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Changing the Indian Health System

Current Issues, Future Directions

APPENDICES

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Contents

APPENDIX 1

Restructuring the Ministry of Health and Family Welfare (MHFW) *

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Introduction:

At the outset, the inclusion of this paper as a separate appendix to the Report needs an explanation. The Report deals with issues at a macro level. On the other hand, restructuring of the MHFW could legitimately be considered a matter of detail, which may appear to be outside the scope of the Report. The inclusion of this paper is based on the conviction, that the wide ranging reforms suggested in the Report would require very strong leadership from MHFW, which may not be possible without a thorough restructuring. Even so, keeping in view the mandate of the Report, the treatment of the subject has been limited to only the broad framework of reorganisation. Also, the paper has been included as an appendix and not made an integral part of the Report.

The paper is primarily based on the two studies by the Administrative Staff College, Hyderabad (ASCI) 1986, and the Centre for Policy Research, Delhi (CPR) 1999 with important inputs from the Expert committee on Public Health systems 1996 (Bajaj Committee). However, the personal experience of the author in the MHFW has also contributed to the paper, which could result in some bias. Although every possible care has been taken to maintain objectivity, yet the possibility of this bias has also persuaded us to keep this paper separate from the main Report. The views expressed herein are entirely to be attributed to the author.

Existing Structure :

A minister of cabinet rank, or alternatively, a minister of state with independent change, heads the Ministry. In the case of the former, there is usually a minister of state to assist the cabinet minister. The Ministry has three independent departments, viz. The Department of Health (DH), the Department of Family Welfare (DFW), and the Department of Indian Systems of Medicine and Homeopathy (DISMH), each headed by a secretary (See Figure 1). The Ministry thus, has 3 Secretaries, 2 Additional Secretaries (both in DH), 8 Joint Secretaries and 30 officers of the rank of Director excluding technical advisers.[1] The cost of administration at headquarters is Rs. 14 crores a year. It currently commands a budget of Rs. 6,000 crores of which Rs. 3,400 crores goes

[1] CPR – 1999 and MHFW

* The paper is authored by Rajiv Misra, who held the position of Secretary, Department of Health, MHFW from 1.1.91 to 31.1.94.

into the maintenance of institutions and existing levels of services and Rs. 1,600 crores on the expansion of national programmes and centrally sponsored schemes.[2]

The division of responsibility between DH, DFW and DISMH is given in the Allocation of Business Rules (Annex I) DH broadly deals with public health, medical services, medical education, food and drug standards, professional councils, international aid to health and health research. Although, not specifically mentioned in the Rules, health policy has been traditionally dealt with in DH. The DFW is primarily responsible for family planning and maternal and child health. Again, though not specifically mentioned in the Rules, it has been made responsible for rural health infrastructure. The DISMH, as the name suggests, deals with all matters relating to Ayurveda, Siddha, Unani, Homeopathy, Naturopathy and Yoga. As the CPR report observes "there is today no Ministry as such, only three independent Departments".

MHFW has an attached office; the Directorate General of Health Services (DGHS), which is the apex technical institution for health matters in the Government. It is headed by the Director General (DG), who is equivalent in salary and status to a Secretary. The DGHS has an organisation larger than the DH with a budget of Rs. 13 crores as against Rs. 8.9 crores for the latter.[3] The DG is assisted by Additional DG's, Deputy DG's and Assistant DG's and a host of other technical and non-technical staff.

MHFW has 3 and the DGHS 101 subordinate offices (Annex 2 and 3).[4] In addition, there are 31 autonomous / statutory bodies under MHFW,[5] although only 25 are listed in the CPR Report (Annex 4). The Ministry has 3 Public Sector undertakings (Annex 5). MHFW either directly or through the DGHS / autonomous bodies is involved in the day to day management of a host of institutions ranging from medical colleges, hospitals, laboratories, production units of condoms, Ayurvedic medicines and vaccines, research and training institutions and health care schemes for Central Government Servants (CGHS). The situation is made more difficult as the autonomous bodies, are autonomous only in name, with the Minister / Secretary chairing the governing bodies and the Ministry representatives dominating their functioning. The affairs of institutions like the All India Institute of Medical Services, which also provide tertiary

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[2] ibid.

[3] ibid.

[4] ibid.

[5] Annual Report 2000-2001, MHFW.

health care facilities to VIPs, always command disproportionate attention of the Minister and senior officials.

The DGHS and its subordinate offices are primarily manned by the Central Health Service (CHS) which is composed of four sub cadres as follows[6] :

	Name of sub-cadre	Approved Strength
(i)	General Duty Medical Officers (GDMO)	3123
(ii)	Teaching Specialists	623
(iii)	Non-Teaching Specialists	769
(iv)	Public Health Specialists	78

In addition there are 13 posts in the Higher Administrative Grade common to all the four subcadres.[7] The dominance of GDMO's and the relatively poor representation of public health specialists seriously affects the professional and technical competence at senior levels, as all cadres are eligible for the senior positions including that of the DG.

It is impossible to capture in a few paragraphs, the diversity of institutions being managed by the MHFW and the DGHS. Most of them have highly unionised cadres leading to frequent agitations and strikes. **It would not be an exaggeration to say that the main preoccupation of the Ministry is managing itself rather than providing stewardship to the national health system.** The situation has got further aggravated by the recent trend of judicial activism which imposes a heavy burden on the officers who keep rushing from one court to another.

The organisation of DGHS is particularly weak, loaded as it is with GDMO's having experienced only clinical practice in CGHS dispensaries. They have experienced neither public health nor administration. They head organisations like the Bureau of Planning, Central Bureau of Health Information, Central Bureau of Health Education, where they can rarely provide effective leadership. The DG is also saddled with duties of VIP health care which claims disproportionate time and energy. In the recent past, all DGs have been from clinical backgrounds with no formal training or experience in public health. This has been a serious limitation on their technical contribution, although admittedly some gifted individuals have

[6] ibid.

[7] ibid.

overcome this deficiency by their diligence and learning capabilities. A majority of senior technical experts in the DGHS, have never had exposure to the rural health services where three fourth's of the population lives and where most public health programmes are targetted. As a result, DGHS has not been able to provide the expected technical leadership, which has encouraged the Ministry to directly assume more and more responsibility and functions.

The so called autonomous institutions are worse off. Since most governing bodies are chaired by the Minister himself, the more important ones, like the All India Institute of Medical Sciences (AIIMS) get a lot of attention and in the process get highly politicised. On the other hand, the less important ones cannot even get the Minister's attention and time for scheduling the meetings of the governing bodies and completing the statutory formalities of passing the budget, annual accounts etc.[8] Even a research organisation like the Indian Council of Medical Research (ICMR) has statutorily provided for the Minister to be the chairman and the secretary to be the vice chairman. The inevitable consequence of this arrangement is that the Ministry is heavily burdened by routine administrative issues relating to these autonomous bodies. This has been further aggravated by the Finance Ministry directives in the wake of fiscal constraints to dilute the financial powers of these bodies. Since all creation of posts, upgradations etc. even within the sanctioned budget require specific approval of the Finance Ministry, the matter has necessarily to be processed in the Ministry, even after the competent body of the autonomous institution has approved the proposal. The Government, thus, exercises excessive control over autonomous institutions, which is totally counterproductive. The only explanation for the continuance of this unhappy arrangement is, that it provides opportunities for exercising power and patronage both to the political heads and the bureaucracy.

The proliferation of sub-standard medical and dental educational institutions and their unbridled expansion without requisite facilities led Government to amend the Medical and Dental Council legislations to provide for specific prior approval before starting, expanding or upgrading an institution. Earlier these approvals were given by the relevant Councils and only their formal notifications were issued by the Government. They were not effective in exercising control, partly due to the weakness in the law, and partly because of their own vulnerability to political and other pressures. This was sought to be remedied by the amendment in the statutes, but an unintended result was the transfer of decision making powers from the Councils to the Ministry. This had not

[8] ASCI Report 1986

only generated substantial additional work for the Ministry but thrown up new opportunities for corruption and influence peddling.

The parliamentary work has also increased over the years. The Standing Committees of Parliament constituted to scrutinise the budget and programmes of each Ministry, function round the year generating a lot of additional paper work. Then, there are natural calamities and epidemics in different parts of the country to keep the officials on the run. Cumulatively, this has led to the Ministry usually lurching from one crisis to another and the officials finding it difficult to cope with even routine work, let alone the time and opportunity to reflect, introspect and develop a long term vision for the health of the nation.

The quality of leadership also suffers on two counts : the low profile of the Ministry and the high turnover of ministers and secretaries. The former results in the portfolio being assigned to political light weights who cannot assert effectively the viewpoint of the health sector in inter-ministerial consultations. Till recently (27.5.2000), the minister in charge did not even enjoy cabinet status. Similarly, MHFW is not considered an important position in the bureaucracy, and has often been used as a dumping ground for civil servants proving inconvenient elsewhere, which undermines their morale and motivation. The problem gets compounded by very high turnover both at the political and bureaucratic levels. In the last five years, both the current Minister for Health and Family Welfare and the Secretary Health are fifth occupants of their respective positions. The management of the Indian health system is a most challenging assignment in any circumstances. It naturally takes time for a minister or a civil servant to grasp the complexity and the enormity of the problems to be addressed. Even before the learning process is complete, the incumbent is replaced. If systemic reform in the health sector is to succeed, the Government would need to assign to this Ministry the most capable political and bureaucratic leadership and assure them a reasonably stable tenure.

Role of the Ministry :

The role of the State in health and the respective jurisdictions of the Centre and the States have been discussed in Chapter 3 of this Report. The role of the Central Government has been suggested as follows :

1. Stewardship :
   - Formulating health policy, defining vision and direction;
   - Regulation, framing laws, setting standards and arranging their enforcement;

- Monitoring the health and demographic indicators, including their main determinants, and evaluating the impact and performance of health related interventions;
- Collecting and using health intelligence for epidemiological surveillance and policy formulation;
- Promoting inter-sectoral coordination for achieving health goals;
- Guiding and overseeing the health system to meet the objectives of universal access, equity, quality and consumer satisfaction.
- Mobilising public opinion and support of all stake-holders and promoting active people's participation for public health activities.

2. Health Finance :
   - Mobilising resources and facilitating the establishment of a health financing framework which ensures fairness and financial risk protection;
   - Mobilising external aid and channeling it to priority areas.

3. Manpower Development :
   - Planning and encouraging the development of human resources for health and developing an appropriate incentive system to attract, retain and motivate health workers to work in priority areas.

4. Health Research :
   - Promoting and supporting health research in relevant areas in both public and private sectors;
   - Establishing institutional mechanisms for analyses of research inputs and their utilisation for health policy and programmes.

5. Public Goods :
   - Promoting and supporting health education, sanitation, safe drinking water, improvement of environment, control of risk factors like tobacco, alcohol and unhealthy life styles.

6. Merit Goods :
   - Planning and supporting delivery of merit goods, like immunisations, control of communicable diseases, population control and nutrition.

7. Public Health :
   - Arranging technical expertise to guide and oversee state programmes.

8. Drugs and Pharmaceuticals :
   - Developing the policy framework to ensure availability of essential drugs at affordable costs;
   - Standardisation, quality control and their enforcement;
   - Encouraging rational drug use.

9. Food Standards :
   - Laying down standards and regulations and overseeing their enforcement.

While some of these functions are presently outside the purview of MHFW, the main responsibility for discharging these responsibilities lies with this Ministry. Although many of these functions are being performed by the Ministry in one way or another, the outcomes are well below expectations due to structural weaknesses that have been discussed above.

