chemicals; Transport; Electricity; Plastics Technical Human Resources and so on	Supply of drugs and pharmaceuticals to the Health sector	Plastics, chemicals, drug intermediaries	Drug intermediates, chemicals and drugs.

Box 1: Matrix of Macro-structural Linkages

With such a framework of sectoral linkages, these two sectors at the national level are analysed here at the macro level[2]. The macro-economic analysis is framed in the context of the Economic Reforms Process, which is currently on in India since 1991. The following major questions are raised in this analysis.

- Have the governments at the Central and state levels changed their pattern of allocating the financial resources on the Health and Medical Care sector significantly? As the policy of the Reforms Process, the role of the state is likely to go down in the management of the economy's investment activities in general. This is done with the withdrawal of

[1] Needless to mention at the outset that such a macro analysis is not complete without state , regional , and district level, and even village level linkages. These are addressed separately in other monographs from CMDR.

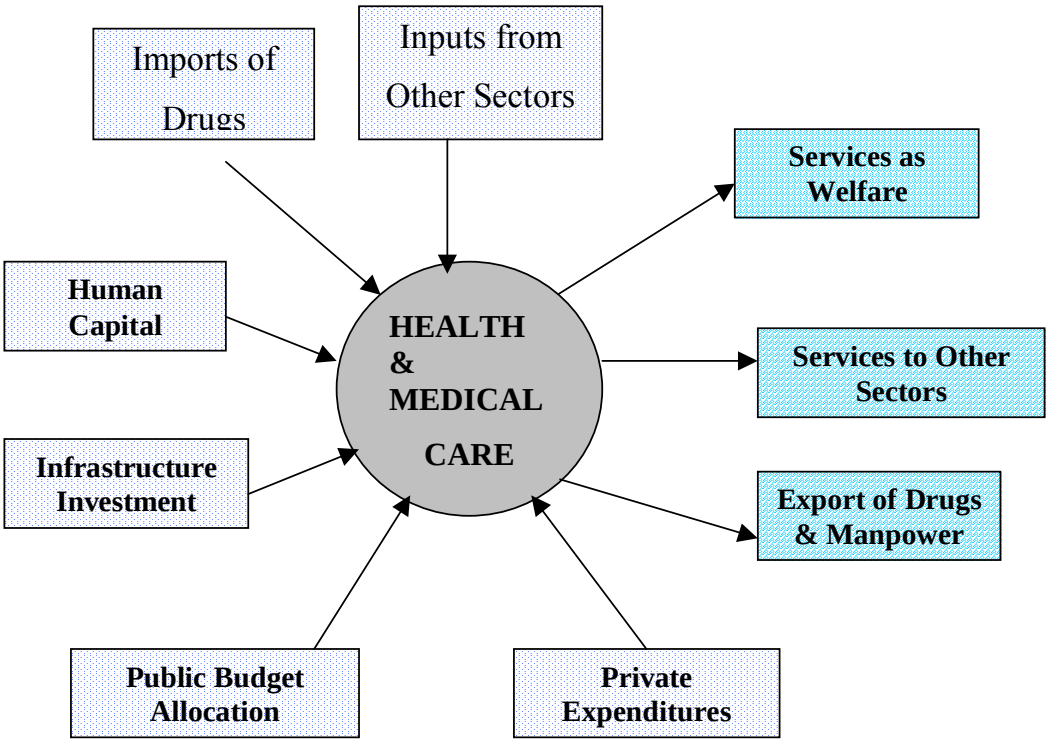
public investments and allowing private sectors to take over some of the investment and management activities. However, health being, part of the social sectors of the economy, may have its own public good characteristics, making it necessary to move in this direction in a calibrated way.

- Have the people of the country accepted privatization in the Health Care sector? In terms of affordability and acceptability, is the private medical care a good substitute for the public health care management?
- How is the performance of the Health and Medical Care sector in the post 1991 period as compared to the previous period, both in the public and private domains?
- What lessons do we have in the liberalised (or more generally stated as globalised) situation? Are the export and import linkages shifted significantly to increased exports and imports or they have shrunk in the post 1991 period?

These and many such macro-economic questions are addressed in this study.

2. Analysis of Public Expenditure on Health and Medical Care in India:

Even today, India is a mixed economy in many walks of life (Baru, 1995), particularly so in the health sector. Both the central and state governments spend in the form of capital resource allocations and



revenue expenditures on the health sector. How are the public expenditures in India related to health care deliveries in India? Answer to this question is not easy in an economy with a mix of public and private health delivery systems working simultaneously[3]; and not referring to indigeneous knowledge and direct access to medical care in kind through the supply of herbal and medicinal plants and roots[4]. None the less, the broad channels or groups that incur monetary expenses on health and medical care are:

- The state (central and state governments) as public expenditure
- The people by themselves as part of their personal expenditures[5]

The first one consists of all the government expenditures on Health and Family Welfare, at the Central and State government levels on medical education, research, hospitals, PHCs, ANM Services and so on. This also includes, by the very definition, the government expenditure as subsidy indirectly on the people. Examples are, subsidy through CGHS, medical reimbursements etc.

The pattern of expenditures of the central and state governments and their analysis on per capita and per GDP basis in constant 1993-94 prices are shown in Tables 1 and 2. Basically three distinct indicators of public expenditures are analysed here.

Table : 1 : Pattern of Public Expenditure on Health Care

Year	Revenue Expenditure				Capital Expenditure			
	Central		State		Central		State	
	As % of total Revenue Expenditure	As % of GDP	As % of total Revenue	As % of GDP	As % of total Capital Expenditure	As % of GDP	As % of total Capital Expenditure	As % of GDP
1980-81	0.729	0.088	9.39	1.136	0.083	0.007		
1981-82	0.788	0.087	9.862	1.176	0.109	0.009	0.312	0.019
1982-83	0.8	0.097	9.94	1.262	0.088	0.007	0.359	0.02
1983-84	0.756	0.093	11.302	1.301	0.013	0.001	0.492	0.022
1984-85	0.718	0.096	9.765	1.327	0.067	0.006	0.362	0.02
1985-86	0.602	0.09	9.846	1.38	0.027	0.002	0.371	0.019
1986-87	0.71	0.116	9.805	1.435	0	0	0.436	0.02
1987-88	0.582	0.095	9.621	1.481	0.102	0.006	0.417	0.021
1988-89	0.643	0.103	8.728	1.292	0.077	0.005	0.39	0.016
1989-90	0.549	0.104	9.058	1.331	0.073	0.005	0.315	0.013
1990-91	0.643	0.103	8.672	1.303	0.006	0	0.306	0.012
1991-92	0.602	0.093	7.904	1.232	0.069	0.004	0.372	0.015
1992-93	0.647	0.099	8.062	1.23	0.037	0.002	0.388	0.014
1993-94	0.651	0.1	8.314	1.241	0.036	0.002	0.379	0.013
1994-95	0.685	0.1	8.08	1.196	0.207	0.009	0.365	0.014
1995-96	0.839	0.121	8.022	1.156	0.052	0.002	0.418	0.014
1996-97	0.834	0.119	7.495	1.102	0.154	0.006	0.451	0.013
1997-98	1.026	0.14			0.077	0.003		
1998-99	1.193	0.162			0.088	0.003		

[3] As one goes beyond the macro level, to micro level, the disaggregated information is more and more difficult to get. For instance, do we know how many patients in India are financed by some relative for tuberculosis treatment , as against by insurance schemes ?

[4] According to the National Biodiversity Strategy and Action Plan, about 40% of medical requirements in India are directly met from biological resources (herbal and medicinal plants and animals).

[5] This is analysed in next section.

Table 2:
Per Capita Public Expenditure on Health and Family Welfare (in Rs.)
(in constant 1993-94 Prices)

	Revenue Expenditure		Capital Expenditure	
Year	All states	Central	All states	Central
1980-81	20.48	1.59	0.12	
1981-82	22.07	1.64	0.16	0.35
1982-83	23.87	1.84	0.13	0.38
1983-84	26.08	1.86	0.02	0.44
1984-85	27.02	1.95	0.12	0.4
1985-86	28.62	1.87	0.04	0.4
1986-87	30.39	2.46	0	0.43
1987-88	32.02	2.05	0.14	0.45
1988-89	30.25	2.4	0.11	0.38
1989-90	32.63	2.55	0.13	0.31
1990-91	32.95	2.59	0.01	0.31
1991-92	30.81	2.32	0.09	0.37
1992-93	31.76	2.55	0.05	0.37
1993-94	33.42	2.69	0.04	0.35
1994-95	34.08	2.85	0.26	0.4
1995-96	34.69	3.62	0.06	0.41
1996-97	34.94	3.78	0.18	0.42

Source for Tables 1 and 2
RBI Bulletin
Currency & Finances Various Issues (RBI Publication)
Data Regarding Health Sector Expenditures of Central Govt_ relate to .
only Developmental Expenditures.

- State and Central govt. expenditures on health care, as percentage of their respective total governmental budgets,
- State and Central government expenditures expressed as percentage of GDP (all in constant prices),
- Per capita public expenditures on health care by Central and State governments (all in constant prices).

It is important to note here that the share of public expenditures on health and medical care (i) out of total public expenditure, and (ii) as a ratio of GDP are two important macro-economic fiscal indicators. The per capita public expenditure allocation however, is a useful indicator, but only when juxtapositioned with per capital private expenditures. It will then reflect the degree of privatization in the economy.

The public expenditure on this sector shows several distinct patterns over the last two decades, which are worth noting.

- ***Reflections on Per capita Revenue expenditures on Health and Medical care:***

➢ The per capita revenue expenditures by the central government have shown a slow increasing pattern. It rose from Rs. 1.59 in 1980-81 to Rs.3.78 in 1996-97 registering an annual growth rate of 5.23%.

➢ The per capita total revenue expenditures by all the states taken together have been quite high at Rs. 20.48 in 1980-81, also rising to Rs. 34.94 by 1996-97. This implies a rate of growth of 3.19 percentage annually.

➢ Taken together at the all India level, the total per capita public expenditures on health and medical care seem to be on the increase from Rs. 22.07 in 198-81 to Rs. 38.27 in 1996-97.

- ***Reflections on Public expenditures on Health and Medical Care, as relating to GDP***

➢ As a percentage of the GDP, the public expenditures on health and medical care reflect some degree of efficiency in maintaining the health delivery system.

➢ These ratios were very low at 0.088% for central revenue expenditures in 1980-81. They rose to 0.162% by 1998-99. On the contrary, the all states revenue expenditures as a ratio of GDP have remained fairly the same all through the last two decades. It was 1.136% in 198-81, and remained at 1.102% in 1998-99. This gives the impression that the states have been withholding any growth in maintaining the health infrastructures and man-power. Even in the case of the central revenue allocations, the growth rate in this ratio is jus about 3.4%.