Recommendations of the Studies/Committees :

ASCI Report :

The first independent assessment of the role and structure of MHFW was done by the Administrative Staff College of India, Hyderabad (ASCI) in 1986. This is a well researched and detailed report which, unfortunately, never received due consideration. The report was generally regarded as too academic and theoretical and of little practical value, and it was quietly buried as the DGHS could not be persuaded to examine and offer comments. The DG, at that time, was a controversial but a politically influential figure, who blocked consideration of the report, which recommended complete integration of the Ministry and DGHS. Above all, no one had the time and inclination to read a bulky report and develop an appropriate action plan to follow it up. The report got buried so deep that when the next exercise on the same subject was undertaken more than a decade later by the Centre for Policy Research, they were not even aware that such a report existed.

The specific objectives of MHFW suggested in the ASCI report are :
- To monitor the epidemiology of disease, prioritise among them and develop programmes to control or eradicate them;
- To supplement the States in providing high technology or specialised medical care;
- To set and maintain standards of medical and related education and to project manpower need;
- To set and maintain standards of food and drugs;
- To determine intermediate and long term research needs;

- To exercise health relatec control at international borders;
- To provide contraceptive services for family planning; and
- To guide and influence policy formulation.

In order to achieve the above objectives, the main recommendations of the ASCI report were :

- MHFW and DGHS be combined and regrouped into six programme divisions and two functional divisions. This implied total integration of the then existing two departments of Health and Family Welfare as well as DGHS. This was sought to be done to "strike a judicious balance between technical soundness and implementation feasibility."[9]
- A Policy Advisory Committee be set up with a separate secretariat to advise the Ministry on policy issues.
- The Central Government Health Scheme (CGHS) be converted into an autonomous board to relieve the Ministry and DGHS of day to day management responsibilities.
- The Ministry expends considerable time and energy on the hospitals under its charge for seemingly trivial and routine maters. These routine functions be delegated to a hospital management committee and the intervention of MHFW confined only to policy and the larger issues.
- The publicity and promotion functions to be decentralised to programme divisions and externalised to specialised agencies. (This would make existing organisations like the Central Health Education Bureau in the DGHS and the Media Division in DFW redundant).
- A separate organisation be set up to deal with non-contraceptive issues related to population. (The setting up of the National Population Commission with its secretariat in the Planning Commission may have met this need).
- The Minister / Secretary should not chair the governing bodies of the autonomous organisations. The chairperson should be a non-official with a reasonable term of office. The Ministry may be represented by one, or at the most two persons on the governing body.
- The offices of the Regional Directors of Health be abolished.
- The manning of technical posts, particularly senior positions, from state government cadres be considered.

[9] ibid

CPR Report :

Almost a decade later a study on the same subject was entrusted to the Centre of Policy Research by the Department of Administrative Reforms and Public Grievances, Government of India as a follow up of the recommendations of the Fifth pay Commission. The core functions of MHFW were defined in this study to comprise the following :

- Setting national goals for the health status of all citizens, for delivery of health services to them, and for moving towards a zero growth population in different regions, in definite time frame;
- Monitoring progress towards these goals;
- Formulating national policies, strategies and investment priorities to achieve these goals;
- Developing national systems of control of major communicable and non-communicable diseases;
- Developing national programmes of medical education, training, and research, including the establishment and control of some institutions of national importance.

The report also stated a general proposition : "A Central Ministry should be concerned essentially with planning, evolving policies and programmes for the implementation of the plan objectives; and the allocation of funds to the State, and the executive agencies and autonomous organisations, institutions, etc. The implementation of policies, execution of programmes and management of institutions are essentially responsibilities to be undertaken by State Governments, executive agencies and autonomous organisations."

The main directions of the reforms were summarised in the CPR report as under :

(i) "Decentralisation of planning and investment programming in the health sector substantially to the States, who were in any case responsible for implementation. MHFW would be responsible for setting national targets, formulating policies, extending advice and assistance through technical experts, and monitoring health indicators, demographic indices and service norms in the States.

(ii) The executive functions that today eat up considerable time of senior MHFW officials should be drastically reduced. This can be done by transferring some institutions to the States and entrusting ancillary activities like CGHS and drugs control to independent agencies.

(iii) Large existing institutions funded wholly or partly by MHFW should be made fully autonomous, without indirect control of MHFW through representations on their Boards."[10]

[10] CPR Report

The main structural changes suggested in the CPR study are :

- Integration of the three Departments, viz. Health, Family Welfare and Indian Systems of Medicine and Homeopathy.
- Converting the Central Government Health Scheme into a fully autonomous organisation managed by its own board.
- Setting up an autonomous Medical Store Purchase organisation or even a corporation to handle procurement in place of the present organisation under the DGHS.
- All medical colleges and hospitals in Delhi be transferred to the Delhi government along with their budgets with the sole exception of Dr. R.M.L Hospital which may work under the new autonomous organisation for CGHS.
- The Central and Centrally Sponsored Schemes run by the Minsitry be generally made a part of the State's block Cental Plan assistance with a few exceptions like AIDS, drug resistant TB and Malaria.
- MHFW should have no administrative responsibilities for day to day management of hospitals, medical colleges research institutions; instead it should concentrate on its basic tasks of national health planning and policy making;
- All governing bodies of autonomous institutions should be manned by expert professionals identified through search committees. The Ministry should not have any representation on these bodies.
- The Drug control functions be transferred to an independent National Drug Authority as envisaged in the Drug Policy of 1994.
- An independent commission be established on the lines of University Grants Commission to deal with all matters relating to medical education.

Bajaj Committee :

The Expert Committee on Public Health System (Bajaj committee) 1996 had a much wider mandate but it made some very important recommendations on the restructuring of the MHFW :

- A health impact assessment cell should be established to evaluate development projects and schemes with regard to their health consequences.
- An All India Service for Medical and Health be constituted on the lines of the Indian Administrative Service, the Indian Police Service and the Indian Forest Service, to facilitate interchange of specialists between centre and the states.
- The three departments in MHFW should be merged.

- An institutional mechanism should be devised to address inter-sectoral coordination among all health related activities, viz. education, sanitation, drinking water, environment, nutrition, rural and urban development etc. Even an overarching Ministry of Human Welfare be considered for this purpose.
- Establishment of a health manpower planning division in the DGHS.
- The National Institute of Communicable Disease (NICD) be upgraded into a centre of excellence on the lines of the Centre for Disease Control (CDC). Atlanta in USA, to oversee and monitor both communicable and non-communicable diseases and to provide state of the art technical expertise.

Broad Direction of Reform :

The above analysis conclusively establishes the need for wide-ranging reform as well as its broad directions. The first and foremost is the obvious need for MHFW to shed most of its executive functions and to focus on its policy making, planning and monitoring role. Constitutionally, 'health' is a state subject and thus there is no justification for the Central Ministry to involve itself in implementation of programmes or in day to day management of medical institutions. Unless and until, MHFW can shed the excess baggage it has accumulated historically, it would never be able to devote time and attention to core issues. Even a cursory examination of the list of institutions being managed by the MHFW and DGHS (Annexes 2,3, and 4), would reveal that many of them are unrelated to its legitimate responsibilities and have been established without sufficient scrutiny. Many of them are the result of individual fancies and pet ideas of Ministers and senior bureaucrats. It is obvious that MHFW has not grown according to any vision or a plan but purely on adhoc basis. And in Government, unfortunately, once an institution gets established, it is near impossible to close it down, even when its redundancy is patent.

This brings us to the next point. What we need is an end to adhocism and growth and development according to a well thought out plan. This requires strategic thinking and in depth analyses which could contribute to an improvement to the quality of decision making. The core ministries of the Government, like Home, Defence, Finance have in built capabilities for analysis but the so called developmental ministries, which saw rapid growth after independence, are particularly deficient. It is often argued that the time spent on research, study and analysis is a waste as the decision makers would anyway decide in accordance with their preconceived notions. There is no empirical evidence to support this view. In any case, even if a decision is to be taken to disregard the evidence and the analysis, it should be a conscious one mindful of its

implications. There is an urgent need to develop capabilities for policy planning and analysis to contain adhocism and to encourage evidence based and well informed decision making.

The temptation to run the health system of the country setting in Nirman Bhawan[11] arises from a desire to exercise power and influence. As we have seen, this is neither constitutionally mandated nor is it feasible in a country of India's size and diversity. But the same power and influence can be exercised much more productively in a different way, by the sheer weight of knowledge and expertise. MHFW should then become a repository of the highest professional and technical expertise in areas like public health, epidemiology, health economics and finance and health care management – something the states can never do at their level. The states would then be voluntarily seeking the Ministry's advice and guidance, giving it power and influence without in any way appearing interventionist. The centre can then use its traditional stature and financial clout to steer the country's health system towards rapid and sustained improvement. Basically, MHFW and DGHS need to be restructured to become store houses of knowledge, expertise, and analytical capacity – more of a think tank than an organisation for day to day management.

It would be impractical to suggest a complete shedding of executive responsibilities. There are constitutional, statutory and parliamentary functions assigned to MHFW which would involve management of some institutions and organisations and performing essential staff functions. Even in such cases, as a general rule, the attempt should be to distance the Ministry from day to day management to the extent possible, by grant of autonomous status and delegation of powers, and limiting the Ministry's role to laying down policy, approving financial allocations and monitoring performance. This alone would keep the focus on the core policy making role.

Another beneficial consequence of the shedding of executive functions would be that the officers of MHFW and DGHS would not be tied down to their desks and would be able to travel to the states, where the real action lies. The unfamiliarity with the reality on the ground which develops as a result of the officials' preoccupation with routine administrative work in Delhi, greatly limits their ability to contribute to policies and programmes. The more the officials are able to see things for themselves and interact with health workers at the cutting edge, the better would be their contribution to the programmes.

[11] The building in New Delhi which houses MHFW.

Specific Recommendations :

The broad approach to restructuring would follow from the above discussion. Once the goals are clear, the specific steps to be taken to achieve them can be identified after considering the feasibility and implications of various options suggested in the three reports. It is neither possible nor desirable in this brief paper to debate the merits and demerits of each suggestion. However, some recommendations, which appear eminently sound and feasible, are commended for consideration. However, it may again be clarified, that the specific measures suggested are not important in themselves, as long as there is movement towards the stated goals.

Integration of the three Departments (DH, DFW, DISMH) :

All the three reports are unanimous on this recommendation. In fact, disease control, immunisations, maternal and child health and contraceptive services are inseparable as they are to be delivered on the ground by the same health infrastructure. It is also essential, that not only is there complete coordination between the three departments, but that there is someone to take a comprehensive and holistic view of the entire health scene. It is however, recognised that a separate department for ISMH has given long overdue attention and visibility to a hitherto neglected but high potential area. The ideal position would be to completely integrate the three Departments, with activities like ISMH and family planning, requiring senior level stewardship, being looked after by special secretaries or additional secretaries. However, if this is considered infeasible for any reason, there are two easier alternatives for achieving the goal of coordination :

(i) The existing structure with some modifications to avoid duplication be retained with the Health Secretary being raised to the level of Principal Secretary and given the coordinating role.

(ii) The above suggestion, can also be implemented with the senior most secretary being given the coordinating role, like in the Ministry of Finance.

We may hasten to add that with the proposed reduction in executive responsibilities, the existence of the three separate departments may not be justified on the basis of workload alone.