➢ The capital expenditures on the health sector as a ratio of GDP show two revealing facts. First, at the Central government level, they are fluctuating annually quite a bit, slowly declining from 0.007% in 1980-81 to 0.003% in 1998-99. Second, the same for the all states taken together have been declining consistently, from 0.019% in 1980-81 to 0.013% in 1996-97.

- ***Reflections on the share of public expenditures on health and medical care***

➢ The central and state governments have to make the allocations of their total public funds between the social and other economic sectors taking in to the role that the governments have to play in the over all developmental strategies set for themselves.

➢ Viewed from this angle, one gets the impression that while the central government public revenue allocations have shown a decline (as a share of total public revenue expenditures) till about 1991-92, the same started

showing an upward trend from then onwards. This share was 0.719% in 1980-81, which declined to 0.602% by 1991-92. Subsequently, it has been rising, rather quite remarkably to 1.193% by 1998-99.

- On the other hand, the states have shown a consistent declining rate in their share. The share of all states revenue expenditures in total public expenditures was 9.39% in 1980-81. The same has slowly declined to 7.495% by 1998-99. The share was fairly constant till 1987-88, but subsequently started declining slowly.
- The indicators of shares of capital expenditures reveal that (a) at the central government level they have been fluctuating considerably over the years, but remained fairly the same; (b) at the all states level, they have been less fluctuating but remained fairly constant.

The foregoing analysis of pattern of public expenditures seem to indicate that, while the central government allocations have adhered to some degree of support to this vital social sector, the state governments have not been able to maintain the same at the same rate. Their allocative policies seem to have weakened, which is more pronounced in the period 1988-89 onwards. The shrinkages at the state governmental levels in maintaining the rural and urban health delivery systems through PHCs, CHCs, sub-centres etc. is a matter of concern.[6]

Against these findings the recent observations made by different scholars may also be useful to note. Seeta Prabhu (2001, pp.135) notes that 'State and central governmental allocations to the Social sector seem to have gone up from around 6 per cent of aggregate disbursements in the years 1990-91 to 1992-93, to 8-9 per cent subsequently. Despite this increase, the government's expenditure on these sectors constituted less than 2 percent of GDP even in the year 1996-97'. According to her, in states like Maharashtra and Tamil Nadu, revenue expenditures on health and family welfare as a ratio of total revenue expenditures in 1995-96 were 5.18 and 6.14 percentages, respectively (pp. 185-86). The same as a ratio of respective state domestic products were 0.67 and 1.21, respectively.

One can only say that, in the early period of 1990's if the share of public allocations to social sectors have shown marginal improvement, they did not reflect in the health sector, but perhaps have subsumed in education, nutrition, PDS and such other social commitments of the governments.

In another independent study, Berman (1996, pp. 335) shows that in India the public expenditure on health care is just about 1.3% of GDP in 1990-91, private expenditure out of pocket is 4.5% of GDP[7]. This amounts to public expenditures being just about 25% and rest being met through private sources. Krishnan (1996, pp. 944)

[6] This issue will be addressed in greater detail, in another monograph.

[7] Our own data also show the same.

quoting from a study by Reddy (1995) states that in India public expenditure in India including preventive care forms a mere 2 percent or less than of GDP. Krishnan goes on to say that these are much lower than the rates observed in China and other east Asian countries.

3. Analysis of Private Expenditure on Health and Medical Care in India:

The second major chunk of expenditure on health care is incurred by people themselves, either out of pocket or through some insurance schemes. There are two major sources of information on this at the macro level. One, from Central Statistical Organisation (CSO), and second by the National Sample Surveys (NSS). In both the sources of data, by *personal expenditures* it is meant to imply the expenditures incurred by the people as personal consumption expenditures.

Let us examine the data from the CSO first. On per capita terms, the private expenditures will reflect the trend of privatisation as well as the ability (and to some extent) 'willingness to pay' for medical care. Table 3 shows the macro-scenario of the personal expenditures on health and medical care in India from 1970 to 1999. At the aggregate level, the private expenditures on health care are about 4.39% (in current prices) of the total of all private consumption expenditures in India in 1998-99, or about 3.36% of total disposable income of the people of India. These aggregated shares in the past, have shown a growing trend over time.

Two major observations can be made on the basis of the pattern of private expenditures.

- First, as a share of total private consumption expenditure as well as that of total disposable income (not shown in this table), the private expenditure on health and medical care has been consistently decreasing (both in current prices and in constant prices). In constant prices the share of private expenditures on health care out of total private consumption expenditures were 3.03% in 1980-81, which declined slowly to 2.03% by 1996-97.
- Second, while the private expenditures in current prices have shown a remarkable trend growth, from Rs. 44.32 in 1980-81 rising to Rs. 173.42 in 1996-97 (at annual growth rate of 8.9%), they are fairly constant at Rs. 44 on average during the 1980 to 1997 period.
- The average elasticity of private expenditure on health care vis-à-vis total private expenditure before and during current reforms period are almost the same at - 0.046.

- As a share of disposable income, the private expenditures on health care have been declining from 2.43% in 1985-86 to 1.53% in 1996-97.
- The growth rate in private expenditure on health from 1971 to 1996 period has been just about 0.012%; whereas the growth rate in per capita disposable incomes has been 0.119%.
- The elasticity of private expenditure on health with respect to disposable income is 0.1019 (=0.0121/0.1187) during the same 25 years period, which is much less than unity, indicating a very slow uptake on the health front, in sharing the responsibility of health care privately.
- However, in the reforms period (i.e., after 1990), the per capita private expenditure on health care have been marginally declining at a rate of 0.16%; but the per capita disposable incomes have been increasing at much faster rates than in the earlier period. Growth rate of per capita expenditure on health (in constant prices) during 1971-1990 was 1.58%, whereas the same during 1991-99 was -0.16%. Per cap. disposable income growth rate in 1971-91 was 11.17%, which increased to 14.23% during 1991-99 period.

Table 3: Per capita Personal Consumption Expenditure on Medical and Health Care in India

Year	Per Capita Private Expenditure on Health & Medical Care in Rs		Per Capita Private Health Expenditure as %of PFCE	
Old Series Prior to Reforms	In Current Prices	In Constant Prices 1980-81=100	In Current Prices	In Constant Prices 1980-81=100
1971-72	13.29	32.55	2.1	2.46
1972-73	15.26	34.92	2.24	2.69
1973-74	17.54	35.31	2.18	2.71
1974-75	20.15	35.13	2.11	2.75
1975-76	23.14	34.3	2.43	2.6
1976-77	26.59	35.37	2.74	2.67
1977-78	30.56	37.17	2.8	2.66
1978-79	34.66	38.93	2.98	2.68
1979-80	39.32	45.87	3.2	3.33
1980-81	44.32	44.32	3.04	3.03
1981-82	50.4	44.31	3.07	2.95
1982-83	57.3	44.28	3.25	2.93
1983-84	65.14	44.22	3.2	2.78
1984-85	65.93	44.15	3.01	2.73
1985-86	67.95	44.1	2.89	2.68
1986-87	69.93	44.01	2.7	2.6
1987-88	75.64	43.94	2.66	2.56
1988-89	90.73	43.94	2.82	2.47
1989-90	93.1	43.95	2.64	2.41
1990-91	98.69	43.87	2.49	2.37
Reform Period				
1991-92	106.69	44.34	2.37	2.4
1992-93	114.33	44.24	2.29	2.34
1993-94	124.77	44.13	2.22	2.27
1994-95	145.82	44.14	2.29	2.19
1995-96	155.31	44.07	2.2	2.11
1996-97	173.42	43.97	2.21	2.03
New Series				
1993-94	222	222	3.43	3.43
1994-95	283.98	241.48	3.9	3.61
1995-96	329.88	262.63	4.03	3.77
1996-97	370.56	285.57	3.88	3.82
1997-98	438.03	311.57	4.3	4.13
1998-99	509.34	334.42	4.43	4.29

Source : National Accounts Statistics 2000 (CMIE)

Notes: The estimates based on Old series and the New Series are not directly comparable. This is because, CSO has revised the methods of estimating National income etc., to a new base year of 1993-94 from the old method of referring to 1980-81 as the Base.

The second important source of data on private health and medical care expenditures is the National Sample Surveys. On the basis of available NSS data for the recent period, a segregation of expenditures by individuals on hospitalisation and out-patient expenses vis-a-vis total private expenditures are compiled on per capita basis. Table 4 and 5 show the same for the urban and rural, at the all India levels. Details of expenditure on medical care are available for the year 1988 and 1992 onwards till 1998.

Four major observations can be made on the basis of this data and information.

- First, when it comes to expenditures on medical care, there is a significant contrast between the rural and urban population. On average the urban population spend a higher amount.
- Second, over the years the expenditure incurred by the urban population is rising faster than that for the rural population. It was Rs. 8.14 per capita in 1988, which rose to Rs. 37.72 by 1998. The same for the rural

Table 4: Pattern of Private Expenditure on Medical and Health Care (Rural)

Year	Total Medical Expenditure		Total Consumer Expenditure	Medical Expenditure as % of Total Expenditure		
July-June88	7.01		158.1	4.43		
Jan-Mar92	12.27		247.21	4.96		
	institutional	Noninstitutional		institutional	Noninstitutional	Total
July 93-June 94	2.58	12.76	281.4	0.92	4.53	5.45
July 94-June 95	3.72	11.71	309.43	1.2	3.78	4.98
July 95-June 96	2.44	11.56	344.29	0.71	3.36	4.07
Jan-Dec 97	6.23	16.3	395.01	1.58	4.13	5.71
Jan-June 98	6.1	14.74	382.07	1.6	3.86	5.46

Table 5: Pattern of Private Expenditure on Medical and Health Care (Urban)

Year	Total Medical Expenditure		Total Consumer Expenditure	Medical Expenditure as % of Total Expenditure		
July-June88 Jan-Mar92	8.14		449.93	1.81		
	Institutional	Noninstitutional		Institutional	Noninstitutional	Total
July 93-June 94	5.54	15.51	458.04	1.21	3.39	4.6
July 94-June 95	5.28	12.28	508.07	1.04	2.42	3.46
July 95-June 96	7.3	15.03	599.26	1.22	2.51	3.72
Jan-Dec 97	12.41	20.58	645.44	1.92	3.19	5.11
Jan-June 98	17.62	20.1	684.27	2.58	2.94	5.52

population were Rs. 7.01 and 20. 84, respectively.