Giving up executive functions :

The recommendations of both ASCI and CPR Reports in this regard need to be implemented. Regarding the autonomous bodies, both are unanimous that MHFW should not be chairing governing bodies of these institutions. The CPR, however, suggests that there be no representation of MHFW, while ASCI agrees to one or two representatives on the governing bodies. MHFW is answerable to Parliament for these orgainsations as they are discharging important functions on behalf of the Government. Hence the ASCI suggestion appears more acceptable as long as the spirit of the reform is respected. In respect of subordinate offices of DGHS, a very rigorous scrutiny would be needed to see whether their continuance is still justified. Some important institutions like Jawahar Lal Nehru Institute of Medical Education and Research, Pondicherry (JIPMER) and All India Institute of Hygiene and Public Health, Kolkata (AIHPH), need to be converted into fully autonomous institutions. Further, the institutions in Delhi, viz. Safdarjung Hospital, Lady Hardinge Medical College and nursing institutions should be transferred to Delhi Government along with their budgets. Likewise the Chittaranjan Cancer Institute, Kolkata and the Institute of Psychiatry, Ranchi should go to the respective State Governments.

Reorganisation of DGHS :

If the DGHS is to effectively play the role of the apex technical and professional organisation in public health, it would need to separate the medical services functions from public health. For this purpose, the present DGHS be divided into a Directorate General of Public Health and a Directorate General of Medical Services. The public health cadre would be substantially expanded by induction at senior levels from State Directorates of Health. While the ideal would be to create an All India Service as suggested by the Bajaj Committee, in the present political climate, creation of a new All India Service may not be acceptable to State Governments. Hence arrangements for two way deputation may be worked out with 50% of all posts of DDG and above earmarked for state officials. Directorate General of Medical Services would then become the apex institution for curative care and medical education. It would lay down standards, quality assurance norms, prescribe medical audits, suggest rational drug use, develop accreditation mechanisms and deal with professional bodies like the medical council, besides looking after residual clinical care responsibilities.

The procurement of medical stores should be entrusted to an autonomous corporate body as suggested by CPR following the successful model of Tamil Nadu. This would further reduce the administrative burden on the DGHS.

In order to make it a highly professional organisation, career progressions in DGHS would need to be dependent on professional attainments rather than on seniority and merit (as judged from Confidential Rolls). The entire culture and ethos of the organisation would need to be transformed with emphasis on specialisation, training and professional advancement. GDMO's would have very limited role in this organisation.

Central Government Health Scheme :

As suggested by both CPR and ASCI, CGHS should be converted into an autonomous organisation separate from DGHS. The organisation would also include Dr. R.M.L. Hospital which would serve as the institution for specialist care for CGHS patients. Eventually, as suggested by CPR, the entire scheme could be replaced by appropriate insurance cover.

Food and Drug Control Organisations :

The drug control functions need to be separated from DGHS with the creation of an independent National Drug Authority as envisaged in the Drug Policy of 1994. Better still, a combined national Food and Drug Authority can be established on the lines of the FDA in USA. This is an area which is relatively weak and deserves to be substantially strengthened. The codification and enforcement of food standards has become particularly, important with the lifting of quantitative restrictions on imports.

Inter Sectoral Coordination :

The Bajaj Committee has rightly emphasized the need for coordination with sectors having a major influence on health outcomes. A Ministry for Human Welfare may become unwieldy and may not be feasible. But as an immediate step two committees, one at the Cabinet Secretary's level and another at Cabinet level need to be set up to periodically review coordination and strive for convergence at grass root level. These two Committees may be :

(i) Cabinet Committee on Health, and
(ii) Committee of Secretaries chaired by Cabinet Secretary comprising all departments concerned with activities influencing health outcomes, like education, sanitation drinking water, environment, nutrition, etc.

The latter may meet at least once a month and the former once a quarter.

Strengthening Planning and Analytical Capabilities :

The existing Bureau of Planning in DGHS would need to be replaced by a strong, professional multidisciplinary team of epidemiologists, public health specialists, experts in health economics and finance and statisticians located in the MHFW itself with close linkages with research institutions. A Policy Advisory Committee, as suggested by ASCI would be a step in the right direction. There should be an earmarked budget for health policy and systems research (WHO Country budget could also be utilised for this purpose) and a mechanism for regular interaction between policy makers and researchers for setting the research agenda and utilisation of research inputs.

Health Education Commission :

The recommendation of CPR for the setting up of an autonomous Health Education Commission on the lines of the University Grants Commission would yield many benefits. It would enable undivided attention to medical education and the take over of the functions being exercised by the Government after the 1992 amendments in the statutes. Also it would act as the focal point for manpower planning which has been rightly emphasized by the Bajaj Committee.

Health Impact Assessment Cull :

The recommendation of the Bajaj Committee needs to be implemented to set up a specialised unit, for in the DGHS for health impact assessment of various development programmes which could be causing new health hazards. In fact a health impact audit of all major development schemes needs to be made mandatory.

Upgradation of National Institute of Communicable Diseases (NICD) :

The suggestion of the Bajaj Committee to upgrade the NICD into an institute of excellence on the lines of the CDC Atlanta (USA) deserves support. The existing infrastructure is totally inadequate as we have seen in case of the epidemics. Also with the epidemiological transition, the Non-Communicable Diseases and their risk factors would require increasing attention. The upgraded NICD could take over from the DGHS, the important task of epidemiological surveillance. This would again be converted into an autonomous institution in accordance with the policy enumerated earlier.

Indian Council of Medical Research :

The restructuring of ICMR is a subject that deserves a separate paper and cannot be dealt with adequately here. Suffice here to say that statutory changes would need to be made to replace the Minister and Secretary as Chair and Vice Chair of the governing body. Also, it may be desirable to change its nomenclature to Indian Council of Health Research in recognition of the role of health policy and systems research, which must be an integral part of ICMR's mandate. It should play an active role in promoting research in health policy sciences extra-murally and also develop adequate in house capacity in these disciplines. Another reform, deserving immediate attention is, developing institutional mechanisms for close interaction between disease control programmes and research, and more active participation of programme managers in setting the research agenda.

Health Education :

Health education and creaing awareness about risk factors would need to be an integral part of the new strategy. The Central Bureau of Health Education in DGHS, as it is presently structured, would be quite unequal to the task. As suggested by ASCI, the actual publicity would need to be externalised to professional agencies. But internally, we would need capacity for identifying the main messages, the best ways of disseminating them and the ability to select the right professional agency for each task. An integrated media division in the Ministry working in close collaboration with programme divisions and DGHS would be the best way to address this important requirement.

Monitoring and Evaluation :

One of the main responsibilities of MHFW would be monitoring of health parameters and evaluating the impact of various State interventions. It should develop strong institutional capabilities, with increasing use of information technology, to keep a close watch on all developments related to health in different parts of the country. It should develop capacities to respond quickly to feedback from the states with policy and programmatic changes.

Regulatory Framework for Health Insurance :

With the opening up of the insurance sector, there are likely to be many players in the field of private health insurance, which would require the establishment of a strong and independent regulatory mechanism to avoid the well known market failures of the health insurance system. In addition,

there would need to be major expansion of employer-based, and social health insurance to provide much needed risk pooling and financial risk protection. All this would require a vigilant and strong regulatory framework to be established by MHFW.

Regulation of Private Sector :

The regulation of private sector would primarily be the responsibility of the states. However, MHFW would need to play a major role in developing appropriate legislation, establishing and laying down standards and quality assurance norms, evolving mechanisms for public private partnerships and accreditation and playing the role of the apex body for interface and dialogue between the public and private sector. In the changing scenario, a separate division dealing with health insurance and private sector would be required in the Ministry.

Conclusion :

The above suggestions should not be considered prescriptive. The proposals have been made in all humility, based on the reports of expert studies and committees, fully recognising that there may be other ways of achieving the same objectives. The paper also brings out the deficiencies of the existing system rather candidly, for any attempt to sweep them under the carpet, would have defeated its very objective. However, this must not be misunderstood as criticism of the performance of the Ministry. The fact that the Ministry is able to discharge its constitutional and stewardship role, albeit inadequately, despite grave systemic deficiencies, is a tribute to the quality and commitment of the officers and other staff of the Ministry. They are, indeed prisoners of the system, which does not allow them to rise to their true potential.

The author is fully conscious of the obstacles likely to be encountered in pursuing these reform proposals. However, these stem from the deep conviction that to carry forward and lead the reform process for the health system of the country, the MHFW must first address its own inadequacies and equip itself for the challenges ahead. The suggestions made herein are, thus, in the spirit of 'physician heal thyself'.

References

1. Reorganisation : Ministry of Health and Family Welfare, L. H. David, G.R.S. Rao, A. Upadhyay, U. Pandey, 1986, Administrative Staff College of India, Bella Vista, Hyderabad - 500049

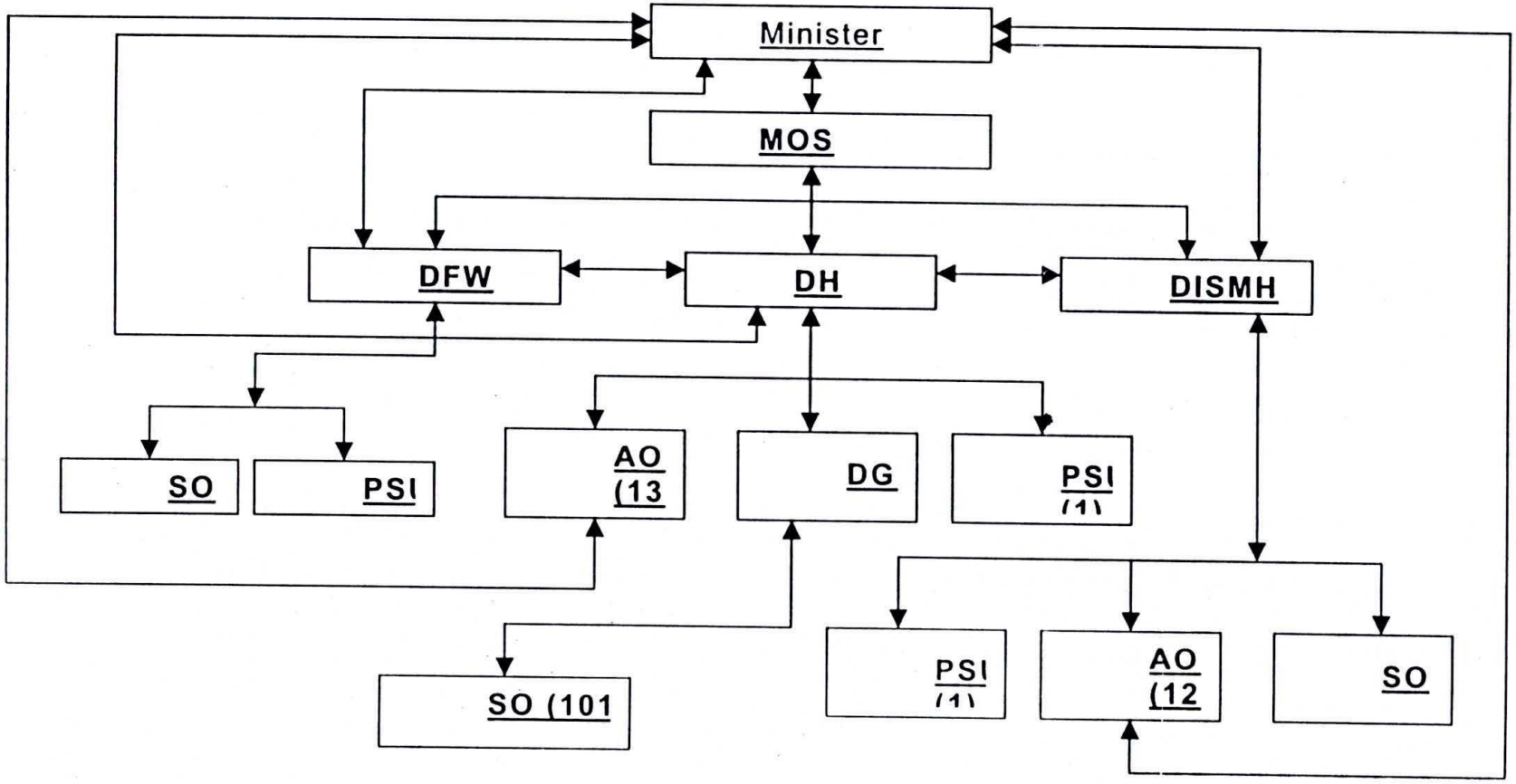
2. Report of the Expert Committee on Public Health System, chaired by Prof. J.S. Bajaj, 1996, Government of India, Ministry of Health and Family Welfare.

3. Report on the Restructuring The Ministry of Health and Family Welfare, 1999, Centre for Policy Research, Dharma Marg, Chanakyapuri, New Delhi – 110021.

4. Annual Report 1999-2000, Ministry of Health and Family Welfare, Government of India.

5. Annual Report 2000-2001, Ministry of Health and Family Welfare, Government of India.

Figure 1.1
Organogram Showing Structure of the Ministry of Health and Family Welfare



MOS	:	Minister of State
DH	:	Department of Health
DFW	:	Department of Family Welfare
DISMH	:	Department of Indian Systems of Medicine and Homeopathy
DGHS	:	Directorate General of Health Services
AO	:	Autonomous Institutions
PSU	:	Public Sector Undertaking

Annex 1.1
Ministry of Health and Family Welfare
(Swasthya Aur Parivar Kalyan Mantralaya)

A. Department of Health (Swasthya Vibhag)

I Union Business

1. Union agencies and institutes for research or for the promotion of special studies in medicine and nutrition including all matters relating to the :
   (i) Central Research Institute.
   (ii) All India Institute of Hygiene and Public Health.
   (iii) National Institute of Communicable Diseases.
   (iv) Central Drugs Laboratory.
   (v) Rajkumari Amrit Kaur College of Nursing.
   (vi) Lady Reading Health School.
   (vii) Central Institute of Psychiatry.
   (viii) Dr. Ram Manohar Lohia Hospital & Nursing Home.
   (ix) Safdarjang Hospital.
   (x) Medical Stores Organisation.
   (xi) B.C.G. Vaccine Laboratory.
   (xii) Jawaharlal Institute of Post-Graduate Medical Education and Research.
   (xiii) Smt. Suchete Kripalani Medical College and Hospital and Kalawati Saran Children's Hospital in India and abroad in medical and related fields.

2. International aid for Health Programmes.

3. National Programme for Control of Blindness.

4. National Leprosy Eradication Programme.

5. National Tuberculosis Control Programme.

6. National Malaria Eradication Programme.

7. All National Programme relating to control and eradication of communicable diseases.

8. Bilateral Cultural Exchange Programmes-Implementation of health related components.

9. Fellowships for training in India and abroad in various medical and health subjects.

10. Matters relating to epidemics:- Problems connected with supply of medicines, effects of malnutrition and shortage of drinking water leading to various diseases as a result of natural calamities.

II List of Business for Legislative and Executive Purposes in Respect of Union Territories.

11. Public Health hospitals and dispensaries.

12. Scientific societies and associations pertaining to subjects dealt with in the Department.

13. Charitable and religious endowments pertaining to subjects dealt with in the Department.

III **List of Business with which the Central Government Deal in a Legislative Capacity only for the Union and in both Legislative and Executive Capacities for all Union Territories.**

14. The Medical profession and medical education.

15. The nursing profession and nursing education.

16. Pharmacists and pharmacy education.

17. The dental profession and dental education.

18. Mental Health.

19. Drugs Standards.

20. Advertisements relating to drugs and medicines.

21. Prevention of the extension from one State to another of infectious or contagious diseases affecting human beings.

22. Prevention of adulteration of foodstuffs and drugs.

IV **Miscellaneous Business**

23. The Medical Council of India.

24. The Central Councils of Health and Family Welfare.

25. Dental Council of India.

26. Indian Nursing Council.

27. Pharmacy Council of India.

28. Indian Pharmacopoeia Committee.

29. Concession of medical attendance and treatment for Central Government servants other than (i) those in Railway Service (ii) those paid from Defence Service Estimates (iii) officers governed by the All India Services (Medical Attendance) Rules, 1954 and (iv) officers governed by the Medical Attendance Rules, 1956.

30. Medical Examination and Medical Boards for Central Civil Services [other than those controlled by the Department of Railways (Rail Vibhag) and those paid from Defence Services Estimates excepting Civilian Services].

31. Grants to Vallabhbhai Patel Chest Institute (under Delhi University)

32. Grants to Indian Red Cross Society.

33. Spas and Health resorts.

34. The Indian Council of Medical Research.

35. National Board of Examination.

36. Chittaranjan National Cancer Research Centre.

37. All India Institute of Medical Sciences.

38. Medical & Bio-medical Research.

39. All India Institute of Speech and Hearing.

40. Pasteur Institute of India.

41. Physiotherapy Training Centre, Kinf Edward Memorial Hospital.

42. National Institute of Mental Health and Neuro Sciences.

43. Inquiries and statistics for the purpose of any of the matters in the above list.

44. Fees in respect of any of the matters in the above list, but not in any court.

45. Hospital Services Consultancy Corporation Limited.

B. Department of Family Welfare (Parivar Kalyan Vibhag)

1. Policy and organisation for Family Welfare.

2. Maternal and Child Welfare.

3. Organisation and direction of education, training and research in all aspects of family welfare including higher training abroad.

4. Production and supply of aids to Family Planning.

5. Liasion with foreign countries and international bodies as regards matters relating to family welfare.

6. Inquiries and statistics relating to family welfare.

7. International Institute of Population Sciences, Bombay.

8. Development and production of audiovisual aids, extensional education and information in relation to population and family welfare.

9. Grants-in-aid for the family welfare programme to voluntary organisations and local bodies.

10. Hindustan Latex Limited.

11. National Institute of Health and Family Welfare, New Delhi.

12. Family Welfare Schemes and projects with external assistance.

C. Department of Indian Systems of Medicine and Homoeopathy (Bhartiya Chikitsa Paddhati Aur Homoeopathy Vibhag)

I Union Business

1. Formulation of policy and policy issues for development and propagation of Ayurveda, Siddha, Unani, Homeopathy, Yoga and Naturopathy systems.

2. Development and implementation of programmes including Central schemes and Centrally sponsored schemes for development and propagation of Ayurveda, Sidda, Unani, Homeopathy, Yoga and Naturopathy systems.

3. Co-ordination and promotion of research and development including assistance therefor in Ayurveda, Sidda, Unani, Homeopathy, Yoga and Naturopathy systems.

4. Setting up and maintenance of Central institutions for research and development, education and standards relating to Ayurveda, Sidda, Unani, Homeopathy, Yoga and Naturopathy systems.

5. All issues and matters requiring action at the level of Government in regard to :
   (i) Pharmacopoeia Laboratory for Indian Medicine, Ghaziabad;
   (ii) Homeopathy Pharmacopoeia Laboratory, Ghaziabad;
   (iii) Central Council of Indian Medicines;
   (iv) Central Council of Homeopathy;
   (v) Ayurvedic Pharmacopoeia Committee;
   (vi) Homeopathic Pharmacopoeia Committee;
   (vii) Unani Pharmacopoeia Committee;
   (viii) Siddha Pharmacopoeia Committee;
   (ix) Ayurvedic, Siddha and Unani Drugs Technical Advisory Board;
   (x) Central Council for Research in Ayurveda and Siddha;
   (xi) Central Council for Research in Homeopathy;
   (xii) Central Council for Research in Unani Medicine;
   (xiii) Central Council for Research in Yoga and Naturopathy;
   (xiv) National Institute of Ayurveda;
   (xv) National Institute of Homeopathy;
   (xvi) National Institute of Naturopathy;
   (xvii) National Institute of Yoga;
   (xviii) National Institute of Unani Medicine;
   (xix) National Institute of Siddha;
   (xx) Institute of Post-Graduate Teaching and Research, Gujarat Ayurveda University;
   (xxi) Indian Medicines and Pharmaceuticals Corpn. Ltd.;
   (xxii) Rashtriya Ayurveda Vidyapeeth.

6. Education, Training and Research in all aspects of Indian Systems of Medicine including higher training abroad.

7. Matters of cadre formation and control including formation and amendment of recruitment rules, recruitment, promotion and all other service matters relating to ISM&H doctors of Central Govt. Health Scheme including doctors in ISM&H central hospitals requiring action at Government level. Day-to-day administration and management will continue to be with the Director, Central Government Health Scheme.

8. Liasion with foreign countries and international bodies as regards matters relating to Indian Systems of Medicine and Homeopathy.

9. Matters relating to scientific societies/associations and charitable and religious endowments relating to Indian Systems of Medicine & Homeopathy.

10. Matters relating to quality and standards for drugs in Indian Systems of Medicine & Homeopathy to the extent such matters require action at the level of Government.

11. Consultation and coordination with State Governments, Non-Government Organisations and institutions for review of work and programmes in Indian Systems of Medicine & Homeopathy.

12. Statistics relating to various aspects of Indian Systems of Medicine & Homeopathy.

13. Proposals and matters concerning Union Territoties requiring sanction and concurrence of Government of India in regard to Indian Systems of Medicine & Homeopathy.

14. Legislative proposals pertaining to Indian Systems of Medicine & Homeopathy of individual States requiring sanction and concurrence of Government of India.

Source : Report on the Restructuring of the Ministry of Health and Family Welfare, Centre for Policy Research (July 1999).

Annex 1.2
Subordinate Offices of the Ministry of Health and Family Welfare

1. Director
   FWTRC, 332, S.V.P. Road
   Mumbai – 400004

2. Director
   Homeopathic Pharmacopoeia Laboratory
   Central Government Offices Complex No.1
   Kamla Nehru Nagar
   Ghaziabad – 201 002

3. Director
   Pharmacopoeia Laboratory for Indian Medicine
   Central Government Offices Complex No.1
   Kamla Nehru Nagar
   Ghaziabad – 201 002

Source : Report on the Restructuring of the Ministry of Health and Family Welfare, Centre for Policy Research (July 1999).

Annex 1.3
List of Subordinate Offices under the Directorate General of Health Services

1. Port Health Officer
   Port Health Organisation
   Patten Swasthya Bhawan
   7, Mandlik Road, Flat No.1
   1st Floor, Behind Taj Mahal Hotel
   Coloba, Mumbai - 400 001.