- Thirdly, both in absolute terms and as a share of total private expenditure, the outpatient expenditures are more than that on hospitalisation expenditures.
- Fourth, while the share of medical expenditures in total private expenditures remained fairly constant for the rural population (4.43% in 1987-88, and 5.46% in 1998), for the urban population it escalated from 1.81% in 1987-88 to 5.52% in 1998. The rate of growth for urban population was 11.8% as against 2.1% for rural population. Clearly, in the recent years, the growth of private medical care systems is visible more in the urban areas.

- During the same period, as a share of total private expenditure, the outpatient expenditures are more than that on hospitalisation expenditures in both the rural and urban areas.
- One notices a significant jump in medical expenditures incurred by the rural and urban population between the 1987-88 period to 1992 period. But after the 1992 period, the trend seems to have settled.

The pattern of spending on health and medical care also differs by different income or expenditure classes. Using NSS data for the years 1992 and 1998, two separate questions are asked[8]. How the people below poverty line (BPL population) spend on medical care? How do the top 10 percent of people in the country spend on medical care? Table 6 is deduced from NSS data for the rural population. In order to estimate the expenditure patterns by percent of people, a log-normal distribution is assumed for the medical expenditure as well as total private expenditure data[9].

[8] Expenditure distribution wise data are available from 1992 onwards.

[9] However, this could not estimated for the urban population in 1992 as such data are not available for urban population in the 48th Round of NSS (period January-March 1992).

Table 6 : Rural Income Distributional Pattern of Expenditure on Medical Care

Medical Care	1992	1998
% of population below poverty line	30.87	27.09
Av. Per capita monthly expenditure on medical care	2.83	7.05
Av. Per capita total monthly expenditure	123.8	249.99
% share of expenditure on medical care	2.29	2.82
Top 10 % Expenditure Class	10	10
Av. Per capita monthly expenditure on medical care	53.1	103.91
Av. Per capita total monthly expenditure	588.19	895.19
% share of expenditure on medical care	9.03	11.61

Sources: 1. NSSO, Sarvekshana, various issues; 2. Report of the Expert Group on Estimation of Proportion and Number of Poor (Planning Commission).

It can be observed from Table 6 that:

- The people below poverty line in the years 1992 and 1998 spend just about 2-3 percent of their total consumption expenditure on health care. The top 10 percent people on the other hand, switched upwards from 9% to 12 percent.
- The per capita expenditures per month were low for the BPL population in 1992 as well as in 1998 (just about Rs. 2-3 in 1992, and Rs. 7 in 1998). The same for the top 10 percent of people were Rs. 53 and Rs. 104, respectively.

4. A Close Look at Health Care Performance, and Processes in India

How to analyse the linkages between performance of the health sector in India vis-à-vis (a) the expenditures by the central and state governments, private or personal expenditures on health and medical care, (b) various medical facilities and infrastructures existing in the country in this sector and finally, (c) the quantum of medical man-power resources that are available?

Answer to this question can come only after identifying atleast the major indicators of performance of the health sector, the health care facilities and infrastructural inputs, and human resources[10]. This identification process at the macro level is based, by and large, on the availability of such data over a long period of time. Box 2 shows the major indicators for each of them, selected for this macro analysis. Tables 7-10 show the corresponding data on them for about 17 recent years. The public expenditures on health care (i.e., the central and state governments expenditures on health and family welfare) and private expenditures by people are already viewed (in Sections 2 and 3) as two important indicators of expenditures.

[1] This question is particularly important, since none of them can be captured by any unique indicator, and alternative indicators are not as homogeneous in measurement as the health care expenditures. Stated simply, they are just not additive.

Box 2: Health Sector Related Indicators at the Macro-level

Health Performance Indicators	Input or Process Indicators	
	Infrastructure	Human Resources
1. Crude birth rate 2. Crude death rate 3. Infant mortality rate 4. Life expectancy 5. Couple protection rate	1. No. of hospitals 2. No. of Beds 3. No. of PHCs 4. No. of Sub-centres 5. No. of Comm. H.Centres	1.No. of doctors 2. No. Dentists 3. No. Nurses

Note: While all the performance indicators are expressed as rates (except for Life expectancy), the infrastructure and human resource indicators are expressed per million of population.

As can be seen from the Table 7, the birth rates in India have been going down consistently during the last two decades. It was as high as 34 per thousand population in the 80's. The same has come down to about 26 by the late 90's. On comparison with countries such as China, Chile and Sri Lanka, Indian crude birth rate is still quite high (Refer table 8). But the rate of its decline has been higher in the recent years (going down from –1.18% in the pre-1990's to –1.41% after the 90's). As compared to many developing countries (also going through the reforms processes), this rate of decline in birth rate is still moderate. For instance, Chile registered a declining rate of -3.61% during 1990-98 period; China showed a rate of decline of –2.28%; and our neighboring country Sri Lanka experienced a –2.36% decline during the same period (Ashtekar, 1999;)

Table 7: Health Performance Indicators :All India Level

YEAR	CBR	CDR	IMR	LE	CPR	GPLE	GPCPR
1980	33.7	12.6	114	52.84	22.8	32.16	77.2
1981	33.9	12.5	110	50.4	23.7	34.6	76.3
1982	33.8	11.9	105	54.19	25.9	30.81	74.1
1983	33.7	11.9	105	55.4	29.5	29.6	70.5
1984	33.9	12.6	104	55.54	32.1	29.46	67.9
1985	32.9	11.8	97	56.22	34.9	28.78	65.1
1986	32.6	11.1	96	56.89	37.5	28.11	62.5
1987	32.2	10.9	95	57.57	39.9	27.43	60.1
1988	31.5	11	94	57.7	41.9	27.3	58.1
1989	30.6	10.3	91	58.3	43.3	26.7	56.7
1990	30.2	9.7	80	58.7	44.1	26.3	55.9
1991	29.5	9.8	80	59.4	43.6	25.6	56.4
1992	29.2	10.1	79	60.8	43.5	24.2	56.5
1993	28.7	9.3	74	60.3	45.5	24.7	54.5
1994	28.7	9.3	74	62.29	45.8	22.71	54.2
1995	28.3	9	74	62.97	46.5	22.03	53.5
1996	27.4	8.9	72	63.64	45.4	21.36	54.6
1997	27.3	8.9	64.1	64.32	45.4	20.68	54.6
1998	27	9	63	63	51.32	22	48.68
1999	26.404	8.23	58.61	65.67	52.74	19.33	47.26
2000	25.965	8	55.86	66.34	54.17	18.66	45.83
growth rate before 90's	**-1.18**	**-2.38**	**-2.86**	**1.27**	**7.19**		
growth rate after 90's	**-1.42**	**-2.17**	**-3.99**	**1.12**	**2.33**		
Combined growth rate	**-1.46**	**-2.26**	**-3.4**	**1.16**	**3.78**		

NOTES: CBR = crude birth rate per 1000 popn_
CDR = crude death rate per 1000 popn_
IMR = infant mortality rate per 1000 popn_
LE= life expectancy
CPR=couple protection rate
Gple is a transformed variable defined as: 85-life expectancy
Gpcpr is a transformed variable defined as:100-cpr
Both these indicators are created, for purposes of further Analysis of the sectoral performance
Growth rates (in %) are based on exponential growth models
Source: Health Monitor 1994 (FRHS DATA)

Table 8: A Comparative Picture Among Developing Countries

Country	CBR		CDR		LE		IMR	
	Early 80's	Late 90's	Early 80'	Late 90's	Early 80's	Late 90's	Early 80's	Late 90's
Chile	23	18	7	5	69	75	32	10
China	18	16	6	8		70	42	31
Sri Lanka	28	18	6	6	68	73	34	16

The crude death rate also has been declining from 13 per thousand population in the 80's to 8 in the late 90's. This decline is comparable with the countries such as Chile, China or Sri Lanka. As was the case with these countries, the rate of decline of this in India has been lower in the 90's (-2.17%) , as compared to the pre-90 period (-2.38%). It is important to take note of the better performance of India here. Chile for instance, showed a decline in CDR at –0.36% during 1991-98 period; Chie at positive 0.97%; and Sri Lanka , a declining rate of –0.14%.

A remarkable downward shift has been observed in India in the rate of infant mortality, from 114 per thousand population in the 80's, going down to 56 in the late 90's. But the performance at home is far more behind the countries such as Chile, China or Sri Lanka. However, as compared to its rate of decline of –2.88% in the 80's and early 90's, it has significantly dropped downwards in the late 90's (-3.99%)[11]

[1] The two declining rates are statistically quite significant.

One of the most striking performance in the health sector front seems to be the family welfare programme, though much is desired in the future. The couple protection rates which were just about 23 per hundred eligible couples in the 80's, has gone up to 54% by the late 90's. The rate of its increase has however, gone down from 7.12% in the pre-90's to 2.33% in the late 90's.

As against these health status records, the life expectancy in India has not been going up as remarkably as the other performance indicators. For instance, it was 54 years in the early 80's, which rose to 66 by the late 90's. The overall rate of its increase is 1.16%. As against these, in the countries like China , Chile or Sri Lanka they have crossed 70's. In Chile LE has grown at a low of 0.29%, in China at 0.18% or in Sri Lanka at 0.33% during 1991-98 period.

Thus, one gets the impression from the foregoing analysis that comparison with a large populous country such as China or small countries such as Chile or neighbouring Sri Lanka, Indian performance in the health

[1] The two declining rates are statistically quite significant.

care sector during the recent reform period seems to be encouraging but lot more attainable. Secondly, the health sectoral performance in India seems to have a minimal link with public expenditure pattern, both at the central and state governmental levels. This fact will call for further analysis to be carried out with proper identification of flow of funds to specific health care facilities and amenities and programmes.

The sum and substance of these performances on the health front convey the following major messages for the future planning for this sector.

- The health and medical care sector will have to gear up further to enhance the life expectancy rates in the country.
- The slowing down of family welfare programmes in the post 90's should be taken as a warning for the future planning on the health front.
- The relatively high crude birth rate still persisting calls for some more promotive and preventive health care measures in the future.
- Through providing better health care and enabling transparency and information on the medical front (specifically from curative to preventive and promotive aspects), it is still possible for the Indian population to attain much better health status in terms of birth and death rates.

The medical man-power resources be analysed now. As can be seen from Table 9, one notices that as compared to the previous period, since the 90's there has been an alarming growth in the dental and nursing human resources in the country. However, as compared to an increasing rate of 4.12% in the pre-90 period, the availability of doctors seem to be declining slowly (at the rate of –1.46%It is marginally declining.) during the recent periods.