2. Port Health Officer
   Port Health Organisation
   Marina House, Hastings
   Calcutta – 700022

3. Port Health Officer
   Port Health Organisation
   Wirlingdon Island
   Cochin (Kerala) – 603 003

4. Port Health Officer
   Port Health Organisation,Rajaji Road
   Madras – 600 001

5. Port Health Officer
   Port Health Organisation
   P O Kandla Port
   (Kutch), Kandla – 370210

6. Port Health Officer
   Port Health Organisation
   Marmagao,Goa – 403803

7. Port Health Officer
   Port Health Organisation
   Visakhapatnam – 530001

8. Port Health Officer
   Port Health Organisation
   Mandapam Camp – 623519

9. Airport Health Officer
   Airport Health Organisation
   Airport, Chennai – 600027

10. Airport Health Officer
    Airport Health Organisation
    Sahar, Mumbai – 400099

11. Airport Health Officer
    Airport Health Organisation
    Dum-Dum Air Port
    Calcutta – 700052

12. Airport Health Officer
    Airport Health Organisation
    Delhi Airport
    Palam, New Delhi – 110010

13. Health Officer
Airport & Border Quarantine
7-A, Court Road
Amritsar – 143001

14. Airport Health Officer
Airport Health Organisation
Tiruchirapalli Airport
Tiruchirapalli – 620007

15. Port Health Officer
P.O.G. Building
Jawahar Lal Nehru Port
Sheva, Talvaram, Dist Raigad
Mumbai.

16. Quality Control Manager
Government Medical Store
Depot, Mumbai Central
Mumbai.

17. ADG (MS)
Government Medical Store Depot
9 Clade rew Nastings
Calcutta – 700022

18. ADG (MS)
Government Medical Store Depot
Post Box No. 8
Karnal

19. ADG (MS)
Government Medical Store Depot
37, Naval Hospital Road
Madras

20. ADG (MS)
A K Azad Road
Gopi Nagar
Guahati

21. ADG (MS)
Government Medical Store Depot
Behind Qutab Hotel
New Delhi – 110016

22. ADG (MS)
Government Medical Store Depot
S R Nagar, ESI Hospital Compound
Hyderabad - 500038

23. Dy. Drug Controller (I)
GDSCO West Zone
CGHS Dispensary Building
Ist Floor, Antop Hill
Mumbai – 400037

24. Dy. Drugs Controller (I)
East Zone, CDSCI, CGI Building
Nizam Place, II Floor (West)
234/4, A.J.C. Bose road
Calcutta – 700020

25. Asstt. Drugs Controller
New Custom House
Annexe Ballard Estate
Ford, Mumbai – 400038

26. Asstt. Drugs Controller (I)
15/I, Strend Road
Custom House
Calcutta – 700001

27. Asstt. Drugs Controller (I)
Room No. 2, 4th floor
Custom House
Chennai

28. Dy. Drugs Controller (I)
GDSCO North Zone Segment Wing
'A' Ist Floor, Central Govt. Office Building
Kamala Nehru Nagar
(Central Govt. Enclave)
Ghaziabad

29. Dy. Drug Controller (I)
CDSCO South Zone
Shastri Bhawan, Hadows Road
Annexe, II Floor
Chennai

30. Technical Officer
CDSCO, Custom House
Cochin- 682009

31. Director
Central Drugs Lab
3KYD Street
Calcutta – 700016

32. Director
Central Indian Pham Lab
Raj Nagar
Ghaziabad

33. Asstt. Drugs Controller (I)
Jawaharlal Nehru Port Trust
Nahva-Sava Port, Raigad
Maharashtra

34. Asst. Drugs Controller (I)
Indira Gandhi International Airport
Air Cargo Terminal
New Delhi

35. Director
Central Drugs Testing Lab
ESI Hospital Bldg.
33, Wagle Industrial Estate
IVth Floor Thane
Mumbai

36. Asstt. Drugs Controller (I)
CDSCO Sub-Zonal Officer (UP Region)
DGHS Kalimangare House
364, Chandralok Ist Floor
2- Janpath Road
Lucknow – 220020

37. Asst. Drugs Controller (I)
Sub-Zonal Officer of CDSCO
C/O Regional Director (H&FW)
Danara House, Salimpur Ahora
Behind ADI
Patna

38. Director, JIPMER
Dhavantri Nagar
Pondicherry-605006

39. Principal and Medical Supt.
LHMC & S K Hospital
New Delhi – 110001

40. Addl. Medical Supt.
Kalawati Saran Children Hospital
New Delhi – 110001

41. Superintendent
Lady Reading Health School
Bara Hindu Rao
Delhi-110006

42. Principal
Rajkumari Amrit Kaur College
Of Nursing, Lajpat Nagar
New Delhi – 110024

43. Medical Supt.
Safdarjng Hospital
New Delhi

44. Medical Supt.
Dr. RML Hospital
New Delhi

45. Director
AIIPMR, Haji Ali Park
Mahalakshim
Mumbai – 400034

46. Serologist & Chemical Exam.
Institute of Serology, 3KYD Street
Calcutta – 700010

47. Director & Medical Supt.
Central Institute of Psychiatry
P O Kanke
Ranchi – 834006

48. Microbiologist
Central Food Lab.
3KYD Street
Calcutta

49. Officer In Charge
Food Research and Standard Lab
Navyug Market
Ghaziabad

50. Director
Central Research Institute
Kasauli-173204

51. Director
BCG Vaccine Lab
Guindy
Chennai-600032

52. Director NICD
22, Sham Nath Marg
Delhi – 54

53. Director
NMEP, 22 Sham Nath Marg
Delhi – 54

54. Director
IIH&PH, 110 Chittaranjan Avenue
Calcutta

55. Officer In Charge
RHTG, Najafgarh
New Delhi – 43

56. Director
CLTRI, Chengalpattu
Tamil Nadu

57. Director
RLTRI (Aska Babanpur)
Dist Ganjam-761110
Orissa

58. Director
RLTRI,Lalpur
Raipur-492001

59. Dy. Director
RLTRI, Gouripur
Dist. Bankura
West Bengal-722132

60. Director
NTI, 8 Bellary Road
Bangalore-3

61. Officer In Charge
Model Vital Health Stat
Unit Civil Corporation
Civil Lines
Nagpur-I

62. Medical Incharge
Regional Health Stat.
Training Centre, Trg. Annexe
Primary Health Centre
SAS Nagar
Mehali

63. Medical Record Officer
Medical Record Depot and
Training Centre
Safdarjung Hostpital
New Delhi

64. Addl. Director
CGHS, Room No. 526
'D" Wing, Nirman Bhawan
New Delhi-110011

65. Addl. Director
CGHS, United India Building
Sir Firoz Sham Mehta Road
Fort, Mumbai

66. Dy. Director
CGHS, 102, Sati Ganj
Begum Bridge, Opp. Cantt.
General Hospital
Meerut

67. Addl. Director
CGHS 117/617
Pandu Nagar
Kanpur – 208005

68. Addl. Director
CGHS Q.No. 1
Type III, Double Storey
CPWD, Central Government Colony
Civil Lines
Nagpur – 440001

69. Dy. Director
CGHS, 7, Laddle Road
Allahabad – 211007

70. Addl. Director
CGHS, IV Floor
8, Esplanade East
Calcutta – 700069

71. Addl. Director
CGHS, E-II C
Rajaji Bhawan, CGO Complex
Besant Nagar
Chennai-600098

72. Dy. Director
CGHS, Indu Bhawan
Gandhi Nagar
Boring Road
Patna-800001

73. Dy. Director
CGHS, Kendra Sadan
(Near Airport) Begumpet
Hyderabad – 500016

74. Dy. Director
CGHS, Z-Wing IIIrd Floor
Kendria Sadan Keramngala
Bangalore

75. Addl. Director
CGHS
Hotel Radha Krishna
Old Post Office Road
Near Railway Station
Jaipur

76. Dy. Director
CGHS, Swasthya Sadan
Mukund Nagar
IInd Floor
Pune – 410007

77. Dt. Director
CGHS Shalimar Co-op. Housing Society
Ashram Road, Embassy Market
Ahmedabad

78. Dy. Director
CGHS, 328, Near Russel Chowk
(Behind Jabal Garden Hotel)
Jabalpur

79. Dy. Director
CGHS, 9-A, Rana Pratap Marg
Lucknow

80. Dy. Director
CGHS, Office of the Accountant General
P O Hannu
Ranchi

81. Dy. Director
CGHS, A.G. Colony, Unit-4
Bhubaneswar

82. Addl. Director
CGHS Anand Kutir Path
Zoo Narangitenale
R G Barwa Road
Guwahati

83. Senior Regional Director
Regional Office for H&FW
49, 12-B, Hindustan Park
Calcutta

84. Regional Director
Regional Office for H&FW
Banara House, Salimpur
Ahra (Behind RBI)
Patna – 500003

85. Regional Director
Reg. Office for H&FW
C-2, B-80, Mahanagar
Lucknow 226006

86. Regional Director
Kendria Sadan
4th Floor, Block-C
Sector-9, Chandigarh

87. Regional Director
Reg. Office for H&FW
Kendriya Sadan
Sultan Bazar
Hyderabad – 500195

88. Regional Director
Reg. Office for H&FW
Anand Estate
Industrial Estate Corner
Babunagar
Ahmedabad

89. Regional Director
Reg. Office for H&FW
A-2A, Rajaji Bhawan
CGO Complex, Besant Nagar
Chennai – 600090

90. Regional Director
Reg.Office for H&FW
Din Dayal Upadyay Hospital Compound
Shimla 171001

91. Regional Director
Regional Office for H&FW
Din Dayal Upadyay Hospital
Neelam Chowk
Srinagar – 190069

Sub-Office
F-711, Prem Nagar
New Plot
Jammu Tawi

92. Regional Director
Reg. Office for H&FW
BJ-25, BJR Nagar
Bhubaneswar – 751014

93. Regional Director
Reg. Office for H&FW
84/2, Parvati Darpan Bldg.
1st Floor, Sahakar Nagar-II
Pune – 411086

94. Regional Director
Reg. Office for H&FW
Statue Road, Chirapuram Lane
Trivandrum-695001

95. Regional Director
Reg. Office for H&FW,Sangrilla
Uripek Road,Imphal

96. Regional Director
Reg. Office for H& FW
131/16, Maharan Pratap Nagar
Bhopal

97. Regional Director
Reg. Office H&FW, IInd Floor
"F" Wingh, Kendriya Sadan
Karmangala,Bangalore – 560034

98. Sr. Regional Director
Reg. Office for H&FW
K-10 Durga Das Path
Malviya Marg, 'C' Scheme
Jaipur – 302001

99. Regional Director
Reg. Office for H&FW
Dhankheti
Shillong-794003

100. Addl. Director
CGHS, S E Public School
Engg. Deptt. Ananda Kutir Path
Zoo Narangi Tindl. RG Barua Road
Guawahati 781003

101. Dy. Director
CGHS, CGO Complex
Vallyam, P.O. Poonkulam
Trivandurm – 695002

Source : Report on the Restructuring of the Ministry of Health and Family Welfare, Centre for Policy Research (July 1999).

Annex 1.4
List of Autonomous Bodies under the Ministry of Health and Family Welfare

1. The Director
All India Institute of Medical Sciences
Anasar Nagar (Ring Road)
New Delhi

2. The Director
All India Institute of Speech and Hearing
Manasagangothri
Mysore-6

3. The Secretary
Centre Council of Indian Medicine
Jawahar Lal Nehru Bharatiya Chikitsa-Avam
Homeopathy Anusandhan Bhavan
Institutional Area, Janakpuri
New Delhi

4. The Director
Ayurveda and Siddha
Jawahar Lal Nehru Bharatiya Chikitsa-Avam
Homeopathy Anusandhan Bhavan
Institutional Area, Janakpuri
New Delhi

5. The Director
Central Council for Research in Yoga & Naturopathy
Jawahar Lal Nehru Bharatiya Chikitsa-Avam
Homeopathy Anusandhan Bhavan
Institutional Area, Janakpuri
New Delhi

6. The Director
Central Council for Research in Unani Medicine
Jawahar Lal Nehru Bharatiya Chikitsa-Avam
Homeopathy Anusandhan Bhavan
Institutional Area, Janakpuri
New Delhi

7. The Director
Central Council for Research in Homeopathy
Jawahar Lal Nehru Bharatiya Chikitsa-Avam
Homeopathy Anusandhan Bhavan
Institutional Area, Janakpuri
New Delhi

8. The Secretary-cum-Registrar
Central Council for Research in Homeopathy
Jawahar Lal Nehru Bharatiya Chikitsa-Avam
Homeopathy Anusandhan Bhavan
Institutional Area, Janakpuri
New Delhi

9. The Director
Chittaranjan National Cancer Research Centre
37, S P Mookherjee Road
Calcutta- 700026

10. The Secretary
Dental Council of India
Temple Lane, Kotla Road
New Delhi-110002

11. The Director General
Indian Council of Medical Research
Ansari Nagar (Ring Road)
Post Box 4508
New Delhi

12. The Secretary
Indian Nursing Council
Temple Lane, Kotla Road
New Delhi

13. The Director
National Institute of Health & F.W.
New Mehrauli Road, Munirka
New Delhi-110067

14. The Secretary
Natoinal Board of Examinations
Mahatma Gandhi Marg
Ansari Marg
New Delhi-110029

15. The Secretary
Medical Council of India
Aiwan-E-Galib Marg
Kotla Road
New Delhi-110002

16. The Director
National Institute of Mental Health & Neuro-Sciences
(Deemed University), Post Box No. 2900
Bangalore-560029

17. The Director
North-Eastern Indira Gandhi Regional Institute
of Health & Medical Sciences
'New Lands' Boyce Road
(Near Shillong College)
Shillong-793003

18. The Director
National Institute of Ayurveda
Madhav Vilas Palace, Amer Road
Jaipur-302002

19. The Director
Pasteur Institute of India
Coonoor-643103, Nilgiris
Tamil Naru

20. The Secretary
Pharmacy Council of India
Temple Lane, Kotla Road
New Delhi-110002

21. The Director
Post-Graduate Institute of Medical Education and Research
Chandigarh

22. The Director
Rashtriya Ayurveda Vidyapeeth
Dhanwantri Bhavan, Road No. 66
Punjabi Bagh
New Delhi- 110026

23. The Director
National Institute of Unani Medicine
Dhanwantri Road
Bangalore- 560009

24. The Director
Morarji Desai Nztional Institute for Yoga
68, Ashok Road
New Delhi- 110001

25. The Director
National Institute of Homeopathy
Block-GE, Sector-III
Salt Lake
Calcutta

Source : Report on the Restructuring of the Ministry of Health and Family Welfare, Centre for Policy Research (July 1999).

Annex 1.5
List of Public Sector Undertakings under Ministry of Health & Family Welfare

1. The Chairman and Managing Director
   Hospital Services Consultancy Corporation (I) Ltd.
   E-6(A), Sector I
   NOIDA (UP) – 201301

2. The Chairman & Managing Director
   Hindusthan Latex Limited
   Latex Bhavan, Poojappura
   Triruvananthapuram – 695012

3. The Managing Director
   Indian Medicines Pharmaceutical Corporation Ltd.
   Mohan, Via Ramour, District Almora
   Uttar Pradesh

Source : Report on the Restructuring of the Ministry of Health and Family Welfare, Centre for Policy Research (July 1999).

APPENDIX 2

Economic Growth, Health and Poverty: An Exploratory Study on India

Indrani Gupta and Arup Mitra

Introduction

The nexus between poverty and health is an area that has attracted considerable attention of social scientists and economists. A series of research output based on the World Bank's Living Standard Measurement Surveys have indicated the close links between economic status on the one hand and a host of well-being indicators on the other, including education and health (LSMS Working Paper Series, World Bank). The links between economic growth and health however, have received relatively less attention, partly because of the difficulty in separating cause and effect, and partly because such analyses require longer term time series data that are not easily available. However, health economists study the links between health and poverty, and poverty and growth from the links between the microeconomic and macroeconomic views of health. Below, we present a theoretical framework of these links based on standard health economics (Zweifel and Breyer 1997).

At the individual level, there is a complex relationship between "health" (H), other non-health consumption (C), consumption goods (X) and amount spent on medical care (M). The relationship between H and C is like that of any two economic goods, with a certain marginal rate of substitution of one for the other; here the individual weighs health against all other aims. Secondly, total income Y (i.e. budget) can be spent on either X or M, but unlike in the case of other goods, Y itself depends on health, H. This is because the ability to earn income is a function of how healthy an individual is. Finally, H itself is a function of amount devoted to health care, M. The final outcome or the equilibrium C*, H* and M* would depend on the optimization results, but the important point to note is the interdependence of these variables in the optimization process.

The same variables, if aggregated, will lead to macroeconomic results. The problem is that one does not observe H and C, only X and M. Thus, it is difficult to estimate the equilibrium levels of health expenditure and consumption expenditure (values of aggregate M and X) spent out of GNP (aggregate Y) that would maximize an underlying social welfare function. However, there has been some discussion around the optimal level of health expenditure in a country; for developed countries the concern is cost containment, whereas for developing countries the issue is much more related to gains in health and well-being.

The three issues of importance in a developing country context are the following: (a) do increases in health expenditure necessarily result in

improvements in health indicators? (b) what effects will improvements in health indicators have on investment and therefore on growth? And (c) what are the links between poverty on the one hand and growth and health status on the other.

To take the last question first: where does poverty fit into all this? There is enough evidence now that indicates that poor standards of living go hand in hand with poor health indicators in general. As the 1993 World Development Report indicated, the magnitude of poverty is an especially important reason for differences in health status World Bank 1993). Thus for example, poorer regions or households would show higher infant mortality rates, lower life expectancy as well higher morbidity rates. To compensate for high infant and child mortality rates fertility rates go up, reducing investment per child in terms of education and health, which results in poor human capital formation and deepening of the vicious cycle of ill health and poverty.

Secondly, will improvements in health indicators make a significant difference to growth rates at the macro level? Finally, will improved health emanate from greater investment on health goods (higher health expenditures) and therefore less to other goods or will it in fact free up resources so that savings and investment will actually increase?

The paper examines each of these issues using state-level data for India, and attempts to bring out the key factors that explain the nexus between health, poverty and growth. Panel data for 15 major and smaller states are used for the period 1970-71 through 1995. The organisation of the paper is as follows. In Section 2 we present different arguments explaining the links among these variables. Section 3 presents results from cross-sectional and time series (state-wise) analysis of trends in growth, health indicators and poverty. In Section 4 we present econometric analysis explaining these observed trends and offer plausible explanations for these. Finally, Section 5 summaries the major findings and their policy implications.

Growth, Poverty And Health: A Framework

As the preceding discussion indicated, the links between these three variables are many and often circuitous. In explaining the links between the health sector and the rest of the economy, Over (1991) argues that poor health outcomes manifested in high fertility, mortality and morbidity rates result in poor quality and lower quantity of labour and a reduction in the number of hours worked, which affect national income adversely. Taking this argument further, such ill health of the population – if sustained over time – is bound to affect the rate of growth of national income. Poor growth on the other hand, squeezes the resources in the hands of the Government thus reducing government expenditure on

education, health, food and other developmental fronts. This further excarcebates the vicious circle of ill health and lower well-being.

It is generally understood that countries with better means and resources provide more and higher-quality health and health-related services. But as Stark (1995) points out, causality can run in exactly the opposite direction, i.e. longer life expectancy translates into higher per capita income. His contention is that longer life expectancy encourages larger investments in human capital, which in turn accelerates the per capita income. The explanation of larger investments on human capital due to longer life expectancy is offered by Stark (1995) in terms of inter-generational transfer of assets. Earlier, Becker, Murphy and Tamura (1990) had argued that higher fertility behaviour raises the rate of discount in the inter-temporal utility function thereby discouraging investment in human capital. Stark (1995) however, offers a slightly different argument, saying that holding fertility behaviour constant, changes in life expectancy account for changes in human capital investment. If life expectancy is high, children have to wait a longer period of time to receive familial assets, which they can use for productive purposes. This wait necessitates greater investment in human capital formation early in life, so that the earning potential is enhanced, since this is the only form of insurance against possible unemployment. Earnings are certain to be higher when assets are transferred to skilled labour rather than to bare labour. Hence, the growth performance of the economy is expected to improve with a rise in health status of the population.

While the effect of income among other variables like education and medical inputs have been observed to have positive impact on health indicators like mortality, the effects of improved health status on growth must necessarily be long term in nature. For example, cross-sectional evidence from 65 countries indicated that child mortaltiy falls faster in countries where per capita income is growing rapidly (World Bank 1993). However, the links from improved health status to growth must necessarily be long term and are unlikely to show up in cross-sectional data. This is because the positive impact of improved health status that may alter investment decisions at the household level would not be apparent immediately. These effects would take place only over a few generations, and would have to be sustained over a longer term for the effects to be felt on growth rates. For instance, better health outcomes in terms of longer life expectancy encourages entrepreneurs to make larger investment in the production sector. With shorter life expectancy they have a tendency to invest in financial market – which may not result in growth, but may in fact be inflationary - as the rate of return is much faster compared to the commodity producing sector. From an individual point of view too, better health outcomes translate themselves into greater risk bearing capacity, which in the job market means upward

occupational mobility of the worker over his/her life span. Also, technical efficiency of various industries– an important source of growth – has been found to be positively associated with social infrastructure endowment of the states (Mitra et al 1998). None of these effects however are short term – they are necessarily medium to long term, thus indicating that the effects of health on growth can be gleaned only from long term data.

Cross-Sectional And Time Series Results

Before turning to an econometric analysis of the relationship between poverty, health and growth, we attempt a look at any discernible trends that may exist in these variables across states and over time for each state.

The variables considered for this purpose are the percentage below poverty line, rate of growth of national state domestic product (NSDP) and a number of indicators of health status – infant mortality rate, life expectancy rate, and crude death rate. We also considered crude birth rate and percentage suffering from infectious diseases in the population. Finally, a key policy variable – per capita health expenditure – was also looked at. Various sources were used for the data, and a list of these sources is given in Appendix I.

Two sets of exercises have been attempted: cross-sectional at certain points of time, and time series in each of the states. The years considered are 1973-74, 1977-78, 1983-84, 1987-8, 1993-94 and 1999-2000. The reasons for selecting these years had to do with the availability of poverty estimates. Each of the health indicators are plotted against incidence of poverty, net state domestic product NSDP growth and per capita health expenditures.

What kind of associations do we see from the cross-sectional evidence? While there were considerable year to year fluctuations, the associations between poverty and various health indicators seem to be in the right direction. Table 1 based on the graphs given in the appendix, presents a summary of the nature of relationship between several indicators. Crude birth rate performed the worst and life expectancy (LE) did the best in terms of its association with poverty in the right direction. Both poverty and crude birth rate show a mild positive relationship only for the years 1983, 1987-88, and 1993-94. On the other hand, states with higher poverty levels reveal lower life expectancy for all the years. Morbidity rate defined as the percentage of total population suffering from infectious diseases, crude death rate (CDR) and infant mortality rate (IMR) all three show only mild positive associations with the incidence of poverty. From these cross-sectional patterns though it does not seem that poverty and all the health indicators considered here do not always move together as one would expect; however, one of the most important indicators of the

health of a population, - the IMR – does show the right association with poverty at the cross-sectional level.