Table –9: Human Capital Inputs in Health Sector :All India Level

YEAR	DENTISTS	NURSES	DOCTORS
1981	8642	143883	268700
1982	8656	161044	271500
1983	8801	157372	284200
1984	8725	168024	296500
1985	9598	193907	308200
1986	9725	205489	320300
1987	9750	217375	331800
1988	9796	245386	355600
1989	10475	258167	368600
1990	11011	304137	381900
1991	10751	334900	394000
1992	11300	383632	410800
1993	19523	451240	379300
1994	21720	512135	391200
1995	23953	556859	405200
1996	25762	566213	360100
1997	27707	620361	367198
Growth rate before 90's	2.66	7.93	4.12
Growth rate after 90's	16.8	10.1	-1.45
Combined growth rate	7.69	9.8	2.45

Table10: Facilities and Infrastructure inputs in the Health Sector : All India Level

YEAR	BEDS(ALL)	PHC'S	SUBCENTRES	CHC'S	HOSPITALS
1981	569495	5740	51405	349	6804
1982	583773	5851	57975	471	6897
1983	599074	5959	65643	553	7189
1984	624769	6375	77236	649	7369
1985	656850	7284	84590	761	7474
1986	694121	12934	92483	915	8067
1987	706471	14281	101549	1100	9803
1988	751091	16449	109644	1322	10840
1989	794712	18811	120767	1589	11079
1990	806409	18981	130336	1910	11571
1991	810548	20450	130958	2069	11174
1992	834650	20719	131464	2187	13692
1993	859640	21030	131384	2273	14867
1994	863969	21206	131586	2332	15033
1995	870161	21536	131795	2387	15097
1996	896875	21853	132778	2420	15982
1997	924409	22960	136800	2708	16918
growth rate before 90's	**4.15**	**16.4**	**10.3**	**18.1**	**6.72**
growth rate after 90's	**1.97**	**1.71**	**0.55**	**3.78**	**5.6**
combined growth rate	**3.12**	**9.94**	**5.88**	**12.7**	**6.34**

Notes: All growth rates are derived from exponential growth functions, expressed in %.

Five different health facilities and infra-structural amenities available in the country are anlysed here, both on per capita and total levels. They are, the number of hospital and all other beds, number of hospitals, PHCs, CHCs and sub-centres in the rural areas, as shown in Table 10. Invariably, one gets the impression that they are increasing over time, but at much slower rates in the 90's than in the period before. For instance, the growth in number of PHC's, Sub-centres and CHC's have come down drastically from 16.40%, 10.30% and 18.10% in the period before the 90's, to 1.71% , 5.5% and 3.78%, respectively, in the post 90 period.

Secondly, the number of hospitals have been growing fairly at a constant rate (around 5.6 to 6.7%) before the Reforms and during the current periods. However, the rate of growth of hospital beds have not been increasing at the same rate as the number of hospitals. Rather their growth rate has come down in the past 90's.This seems to be sending a message about the increased shortage of bed availability in the hospital systems in the current periods, as compared to the pre-90 periods[12] .

We have already seen from the analysis of the governmental expenditures and that of private expenditures, that over the years, they have not shown any remarkable shift. Rather, several those indicators suggest that very poor role of the 'State' in the Health Care Sector.

5. Linking the Performance, and Process Inputs of the Health Sector

An attempt is made here to link the various indicators of the health and medical sectors presented in the above two Sections.

The basic questions posed are :

- Is there any evidence that with the onset of the economic reforms process in India, the process of health delivery or performance (to be denoted as HP= Health performance) took the course of substituting more and Medical Facility and Infrastructures (to be denoted as HI= Health infra-structural capital), replacing the Medical Human Capital (to be denoted as HC= Human capital)?
- Have the overall health delivery rate been going down vis-à-vis the rate of population growth, particularly after the introduction of the reforms process?
- Treating health and medical care as an indicator of welfare, how does one calibrate the performance of Indian Health Sectoral Performance vis-à-vis the overall indicator of welfare such as GDP growth?

All these questions need to be addressed in the context of reforms process in India. These are very fundamental questions to be addressed at all levels, be it at the macro economic and micro (regional, district, or village) levels.

For this purpose, an exercise of Factor Analysis is carried out. Major

[1] At this point, it may be useful to take a look at the norms of health sectoral inputs or allocations. A summary these are provided in Annex 1.

steps involved or employed for this exercise are summarily stated here.

- In order to get composite picture of the Health Performance (HP), Health related Human Capital (HC) and Health Facilities and Infrastructures (HI) in India, separate Composite Indices on HP, HC and HI are constructed.
- While doing so, it is necessary to ensure monotonicity of all the variables entering in the composite indices[13] . Observations on all the variables under Health Facility and Infrastructure (Table 10) and Human Capital (Table 9) are monotonically increasing. But in the case of Health Performance variables (Table 7) while CDR, CBR and IMR are declining over the years, the LE and CPR are increasing over the same years.
- Therefore, for purposes of constructing a Composite Index on HP, a transformation of LE and CPR are made. For this, two new variables GPLE= 85-LE, and GPCPR=100-CPR are considered. GPLE is then interpreted as gap in full life expectancy of 85 years (normally recommended in HDI computations). Similarly, GPCPR is gap in achieving 100% CPR. Obviously, without any loss of information for the health sector, these two variables are also declining over the years, just as CDR, CBR and IMR (as can be seen from Table 7). However, the declining rates of all these variables are indicative of improvements in health performances over the years.
- Next, the Composite Indices on HP, HI and HC are estimated using factor analysis (based on Principle Component Method) using all the variables shown in the Table 7 - 10. In the case of Human Capital (HC) and Facilities and Infrastructure (HI), two different Composite Indices are estimated. They are (a) at the 'aggregate' levels as shown in Table 9 and 10, and, (b) On 'per million population' basis.

  Since the estimated indices monotonically increase from –ve to +ve values, for purposes of further presentation a linear transformation the of these has been done by adding 2.0 uniformally to all the estimated indices.
- Note that, with all the five variables under Health Performance decreasing, its Composite Index is also be declining over the years (which, of course, indicates overall improvements in the health sectoral performance).
- Finally, in order to have an increasing composite index of health performance, the estimated composite index is further transformed linearly as : Final Composite Index for HP= 1/ [2-estimated composite index]. Note that, there is no loss of information for analyzing the health performance vis-à-vis health infrastructure and human resources, under any of these linear transformations. The final set of Composite Indices are shown in Table 11.

13. This is just a mathematical requirement. Otherwise, variables such as CBR and CDR decreasing over the years and CPR increasing over the same years, can not be added (even after suitable weights obtained from Factor analysis).

Table 11: Linkages between Health Sectoral Growth in India

Year	Composite Indices of Health				
	Performance (HP)	Facility & Infrastructure (HI)		Human Capital (HC)	
		Aggregate	On per Mill. Popl. basis	Aggregate	On per mill. Popl. basis
80-81	0.28				
81-82	0.27	0.45	0.37	0.74	1.09
82-83	0.31	0.56	0.46	0.8	1.13
83-84	0.32	0.68	0.58	0.89	1.1
84-85	0.32	0.85	0.79	1	1.11
85-86	0.36	1.02	1.01	1.19	1.29
86-87	0.39	1.39	1.49	1.31	1.32
87-88	0.42	1.66	1.78	1.42	1.34
88-89	0.43	1.97	2.19	1.65	1.44
89-90	0.49	2.28	2.55	1.81	1.53
90-91	0.56	2.48	2.7	2.04	1.73
91-92	0.59	2.55	2.65	2.19	1.79
92-93	0.61	2.78	2.87	2.45	1.99
93-94	0.7	2.92	2.97	2.85	2.89
94-95	0.72	2.96	2.89	3.2	3.26
95-96	0.78	3	2.82	3.52	3.56
96-97	0.86	3.12	2.84	3.33	3.58
97-98	0.96	3.35	3.04	3.62	3.86
98-99	1.16				
99-00	2.01				
00-01	2.98				

Notes: The Health infrastructure and human capital composite indices are computed both at the total sectoral level as well as on per million population basis. The pattern of the two will remain the same, though the indices will differ.

The correlation between the three indicators before and during the reforms period is a useful information to infer regarding the nature of their linkages. They are shown in Table 12.a.

Table 12.a.: Correlations between health sector composite indices

	Between 19 80-90		**Between 1991-98**		**Between 1980-98**	
	HC	**HI**	**HC**	**HI**	**HC**	**HI**
HP	0.98	0.97	0.92	0.62	0.96	0.87
HC		0.95		0.6		0.76

As can be seen from the stylized correlation coefficients in (i) the pre-reforms period, (ii) during the reforms period and (iii) the total period, it can be said that:

1. There is a high association between health performance (HP) and Health sectoral infrastructure (HI) and Health man-power (HC)in the period 1980 to 1990. This strong link is broken in favour of, 'between health man-power and health sector performance only' during the latter period.
2. In the period 1991 onwards, basically it is the man-power growth that has kept the health performance quite high.

As can be seen from the graphs and the Table 11, there seems to be some kind of relationship between these performance and process indicators, requiring some further analysis. In the light of the questions posed at the beginning of this Section, the following inferences and observations can be made on the effects of the reforms process on the health sector in India.

- As far as the Health Performance in concerned, the overall performance has just doubled during the period of 1980-81 to 1990-91. HP indicator was 0.28 in 1980-81, rose to 0.56 in 1990-91. But in the subsequent Reforms period, it has more than quadrupled! There may be many reasons for this remarkable performance revealed during the 90's. Health improvements being a long run phenomenon, the investments and efforts carried out in the earlier period might be showing the positive results now. It is also likely that this remarkable performance during 1991 to 2000 may as well be due to the kinds of reforms in the health sector itself.
- The Aggregate Health Infra-structural growth, as viewed from its composite index HI gives the impression that during the pre-1990-91 period, it had grown fivefold in 10 years (from 0.45 in 1980-81 to 2.48 by 1990-91; but during the period 1990-91 to 2000-01, it has increased by just about 35% . Therefore, the high rate of health infra-structural development prior to 90's be noted.
- If one considers the Aggregate Human Capital growth, it has shown an increase by about 175% during 1980-90 period. During the reform period, over about 7 years, it has increased by about 77%.
- One notices that the growths of the Infrastructure and Human Capital suggest different degree of importance attached to them in different sub-periods. As can be seen from **Chart 'A' and Chart 'B'** three sub-periods are discernible. For instance, till about 1985, Health infrastructures were growing faster

than Health related Human Capital. Between 1985 to 1993, the infra-structural growth was getting sluggish, whereas that of human capital was rising faster. In the period 1994 onwards the Health manpower kept on growing still faster where as the infrastructure growth was sluggish (and even declining in the year 1994-95 and 1995-96). A s can be seen from **Chart 'A'** till about 1991, the health infra-structure growth has been over-registered as compared to health man-power. Subsequently, the growth in health man-power over-shadowed the growth in infra-structure.

- The remarkable growth of Health performance during the 1990-2000 period can be then understood as mainly due to high infra-structural growth during pre-1990 period and high health man-power growth in post 1990 period. The setback in the growth of health manpower during the reforms period has certainly affected the health sectoral overall performance. Much of the health manpower has either shifted from public sector to private sector during the period, or they have also registered increased growth in migration abroad.
- As far as the role of public investment and expenditure on the health sector is concerned, it seems to have had very little influence on the performance of the health sector as a whole. However, they may have played certain specific role in certain states or districts, which is a matter of further investigation (in other Monographs). This can be stated emphatically on the basis of both central and state level allocations on the health sector vis-à-vis (i) the total budget, (ii) as a share of GDP and, (iii) on per capita terms. **Figures 1 - 6** highlight the same.
- The major conclusions thus can be reached are:
  - *Budgetary allocations on health sector played the role of 'baby-sitting' in Indian economy, by maintaining it with very little emphasis on the role of the 'state' that has to be performed in the wake of economic reforms in India.*
  - *The development in the health sector took place mainly due to qualitative and technical changes that took place in health care facilities and infra-structure and man-power.*

It may be useful at this stage to link the health performance indicators during the pre-reforms and during the reforms periods, with fiscal reforms indicators analysed earlier. This is attempted with an econometric model of the health sector at the macro level.

The following variables are considered in this model[14] :

- PUCE= Ratio of state and central public capital expenditures to total public capital expenditures
- HC= Composite Index of Health Human Capital
- HI= Composite Index of Health Infrastructure
- HP= Composite Index of Health Sectoral Performance
- D_{90} = 'Reforms' Dummy variable, representing the effects of reforms process; it takes a value equal to zero during the pre-reforms period, and equal to unity during the reforms periods.

The basic objectives of the econometric model are to study the following:

- Is there any clear indication that the health manpower (HC) and health infrastructure developments (HI)) have shown distinct patterns during the two phases of the reforms process, namely before and during the reforms?
- Is there any systematic relation visualized between health infrastructure (HI) and health manpower (HC) growth?
- Is there any patters being followed in allocating public resources on the health sector?
- Can the overall performance of the health sector (HP) be explained by the health manpower, health infrastructure and public investment policies?

In order to study the effects of reforms process itself, a dummy variable D_{90} is introduced. Alternative forms of the relation ships have been estimated, and only the statistically significant ones are summaried in Table 12.b.

The following conclusions can be drawn on the basis of the econometric model:

- The reforms process has distinctly brought changes in the growth of health manpower and health infrastructure. This is also visible from **Chart 'A' and Chart 'B'**. The 'reforms' dummy variable is significant and has a positive coefficient, indicating significant shift in these two major performance indicators of the health sector in the reforms period.
- Secondly, the growth in health manpower and health infrastructure seem to be linked, a fact, perhaps obvious from the experience of the performances. However, the elasticity of health manpower growth with respect to health infrastructure is just about 0.70 (i.e., inelastic). This suggests that man power growth is lagging behind the infrastructural growth.
- Thirdly, public expenditure on health sector seems to be inversely related to the rate of change in health infrastructure. If health infrastructure grows beyond the normal growth rate, then, public investment expenditures are cut. On the other hand, if the health

[1] Public Revenue expenditures at the state and central levels were also considered to be used in the model. But no significant econometric relations could not be established between this and health performance indicators.

infrastructure growth is lagging behind the normal growth, then, public investment expenditures are enhanced. This seems to be a prudent public finance management.

- Fourthly, change in health delivery (HP) is directly related to the levels of health manpower. In other words, development of health manpower is most crucial for the good health delivery system.
- Finally, the revenue expenditures at the states and central levels seem to be determined by considerations outside of the health sector, as both the health infrastructure and health manpower growths do not seem to explain the allocations.

Table 12.b.: Macro-Econometric model of Health Sector

Dependent Variable	Explanatory Variables				
	Constant term	HI	HC	AHI	D_{90}
HI -0.81	1.247*				1.572* (0.35)
HC -0.805	1.261*				1.424* -0.33
HC -0.75	0.562	0.683* -0.7			
PUCE -0.439	0.217*			-0.112* (-0.09)	
ΔHP -0.54	0.00696		0.0164* -0.82		
ΔHP -0.521	-0.00545		@ 0.0226* -1.14		

Notes: 1. Figures in brackets under the dependent variables are the R values; 2. Figures in brackets under explanatory variables are estimated elasticities; 3. @: Here, instead of observed HC, estimated from another regression equation is used.

In summary, maintaining health manpower growth systematically is very crucial to perfect the health delivery system in the reforms period.

6. Production and Consumption Linkage Analysis of Health Sector

Because of multi-sectoral linkages referred to in Box 1, one can also analyse their inter-dependencies linkages. However, data and information on all the aspects mentioned there are not available on an yearly basis (except for imports and exports). The Central Statistical Organisation, an organ of Ministry of Planning in the Central Government, has been compiling them for selected years. They are typically put in a matrix of commodity (including services) flows in value terms for a large number of sectors of the economy. This matrix is generally called 'Input-Output Transactions Matrix' of the economy. In the most recent Transactions Matrix for the year 1993-94, the economy is divided into 115 sectors.

The Sectoral linkage between the health related and other sectors of the economy are viewed in terms of value of various inputs in to these sectors and presented in Tables 13 to 16[15] .

In Tables 14 only the most important and major inputs in value terms into the Health and Medical Sector are shown. The input values are then converted into a ratio of the gross output (or total value of services from the Health sector itself) to obtain an input/output coefficient. The coefficients then reflect the relative importance of the various inputs. For instance, it can be viewed that in 1993-94, for every rupee of services provided by the health sector in India, the drug and pharmaceutical inputs required are to the tune of Rs. 0.28. Likewise, all the inputs are to be interpreted. The total inputs from all sector taken together to provide one rupee of services from the health sector is Rs. 0.52. In a sense, this is an indicator of direct backward dependency of the Health sector. This dependency was as high as 0.68 in 1973-74.The direct inputs material in the health sector seems to have been going down. The implication is that the man-power costs in the health sector in turn have been increasing.

Likewise, from Table 15, it can be viewed that, in 1993-94, the direct backward dependency of Drug and Pharmaceutical Sector on all sectors of the Indian economy was to a tune of Rs. 0.66. Out of this, the inputs from the Drug and Pharmaceutical sector itself was for Rs. 0.18. In the drug and pharmaceutical sector the direct inputs seem to be going up over time (from 0.52 in 1973-74 to 0.66 in 1993-94.

Table 16 shows the import dependency of the two sectors for the most recent period. The import dependency of the Health sector is quite minimal, amounting to only Rs.0.015 per rupee of its service activity. The Drug and pharmaceutical sector however has a larger dependency on the imports amounting to Rs. 0.078 per rupee of gross output.

Several indicators can be computed to reflect the degree of linkages between the two sectors and all other sectors of the economy. They are based on the methodology of Input-Output Transactions Table, referred above. Five major indicators used here are :

- Forward Linkage :
- Backward Linkage
- Total Direct & Indirect Linkage
- Direct & Indirect Inducement
- Total Linkage with Final Demands

[1] These are presented in value terms, for the simple reason that at the macro-economic level, it is not easy and feasible to present the same in physical units such as kgs of medicines, or litres of saline or thousands of syringes and so on.

TaTable 13: Backward, Forward, Total Production Linkage and Final Demand Linkage Indices :Service and Utility Sectors

Sector	1973-74		1989-90		1993-94		1993-94		
	Forward Linkage	Backward Linkage	Forward Linkage	Backward Linkage	Forward Linkage	Backward Linkage	Total Direct & Indirect Linkage Effect Index	Direct & Indirect Inducement Index	Total Linkage Coeff. For final Demand (Relative
Electricity	0.7662	0.5082	0.917	0.6199	0.9084	0.6416	4.9506	1.1063	0.322
Gas	0.0418	0.2304	0.3327	0.5325	0.0897	0.2668	0.4983	0.6956	0.0378
Water Supply	0.3685	0.308	0.3626	0.4481	0.4768	0.2939	0.5854	0.8043	0.065
Railway Transport	0.524		0.6837	0.4546	0.689	0.4488	1.6875	0.9511	0.3291
Other Transport	0.4076	0.3887	0.5135	0.4295	0.5009	0.5189	4.553	1.0074	0.0948
Storage & Warehousing	0.9949	0.1922	0.9898	0.2889	0.9908	0.3184	0.5524	0.7882	0.0004
Communication	0.3144	0.1298	0.6682	0.1752	0.6545	0.1612	1.0869	0.654	0.1583
Banking	0.7398		0.8115	0.2027	0.7817	0.1471	3.2556	0.6089	0.0351
Insurance	0.3464	0.0606	0.9544	0.1189	0.9539	0.1701	1.0557	0.6584	0.0126
Ownership of dwellings	0	0.0796	0	0.1564	0	0.0553	0.4948	0.555	1.6076
Education & Research	0.0001	0.3281	0.0037	0.0923	0.004	0.1119	0.5016	0.6045	1.0783
Medical & Health	0.0462	0.6835	0.1249	0.5383	0.1178	0.5157	0.6348	1.0402	1
Other Services	0.5362	0.0625	0.6201	0.4059	0.4555	0.2406	2.5756	0.9551	1.7309
Public Administration	0	0	0	0	0	0	0.4948	0.4948	1.3219
Trade	1.058	0.4987	0.715	0.6364	0.6024	0.6532	0.8691	1.1859	-
Drugs & Pharmaceuticals	0.3613	0.1468	0.4673	0.267	0.4479	0.2333	5.9201	0.7221	-

Notes : Forward Linkages = $\frac{\Sigma xij}{Xi}$ Total Direct & Indirect Linkage Effect Index = $\frac{n\Sigma Xij}{\Sigma\Sigma Cij}$ Total Linkage Coefficient for final demand (relative) = $\frac{}{(\Sigma Ckj)fj}$

Backward Linkages = $\frac{\Sigma xij}{Dij=Xj+Mj}$ Direct & Indirect = $n\Sigma Xij$ Inducement Index = $\Sigma\Sigma Cij$

Source : Input-Output Transaction Tables, 1973-74, 1989-90, 1993-94

Table 14 : Changing Structure of Inputs into Medical and Health Sector

(Rs. In Lakh)