Table 1
Variation across states among pairs of variables

Pairs of variables	1973-74	1977-78	1983	1987-88	1993-94
Poverty & morbity rate	Mild +	+	No	No	Mild +
Poverty & IMR	Mild +	Mild +	Mild +	Mild +	+
Poverty & crude birth rate	No	No	Mild +	Mild +	Mild +
Poverty & crude death rate	+	Mild +	Mild +	Mild +	+
Poverty & life expectancy	-	-	-	-	-
Poverty & per capita health expenditure	-	-	-	-	-
Poverty & manufacturing growth rate	Mild +	No			
Poverty & NSDP	Mild -	Mild -	Mild -	Mild -	Mild -
IMR & per capita health expenditure	Mild -	Mild -	Mild -	Mild -	Mild -
Morbidity rate & per capita health expenditure	No	Mild -	No	Mild -	No
Crude birth rate & per capita health expenditure	Mild -	Mild -	Mild -	Mild -	Mild -
Crude death rate & per capita health expenditure	Mild -	Mild -	No	Mild -	Mild -

What about poverty and growth rates? Plots based on cross-sectional data point to only a mildly negative association of poverty with the five yearly average rate of growth per annum for some of the years like 1977-78, 1983 and 1993-94. As for growth rates and health indicators, not surprisingly, mostly the various years show no associations, especially in the middle years (1983 and 1987-88). Surprisingly, National State Domestic Product (NSDP) growth and life expectancy do not show any relationship except for 1977-78 when it happens to be positive. Higher growth is associated with lower CBR, CDR, and IMR only in certain years as can be seen from Table 1.

The relation between per capita health expenditure and growth rate is mildly positive and that between expenditure and health indicators ambivalent, though for certain years IMR, morbidity, CBR, and CDR seem to decline across states with higher per capita health expenditure. The incidence of poverty also seems to fall with a rise in per capita health expenditure.

Overall, there are no strong patterns that would immediately draw attention as far as the cross section data are concerned, though the plots are suggestive of mild associations among growth, poverty and health indicators in the direction that one would expect on an apriori basis.

To look at whether each state showed some trends over time in these variables, we looked at the same variables plotted against time. These trends gleaned from the graphs are presented in a consolidated form in Table 2.

The overall picture that emerges based on the annual data is that while health indicators were improving almost in every state, growth rates revealed considerable fluctuations thus showing no distinct trend over time. Since yearly growth rates were unlikely to have any significant associations with these variables, we used five-yearly averages of growth rates as well for the other variables. The picture that emerged was somewhat clearer but not overwhelmingly so.

Table 2
Variations across time among pairs of variables, by state

Pairs of variables	No relation	Movement in the same direction	Movement in the opposite dierection
Poverty & IMR		Andhra Pradesh, Assam, Bihar, Gujarat, Haryana (except 93-94)Karnataka, Kerala , Madhya Pradesh, Maharashtra, , Orissa, Punjab, Tamil Nadu, Uttar Pradesh, West Bengal	
Poverty & crude birth rate		Andhra Pradesh (slight), Assam (slight), Bihar (slight), Gujarat, Haryana (except 93-94), Karnataka, Kerala, Maharashtra, Madhya Pradesh (slight), Orissa (slight), Punjab, Rajasthan, Tamil Nadu, Uttar Pradesh, West Bengal	
Poverty & crude death rate		Andhra Pradesh (slight), Assam (slight), Bihar (slight), Gujarat, Haryana (except 93-94), Karnataka (slight), Kerala , Madhya Pradesh (slight), Maharashtra, , Orissa (slight), Punjab, Rajasthan, Tamil Nadu, Uttar Pradesh, West Bengal (slight)	
Poverty & life expectancy			Andhra Pradesh, Assam (slight), Bihar (slight), Gujarat, Haryana (except 93-94), Karnataka,

			Kerala, Maharashtra, Madhya Pradesh, Orissa, Punjab, Rajasthan, Tamil Nadu, Uttar Pradesh, West Bengal
Poverty & per capita health expenditure			Andhra Pradesh, Assam, Bihar, Gujarat, Haryana (except 93-94), Karnataka, Kerala, Maharashtra, Madhya Pradesh, Orissa, Punjab, Rajasthan, Tamil Nadu, Uttar Pradesh, West Bengal
Growth & IMR		Bihar	Andhra Pradesh, Assam (slight), Gujarat, Haryana (except 93-94), Karnataka (except 90s), Kerala, Maharashtra, Madhya Pradesh, Orissa (except 90s), Punjab (except 90s), Rajasthan (except 90s), Tamil Nadu, Uttar Pradesh (except 90s), West Bengal
Growth & CBR		Bihar	Andhra Pradesh (slight, except 90s), Assam (slight), Gujarat, Haryana (except 93-94), Karnataka (except 90s), Kerala, Maharashtra, Madhya Pradesh, Orissa, Punjab, Rajasthan (except 90s), Tamil Nadu, Uttar Pradesh, West Bengal
Growth & CDR		Bihar	Andhra Pradesh (slight, except 90s), Assam (slight), Gujarat, Haryana (except 93-94), Karnataka, Kerala, Maharashtra, Madhya Pradesh, Orissa, Punjab, Rajasthan (except 90s), Tamil Nadu, Uttar Pradesh, West Bengal
Growth & LE	Bihar	Andhra Pradesh (except 90s), Assam, Gujarat, Haryana, Karnataka, Kerala Maharashtra, Madhya Pradesh, Orissa (except 90's), Punjab, Rajasthan, Tamil Nadu, Uttar Pradesh (except 90's),West Bengal	
Growth & Poverty	Assam, Bihar		Andhra Pradesh (slight, except 90s), Gujarat, Haryana, Karnataka,

			Kerala, Maharashtra, Madhya Pradesh, Orissa (except 90s), Punjab, Rajasthan, Tamil Nadu, Uttar Pradesh, West Bengal

The strongest association was that between poverty and IMR, both sloping downward in most of the states. Poverty and CBR also seem to have moved together, though in Assam, Bihar, Haryana, Madhya Pradesh and Orissa the association of movement in both the variables appears to be only marginal. Similarly with a few exceptions poverty and death rates also seem to have dropped over time in several states. Also, with declining poverty, life expectancy improved in most of the states. Morbidity does not appear to have followed any significant pattern in a large number of states; exceptions being Assam, Karnataka, Kerala, Maharashtra, Madhya Pradesh and Orissa. Against poverty, morbidity does not show any distinct pattern of movement even in these states but that is mainly because of the scale differences in both the indices. Morbidity figures as defined in our study are so low that they hardly show any change over time when plotted along with poverty. If we take morbidity and growth rates together, the associations are somewhat better suggesting a decline in morbidity with improvements in growth rates in some of the states mentioned above.

Another improvement over the cross-section picture was of growth and health indicators, especially IMR. With 5-year averages, more states showed an association in the right direction, i.e. IMR was lower when growth was higher. Other variables like CBR and CDR also by and large tend to fall with improvements in growth, though in several staes like Andhra Pradesh, Assam, Haryana, Orissa, Punjab, Rajasthan and Uttar Pradesh the negative association is only moderate. It is interesting to note that in Bihar IMR, CBR, and CDR all moved in the same direction with growth. This is mainly because the growth rate appears to taper off over time while the health outcomes in terms of the indicators mentioned above improved in this state. Growth and life expectancy also does not show any relationship in Bihar.

Growth and per capita health expenditure reveal a positive association except in Bihar, Rajasthan, Tamil Nadu and West Bengal. Growth and poverty seem to have moved together in the right direction – poverty falling in many states when the rate of growth of NSDP picked up – exceptions being Assam and Bihar.

On the whole, both cross-section and time series data are indicative of certain definite relationships among growth, poverty and health indicators, though the degree of association may vary largely from state to state or from year to year. Our objective is to delineate these relationships in

terms of a more rigorous framework, which we attempt in the next section with econometric modelling.

Health, Poverty And Growth: Econometric Analysis

Before turning to the econometric analysis of the nexus between health, poverty and growth, a closer look at the health variables may be useful. As the discussion above indicates, there are a few commonly used variables that are used to indicate the health status of the population. These are the life expectancy rate, the infant mortality rate, the crude death and birth rates, and morbidity rate. The morbidity rate – being the best variable to describe the health of a population – is also the most difficult variable in terms of comparable data over the years. The previous section used this variable to analyse some broad trends. However, it is often argued (Gumber ?) that this is widely under-estimated and not comparable either across time or across states Also, to get the correct definition of morbidity rate, one would have to get the denominator correct, which is the total population susceptible to a particular disease or to all those conditions defined as morbid. Unfortunately, this could not be done for India, and a surrogate morbidity rate – which was those who suffered from communicable diseases in the total population – is used. Since this is an imperfect variable, we are not going to use it in the analysis. Of the other four indicators of health status, the birth and death rates are more reflective of the demographic changes taking place in the economy, and have more to do with population policy. The life expectancy rate and the infant mortality rates are better indicators of the health status of the population and are influenced by changes in health policy, broadly defined to include investment in health and health services. A look at the associations among these four health indicators is useful to confirm that these indicators however do move together over time. Table 3 presents simple correlations among the four variables in the data set. The numbers in the parentheses indicate the correlations for rural and urban separately.

Table 3
Correlations among health indicators, poverty

Indicators	Life expectancy	Infant mortality rate	Crude death rate
Life expectancy	--		
Infant mortality rate	-.91	--	
Crude death rate	-.93	0.88 (.93 – R, .25 – U)	--
Crude birth rate	-.72	0.79 (.81- R, .26 – U)	0.77 (.71- R, .73 – U)
Poverty	-.64	0.30 (.40 – R, -.08 – U)	0.57 (.44 – R, .67 – U)

As expected, life expectancy is negatively correlated with all the other indicators, but the closest association is with the crude death rate, which is expected. The next close correlation is between the IMR and the life expectancy. Again as expected, the weakest associations of IMR and life expectancy are with the crude birth rate. Interestingly, the IMR and crude death rates are very weakly correlated for urban areas, but highly correlated in the rural areas, indicating that there are more factors at work in the urban areas that impinge on morbidity rates, separate from death rates. Due to the non-availability of continuous data on life expectancy for rural and urabn areas separately, this could not be tested for this variable in conjunction with the other three indicators. However, these trends indicate firstly that life expectancy, IMR and crude death rates are the three variables that could be used for the analysis. Secondly, if possible, there may be some justification for doing the analysis separately for the rural and urban areas. The latter argument can be further tested by looking at the association between poverty and health indicators for rural and urban areas separately. Unfortunately, the life expectancy rates are not available separately for rural and urban areas, so this could be tested only for the IMR and the crude death rates.

The last row of Table 3 indicates the correlation of poverty with the other health indicators. Interestingly, poverty does not seem to be closely correlated with any of the health indicators; the least correlation seems to be between poverty and IMR in urban India.

This above analysis indicates that there is a need to look at these relationships in a multivariate framework, controlling for other variables. Also, as mentioned above, it is probably more meaningful to do the analysis separately for rural and urban areas; however, due to paucity of data, we keep our analysis restricted to total aggregates, i.e. for rural and urban areas combined.

Turning next to the model, it has to be stated at the outset that several alternative models were estimated, but results from only a few that seem the most sensible are presented here.