Rank	1973-74			1989-90			1993-94		
	Sector	**Value**	**Coeff.**	**Sector**	**Value**	**Coeff.**	**Sector**	**Value**	**Coeff**
I	Drugs and pharma	55830	0.478	Drugs & pharma	288211	0.336	Drugs & pharma	493567	0.2808
II	Trade	10870	0.0931	Trade	64287	0.0749	Trade	143118	0.0814
III	Other transport services	3109	0.0266	Medical & health	19763	0.023	Other transport	91764	0.0522
IV	Communication	1582	0.0135	Other transport	19333	0.0225	Medical & health	54817	0.0312
V	Other services	1482	0.0127	Misc. manufac.	14229	0.0166	Other services	33239	0.0189
VI	Electricity	990	0.0085	Other crops	7407	0.0086	Construction	18724	0.0107
VII	Construction	969	0.0083	Electricity	5995	0.007	Electricity	8582	0.0049
VIII	Other livestock products	591	0.0051	Construction	5803	0.0068	Misc. manufacturing	8548	0.0049
IX	Misc. metal products	566	0.0048	Other services	5294	0.0062	Communication	7381	0.0042
X	Railway transport serv.	540	0.0046	Hotels & restaurants	4085	0.0048	Milk & milk prods.	5726	0.0033
XI	Misc. manufacturing	374	0.0032	Milk & milk prods.	4070	0.0047	Water supply	5200	0.003
XII	Hotels & restaurants	310	0.0027	Railway transport	4039	0.0047	Other chemicals	5121	0.0029
XIII	Misc. food products	284	0.0024	Wheat	3607	0.0042	Petroleum prods	4576	0.0026
XIV	Milk & milk products	264	0.0023	Paddy	3422	0.004	Other livestock prods	3870	0.0022
XV	Other crops	253	0.0022	Petroleum prods	2096	0.0024	Paddy	3188	0.0018
XVI	Electrical applicances	10	0.0001	Electrical appliances	71	0.0001	Electrical appliances	506	0.0003
XVII	**Total of the Above**	**78024**	0.6681		**451712**	0.5265		**887927**	0.5051
	All other inputs	1810	0.0155	All other inputs	461836	0.5383	All other inputs	906601	0.5157
	TOTAL INPUTS	**79834**	0.6836	**TOTAL INPUTS**	**461836**	0.5383	**TOTAL INPUTS**	**906601**	0.5157
	Gross Output	116788		**Gross Output**	857896		**Gross Output**	1757861	

Source : Input-Output Transaction Tables, 1973-74, 1989-90, 1993-94

Table 15 : Changing Structure of Inputs into Drugs and Pharmaceuticals Sector

(Value in Lakhs of Rupees)

Rank	1973-74			1989-90			1993-94		
	Sector	Value	Coefficient	Sector	Value	Coefficient	Sector	Value	Coefficient
I	Organic heavy chemicals	5310	0.0914	Drugs & Medicines	151315	0.2282	Drugs & Medicines	246586	0.1772
II	Trade	3368	0.0579	Trade	56606	0.0854	Trade	122625	0.0881
III	Drugs & medicines	3169	0.0545	Organic heavy chemicals	25316	0.0382	Organic heavy chemicals	92362	0.0664
IV	Inorganic heavy chemicals	2786	0.0479	Paper, paper products & newsprint	25052	0.0378	Other transport services	89247	0.0641
V	Non-ferrous basic metals	2170	0.0373	Other Chemicals	23240	0.035	Other chemicals	51921	0.0373
VI	Other crops	1688	0.029	Electricity	18250	0.0275	Paper, paper products & newsprint	48859	0.0351
VII	Other services	1574	0.0271	Forestry & logging	15375	0.0232	Banking	47584	0.0342
VIII	Other non-metallic minerals	1540	0.0265	Other transport	15301	0.0231	Electricity	32070	0.023
IX	Other chemicals	1416	0.0244	Inorganic heavy chemicals	11328	0.0171	Inorganic heavy chemicals	19071	0.0137
X	Paper, paper products & newsprint	1124	0.0193	Other Services	10870	0.0164	Plastic products	17422	0.0125
XI	Other transport services	715	0.0123	Banking	9795	0.0148	Forestry & logging	14843	0.0107
XII	Electricity	654	0.0113	Sugar	8037	0.0121	Non-ferrous basic metals	12976	0.0093
XIII	Banking	582	0.01	Misc. Manufacturing	7368	0.0111	Misc. textile products	11137	0.008
XIV	Plastic products	504	0.0087	Non-ferrous basic metals	6035	0.0091	Other livestock products	9880	0.0071
XV	Wood & wood products	405	0.007	Plastic Products	5951	0.009	Misc. manufacturing	9333	0.0067
XVI	**Total of the Above**	**27005**	0.4646		**389839**	0.5879		**825916**	0.5934
	All other inputs	3369	0.058	All other inputs	48461	0.0731	All other inputs	99635	0.0716
	Total Input	30374	0.5226	Total Input	438300	0.661	Total Input	925551	0.665
	Gross Output	**58120**		**Gross Output**	**663104**		**Gross Output**	**1391850**	

Source : Input-Output Transaction Tables, 1973-74, 1989-90, 1993-94

Table 16 : Imports into Health Related Sectors (1993-94)

(Value in Lakhs of

S. No.	Sectors	Drugs & Pharmaceuticals	Coeff.	Medical & Health	Coeff.
1	Other livestock products	885	0.0006		
2	Khandsari, boora	34	0.00002		
3	Miscellaneous food products	923	0.0006		
4	Wood and wood products	106	0.00007		
5	Paper, paper prods. & newsprint	8364	0.0061	534	0.0003
6	Petroleum products	2087	0.0015	1660	0.0009
7	Inorganic heavy chemicals	6091	0.0043		
8	Organic heavy chemicals	54812	0.0393		
9	Paints, varnishes and lacquers	20	0.00001		
10	Drugs and medicines	25025	0.0179		
11	Synthetic fibers, resin	149	0.0001		
12	Other chemicals	4110	0.0029		
13	Other non-metallic mineral prods.	6126	0.0044		
14	Hand tools, hardware	322	0.0002		
15	Miscellaneous manufacturing			4067	0.0023
16	Other services			20957	0.0119
17	Public administration				
	Total Imports	109055	0.0783	27218	0.0154
	Gross Output	1391850		1757861	

Source : Input-Output Transaction Tables, 1993-94

The definitions of these indicators, their computational methods are shown in Table 13 along with their estimates for the three distinct periods under study, namely, 1973-74, 1989-90 and 1993-94[16]. The question before us, the role and relevance of Health Sector among major service sectors of the country. This is best answered by the Total Linkage Coefficient for Final Demand (computed for the year 1993-94 only). For this purpose, the total linkage index in respect of Final demands for the Health and Medical Care sector is set as a numeraire (i.e., unity). Then the relative indicators for several other service and utility sectors reflect their relative importance. Notice that except for Education, Other Services and Public Administration, all other sectors have very low final demand linkages.

Like wise, all the indicators can be compared across the sectors. Based on such a methodology the following major conclusions can be drawn:

16. The choice of the three periods is simply based on the availability of Input-Output Transactions Tables.

- The Forward linkage of the Medical and Health Care Sector has increased over time, whereas the Backward linkage has declined.
- In the case of Drug and Pharmaceutical Sector, both the Forward and Backward linkages have been increasing.
- In 1993-94 (the most recent year for which the I-O Table data is available), the Forward linkages of health and medical Care sector is higher than for Education.
- The Backward linkage for the health and medical Care sector in the year 1993-94 is quite high as compared to Education, Insurance, Other Services or Banking.
- The Direct and Indirect Inducement Index for health sector is quite high (comparable to Transport sector, Trade or Electricity etc.)
- Drug and pharmaceutical sector has, in comparison to Other Service and Utility Sectors, relatively quite high Forward and Backward linkages.

7. Conclusions

The analysis of sectoral linkages between the Health and Medical Sectors with other sectors of the economy (Section 6 in particular), as well as the role it has to play as a Social Sector (Dreze and Sen, 1995) ascertain that the health and medical sectors seem to have assumed their right place in India as a major Social sectors, having to do with the development of human capital. Its development in the context of Reforms Process therefore, is all the more necessary. As argued by Srinivasan (2000) the question is how to internalize it, rather than doing without it.

The performance of the health sector in India over the last two decades have been reviewed at the macro-economic level in this study. They provide a variety of messages for reforming the health and medical sector in India. The major findings and the relevant policy options and corrections at the macro-economic level are summarised here.

There is some evidence to say that the central budgetary allocations have not been reduced in the health sector, be it at the per capita level, or per GDP or even as a ratio of total revenue budgetary allocations. In fact, invariably they have shown some increasing trend, however marginal they may be. But the same can not be said about the allocations out of state revenue budgets. Clearly, the state's budgetary allocations have declined as a share of allocations out of total revenue budget, remained fairly constant in terms of per GDP basis, but on per capita terms seem to be going up slowly. Since health care delivery is a state subject in India, it is extremely important that states maintain their budget allocations on this vital sector on a growing path of atleast 5-6 percent.

The growth of health man-power and infrastructure is another matter of concern. The analysis shows that while the emphasis was heavily loaded on infrastructural development in the decade of 1980's, the same has shifted to man-power development in the 90's. It may be economically an efficient way of managing the development of the health sector in such a phased manner over the plan periods. But such a development will amount to, at times having infrastructure but not doctor and vice-versa. Certainly, such phasing of development of the two arms of the health sector may not be in the best interests of the people to whom health care delivery is important. Health being a matter of social relevance, more than economic relevance, it is important to maintain some kind of balance in the development of both infrastructure and man-power. In terms of policy, quite often, such developments are driven by external fundings. Then the government should be more careful to see that the health care delivery system is not affected by the funding mechanisms.

Finally, the link between the health sector and the rest of economic sectors should also be kept in mind, for better resource allocation and management. The linkage analysis shows that health sector's backward linkage has been declining and that of forward linakge increasing. This will mean that the development of this sector will depend more and more on advancement of technology, inflow of foreign capital, imports of drugs etc. Rather, it is necessary to recognize the traditional and indigenous knowledge and techniques and find a place for them in the health sectoral development. On the other hand, in the case of drug and pharmaceuticals, both the forward and backward linkages are on the increase over time. Still, one notices that rather than backward linkage, it is the forward linkage which is quite high. Once again, Indian drug and pharmaceutical sectors are becoming more and more dependent upon exporting, imports of foreign drug intermediaries and technologies. This may not be in the best interest of promoting this sector in the country, particularly with a large number of small scale units in this sector.

It is now time to take a close look at the National Health Policy-2002. The findings and observations made in this study are confirmed by this policy document. They have already recognized that:

- As compared to China (24.9%) or Sri Lanka (45.4%), India spends just about 17.3% of total health expenditure on public health.
- The central budgetary allocation for health over the period 1990 to 1999, as a percentage of the total central budget has been stagnant at 1.3 percent, while that in the states has declined form 7.0 percent to 5.5 percent.

- The annual per capita public health expenditure in the country is no more than Rs. 200.
- The National Policy document therefore, recommends to increase central allocations to 6 percent of GDP, with 2 percent of GDP being contributed exclusively as public health investment.
- The state governments are required to commit to raise the allocation to 7 percent of their budget till 2005, and later by 8 percent.
- So far access to and benefits from public health system have been very uneven. These need to be corrected.
- It is estimated that the short fall in SCs/PHCs/ CHCs is going to be about 16% (as against the norms).
- Inadequate public health facilities are such that less than 20 percent of population which seek OPD services and less than 45 percent of that which seek indoor treatment, avail of such services in public hospitals. This is the telling story coming from imbalanced development of the public health man-power and infrastructure in India.
- Accordingly, the policy document suggests to raise allocation on public health infrastructure to a tune of 55 % specifically on primary health sector, 35% to secondary and 10 percent to tertiary sectors.
- The policy document also recommends to encourage handing over of public health service outlets at any level for management to NGOs and other institutions of civil society. It is this aspect of health cooperative that CMDR has been promoting on an experimental basis (described in another monograph), as part the action and policy research.

Chart - A

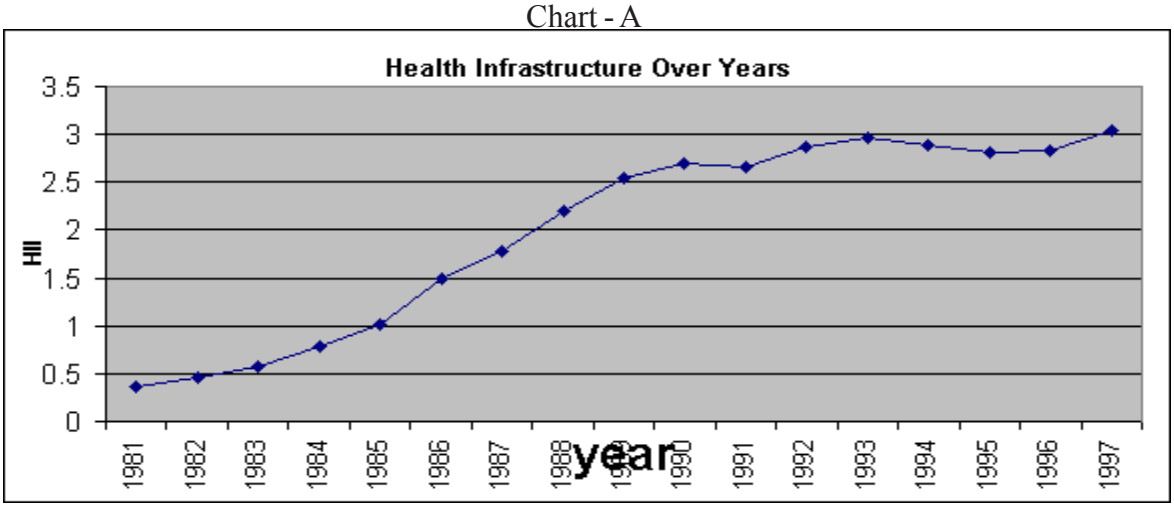


Chart - B

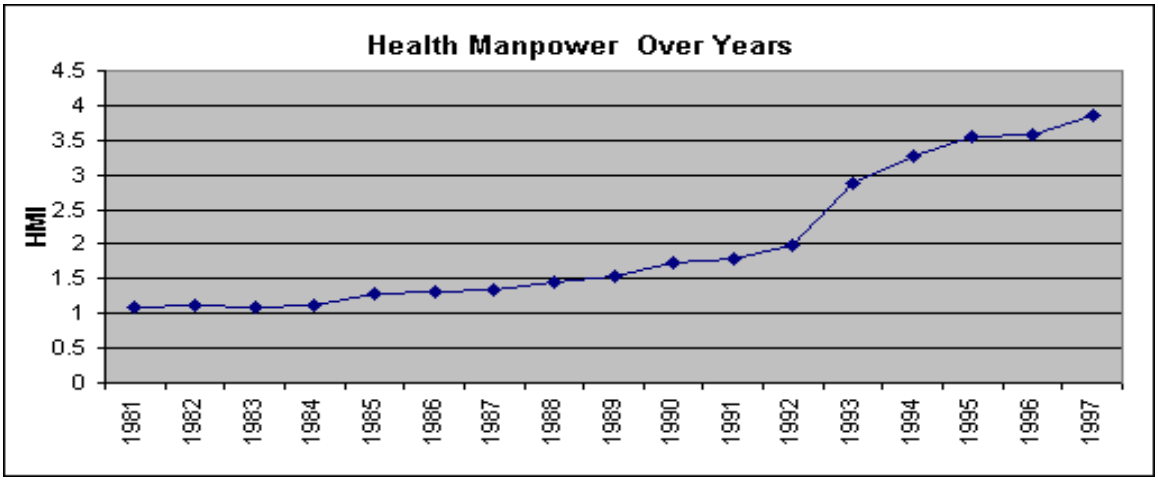


Chart - C

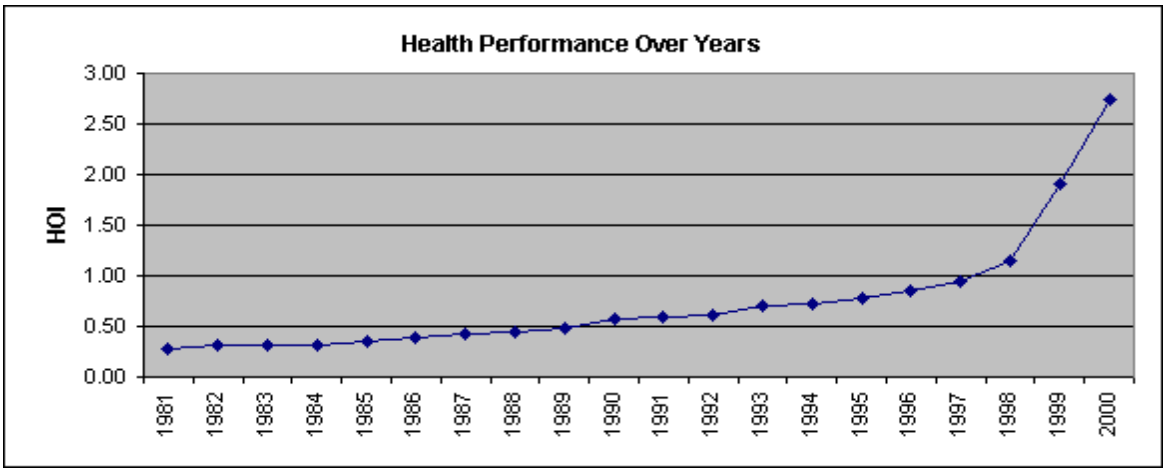


Figure 1 Central Revenue Expenditure on Health Sector As % of GDP

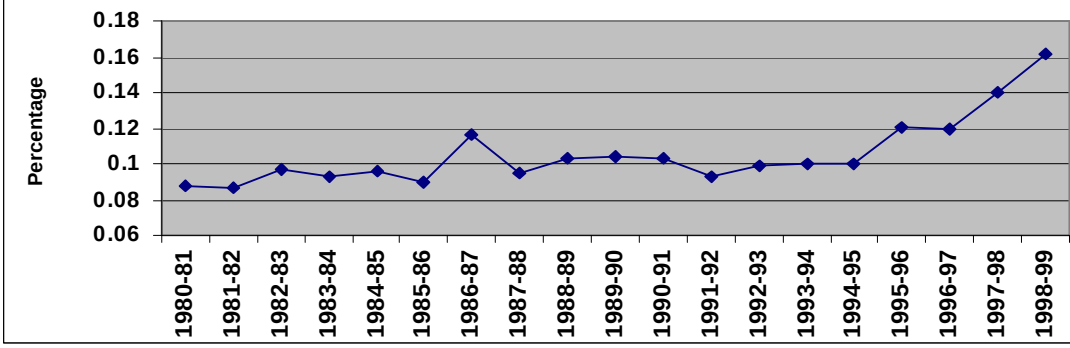


Figure 2 State's Revenue Expenditure on Health Sector As % of GDP

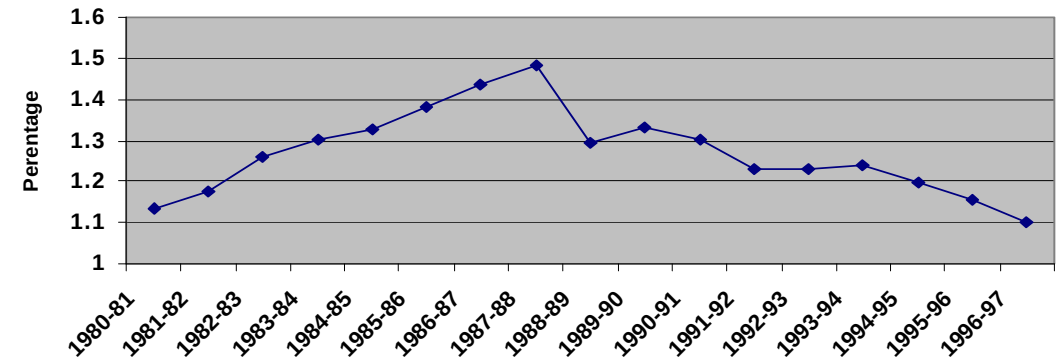
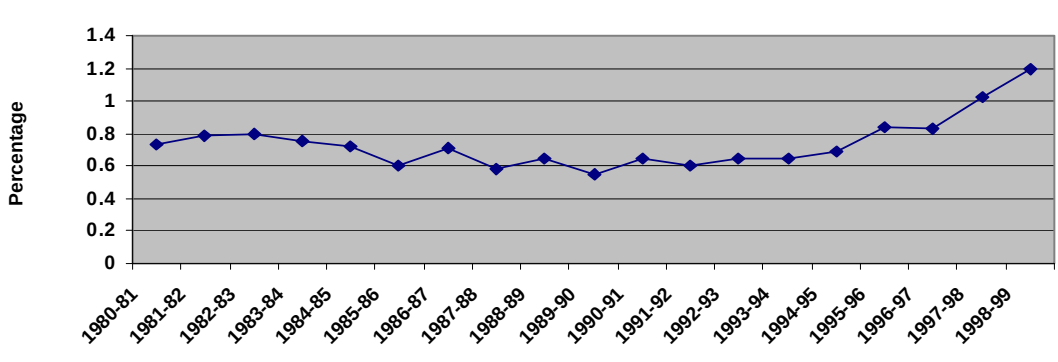


Figure 3 Central Revanue Expenditure on Health Sector As a % of Total Revenue Expenditure



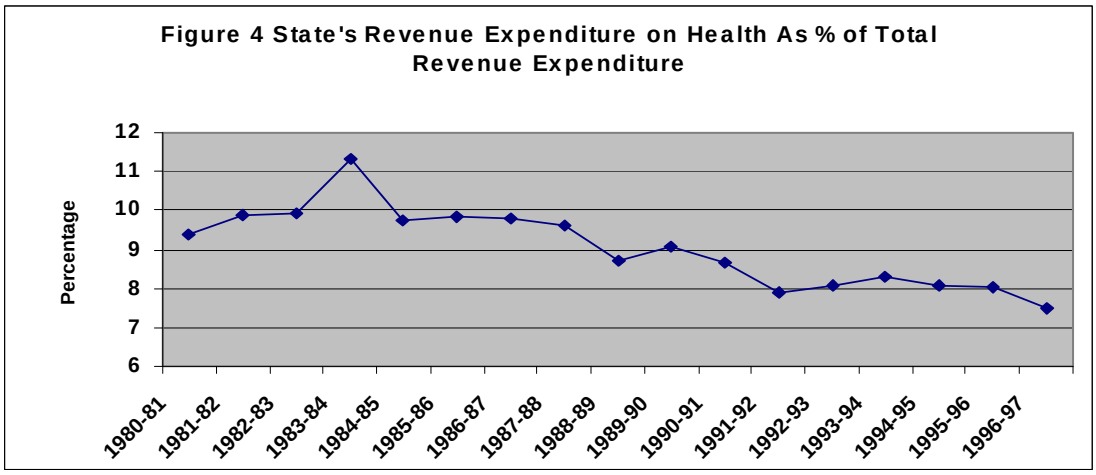


Figure 4 State's Revenue Expenditure on Health As % of Total Revenue Expenditure
Percentage
12
11
10
9
8
7
6
1980-81
1981-82
1982-83
1983-84
1984-85
1985-86
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1987-88
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1991-92
1992-93
1993-94
1994-95
1995-96
1996-97

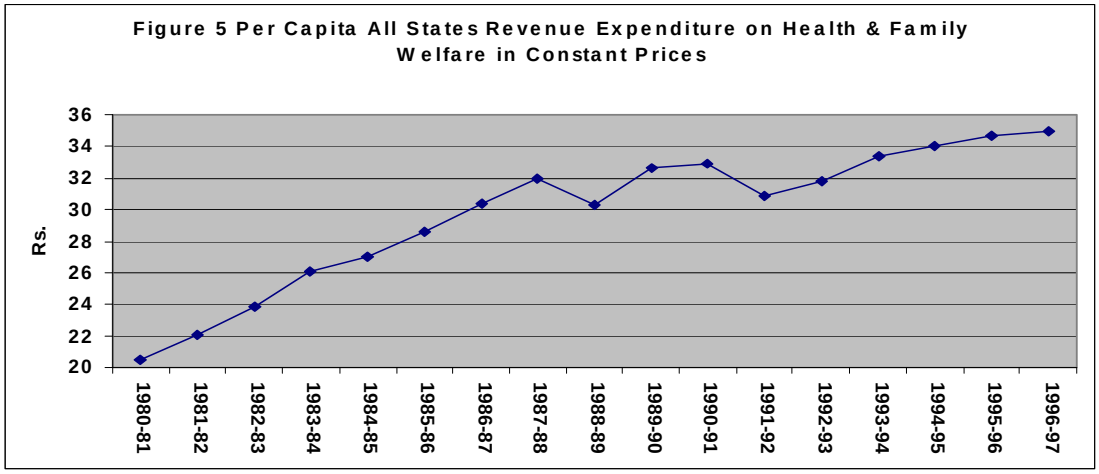


Figure 5 Per Capita All States Revenue Expenditure on Health & Family Welfare in Constant Prices
Rs.
36
34
32
30
28
26
24
22
20
1980-81
1981-82
1982-83
1983-84
1984-85
1985-86
1986-87
1987-88
1988-89
1989-90
1990-91
1991-92
1992-93
1993-94
1994-95
1995-96
1996-97

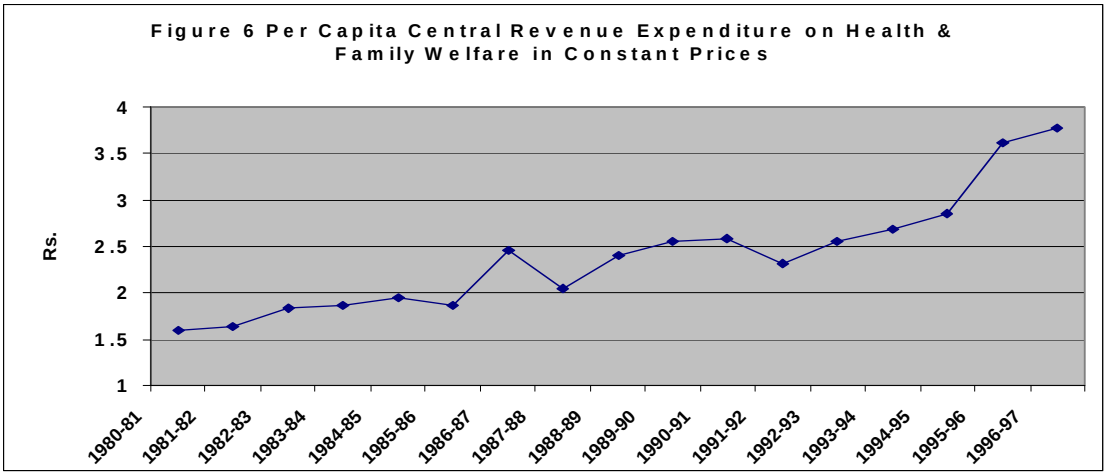


Figure 6 Per Capita Central Revenue Expenditure on Health & Family Welfare in Constant Prices
Rs.
4
3.5
3
2.5
2
1.5
1
1980-81
1981-82
1982-83
1983-84
1984-85
1985-86
1986-87
1987-88
1988-89
1989-90
1990-91
1991-92
1992-93
1993-94
1994-95
1995-96
1996-97

Figure 7 Per Capita Private Expenditure on Health & Medical Care in Constant Prices

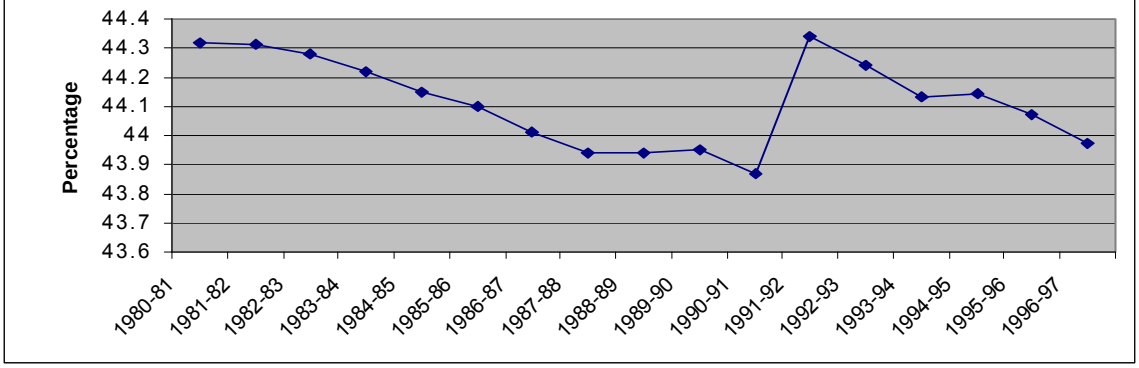
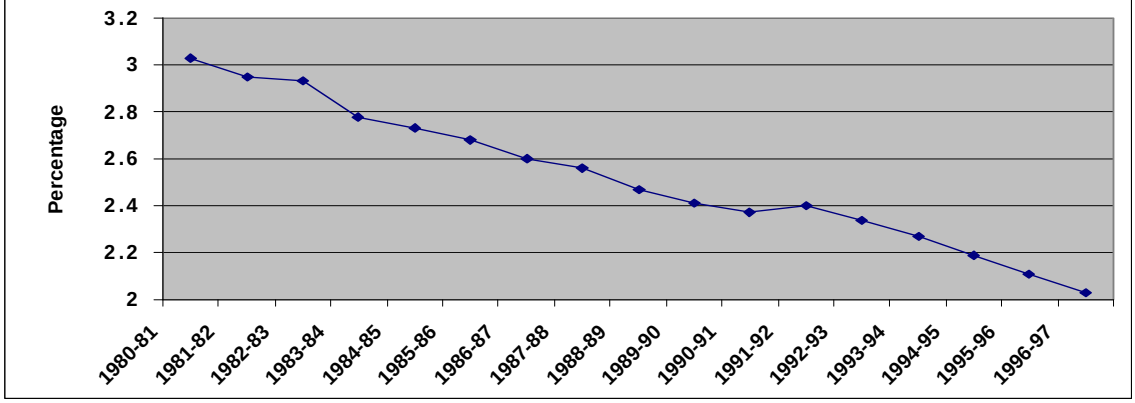


Figure 8 Per Capita Private Health Expenditure as % of PFCE



Annex 1: Broad notional definitions and norms for setting up of Health Facilities

1. PHC serves app. 30,000 population by year 2000 A. D. PHC will be supplied with drugs worth Rs. 30,000 annually. (All India Norm). A PHC will have one doctor.

Subcentres serves app. 5,000 people in plain areas and 3,000 in hilly and tribal areas. Subcentre is managed by Junior Health Assistant (Female) Junior Health Assistant (Male), (All India Norm).

2. CHC serves 1 Lakh population. Generally one CHC is attached to 4 PHCs. It is the policy of government to upgrade all taluka level institutions to 30 bedded hospitals and talukas located at sub-divisional headquarters into 50 bedded hospitals. (All India Norm).

3. District Hospitals a re defined at each district head quarters. The district hospital will have following specialists :

1. Medicine
2. Surgery
3. Obstetric and Gyhacology
4. Paediatric
5. Orthopaedic
6. Opthamology
7. Ear, Nose and Threat
8. Pathology and Bacteriology
9. Skin and SID
10. Radiology
11. Anaesthesia
12. Dental

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