While the brief theoretical framework in Section I was useful as a reference point for a general equilibrium model linking health, poverty and economic growth, it still does not offer very good directions of testing the various causalities out empirically. We do the analysis based on three alternative frameworks. The first framework believes that growth, poverty and health all interact with each other and other variables, and should be therefore estimated in a simultaneous framework. The other alternative is to test a model where growth is essentially being determined by a set of exogenous variables, excluding health status and poverty, which is the common approach taken by macro economists. Poverty however, is a function of growth among other variables, and finally health status is a

function of poverty and other variables. In the third variant of the model growth and health are taken to influence each other and poverty is taken to be a function of growth and health.

All these models are estimated using the pooled data. It is also assumed that the variations in these three variables are affected by state-specific unobservable fixed effects, an assumption which is meaningful, because there are other cultural, political and social factors that are at work that cannot be measured easily, and make states differ from one another. The standard issue of whether the model should be estimated using a fixed or a random effect estimator is resolved to some extent by doing the Hausman test.

Variant I

In the first variant of the model the five yearly average growth of net state domestic product (GROW) is taken to be a function of value added in the base year (taken in the form of log of state domestic product, INSDP), incidence of poverty (POV), health status measured in terms of infant mortality rate (IMR), level of urbanisation (URBN), literacy rate (LIT), industrialisation (IND) measured in terms of the share of manufacturing in total net state domestic product, and infrastructure (INF) taken in terms of the share of transport, storage and communication in total net state domestic product. POV on the other hand is taken to be a function of IMR, GROW, population density (DENS), URB, government expenditure on anti-poverty programmes (EXPPOV), percentage of scheduled caste and tribe population in the state (SCST), LIT, IND, total (primary plus subsidiary status) employment of males in the rural and urban areas as a percentage of total male population (EMPR and EMPU respectively). In the equation for health (IMR), the explanatory variables are POV, GROW, DENS, LIT, SCST, per capita health expenditure (PCHE). All the three equations are identified both on the basis of exclusion principle and rank condition. They are estimated by replacing the endogenous variables from the right hand side by their predicted values generated from the reduced form versions (see Table 4). Table 5 reports the point elasticity of the endogenous variables with respect to exogenous variables, estimated at the mean values of the variables using the reduced form coefficient matrix.

From the structural form of the model it is evident that

(a)neither growth nor heath status influence poverty significantly,
(b)poverty does not affect health status,
(c)higher growth generates better health outcomes,
(d)poverty does not affect growth significantly,
(e)better health outcomes improve growth.

The inter-dependence of growth and health is empirically verified. Among the exogenous variables in the growth equation, the variable percentage urban, yields a positive and significant coefficient. The coefficient of infrastructure turns out to be negative though one would expect growth to vary positively with infrastructure. But here we must note that INF is taken as the percentage share in the total value added, not in physical terms. With every rise in INF – even if the state domestic product is assumed to go up by equal increments – the rate of growth would indeed decelerate, showing almost a relationship that one would expect to hold between the base year income and its growth rate. Industrialisation on the other hand, improves growth.

Both URBN and EXPPOV are found to reduce poverty. While the urban male work participation rate (EMPU) reduces poverty, EMPR is found to raise it suggesting the dominance of low productivity activities in the rural areas. Both literacy rate (LIT) and per capita health expenditure (PCHE) are seen to reduce IMR significantly.

Table 4

Structural Form Equations from Variant I

Explanatory variables	GROW	POV	IMR
GROW		1.64 (0.66)	-7.29 (-3.09)*
POV	-0.007 (-0.14)		0.31 (0.43)
IMR	-0.03 (-1.37)***	0.12 (0.64)	
INSDP	-0.182 (-0.38)		
DENS		0.02 (1.41)***	-0.02 (-0.57)
URBN	0.15 (2.41)*	-0.80 (-2.44)*	
EXPPOV		-0.0002 (-1.59)***	
LIT	0.005 (0.12)	-0.145 (-0.62)	-0.79 (-2.37)*
INF	-0.41 (-1.98)*		
IND	0.101 (1.33)***	-0.19 (-0.48)	
EMPR		0.87 (2.59)*	
EMPU		-0.71 (-2.03)**	
PCHE			-0.16 (-1.69)**
SCST		-0.052 (-0.27)	-0.202 (-0.47)
INTER	8.49 (0.82)	34.81 (0.90)	160.84 (4.69)*

$R^{2(within)}$	0.45	0.77	0.73
$R^{2(between)}$	0.60	0.17	0.66
Model	RE	RE	RE

Note: Figure in parentheses give t-ratios. *,**,*** represent significance at 5, 10 and 20 per cent levels respectively.

Elasticity coefficients (Table 5) show that literacy enhances growth and reduces both poverty and the infant mortality rate. Expenditure on anti-poverty programmes accelerate growth and reduce poverty and IMR, though the impact of the latter (EXPPOV) is not strong.

Table 5
Elasticities from Variant I

Exogenous Variables	GROW	POV	IMR
DENS	-0.06	-0.13	0.009
URBN	0.46	-0.28	-0.06
EXPPOV	0.06	-0.03	-0.07
LIT	0.18	-0.145	-0.54
INF	-0.13	0.02	0.02
IND	0.53	-0.02	-0.17
EMPR	-1.30	0.76	0.70
EMPU	0.17	-0.43	-0.545
PCHE	0.03	-0.01	-0.08
SCST	0.08	-0.58	-0.10

The net effect of industrialisation on health status is better than that on poverty. Per capita health expenditure improves the standard of living and health both, and also appears to raise growth, though marginally. That employment policy alone cannot take care of both standard of living and health condition of the population is reflected in the elasticity measures. The net effect of urban male work participation rate on growth is positive, and it also reduces poverty and IMR. But in response to rise in rural employment rate, growth declines and poverty and IMR tend to increase. So policy measures need to be framed carefully which can serve both the objectives of poverty reduction and improvement in health status.

Variant II

In the second variant of the model (results reported in Table 6) growth affects poverty, which in turn impacts health status. Growth is taken to be influenced by the base year value added (INSDP), urbanisation (URBN), infrastructure (INF), industrialisation (IND) and literacy rate (LIT). Empirical results show that except URBN and INF all other variables are significant. Both industrialisation and literacy raise the growth rate of state domestic product. The base year value added reduces the growth rate lending support to the convergence hypothesis.

In the second equation, POV is taken to vary with growth and expenditure on anti-poverty programmes. In order to estimate this equation we have used the predicted value of growth obtained from the first equation. Both the variables are noted to reduce poverty.

In the third equation health status (IMR) is a function of poverty and per capita health expenditure. This is estimated by replacing the observed poverty by its predicted value obtained from the second equation. IMR is seen to vary positively with POV and inversely with per capita health expenditure, PCHE.

Table 6
Structural Form Equations from Variant II

Explanatory variables	GROW	POV	IMR
GROW		-1.59 (-5.33)*	
POV			3.12 (11.69)*
IMR			
INSDP	-2.32 (-1.77)**		
URBN	-0.07 (-0.49)		
EXPPOV		-0.0004 (-5.58)*	
LIT	0.23 (3.59)*		
INF	0.11 (0.60)		
IND	0.20 (2.23)*		
PCHE			-0.17 (-2.52)*
INTER	48.20 (1.61)***	49.03 (17.59)*	-32.5 (-2.62)*
$R^{2(within)}$	0.39	0.57	0.73
$R^{2(between)}$	0.37	0.14	0.71
Model	FE	RE	RE

Note : See Table 4.

Table 7
Elasticities from Variant II

Exogenous Variables	GROW	POV	IMR
URBN	-0.40	0.07	0.10
EXPPOV		-0.07	-0.09
LIT	2.50	-0.46	-0.63
INF	0.105	0.02	0.03
PCHE			-0.06
IND	0.60	-0.11	-0.15

The elasticity coefficients estimated from the second variant of the model are given in Table 7. Literacy, and industrialisation seem to reduce both poverty and IMR, and accelerate growth more than proportionately. With respect to per capita health expenditure IMR does not show a high elasticity though it tends to decelerate: with every one per cent increase in PCHE, IMR drops by only .06 per cent. Expenditure on anti-poverty programmes results in a fall in both poverty and IMR more or less to the same extent (-.07 and -.09 respectively).

Variant III

In the third variant of the model, growth is believed to be a function of IMR, INSDP, URBN, INF, IND, and LIT. On the other hand, IMR is likely to vary with both GROW and PCHE. And finally IMR, GROW and EXPPOV would have impact on POV. Endogenous variables on the right hand side are replaced by their predicted values obtained from the reduced form equations. Among the exogenous variables, urbanisation, and literacy are seen to influence growth positively. PCHE improves health outcome, and expenditure on anti-poverty programmes reduces poverty.

Table 8
Structural Form Equations from Variant III

Explanatory Variables	GROW	IMR	POV
GROW		-6.59 (-5.36)*	-0.73 (-1.62)***
POV			
IMR	-0.145 (-1.57)***		0.18 (3.52)*
INSDP	-15.24 (-2.38)		
URBN	0.46 (1.46)***		
EXPPOV			-0.0003 (-3.09)*
LTI	0.21 (1.89)**		
INF	0.28 (1.05)		
IND	0.04 (0.28)		
PCHE		-2.20 (-3.74)*	
INTER	373.62 (2.26)*	185.55 (10.42)*	28.82 (4.58)*
$R^{2(within)}$	0.65	0.57	0.76
$R^{2(between)}$	0.43	0.13	0.03
Model	FE	FE	FE

Note: See Table 4

Table 9
Elastcities from Variant III

Exogenous Variables	GROW	POV	IMR
URBN	-0.43	0.04	-0.15
EXPPOV		-0.06	
LIT	2.46	-0.83	-0.065
INF	-0.09	0.03	0.09
IND	0.62	-0.13	-0.18
PCHE	0.036	-0.12	-0.29

As far as the endogenous variables are concerned the results are again suggestive of a nexus between growth and health outcomes – both improving each other. Poverty is seen to be related to both health and growth though the t-ratio corresponding to IMR is highly significant whereas that of growth is siginificant only at the 20 per cent level. In other words, this variant states that the issue of poverty reduction can be addressed more effectively by improving health status of the population rather than accelerating growth. The elasticity given in Table 9 show that literacy accelerates the growth rate considerably. It also reduces poverty (e = -0.83) and improves the health status by causing a fall in IMR though the elasticity is only –0.065. Per capita health expenditure on the other hand shows a positive effect on the health status as IMR tends to fall by .29 per cent with every one per cent increase in PCHE. It also reduces poverty and fastens growth. Industrialisation is another variable which shows a promising effect on all the three endogenous variables, growth, IMR and poverty. Expenditure on anti-poverty programmes does not show any strong effect on poverty (-0.06).

Conclusion :

Based on time series and cross-section pooled data for the Indian states, the analysis has been carried out for almost three decades - seventies, eighties and nineties. Cross-section plots were suggestive of mild associations among growth, poverty and health indicators in the direction that one would expect on a priori basis, i.e., higher growth coincides with lower poverty and better health status of the population. Time series data made the picture somewhat more clear, especially as far as the relationship between growth and health indicators - especially IMR - was concerned. With five yearly averages, more states showed that with higher growth, IMR declined. Other variables like CBR and CDR also by and large tended to decline with improvements in growth, though in several states the negative association was only moderate. On the whole, both cross-section and time series data tended to suggest certain definite relationships among growth, poverty and health indicators.

These trends and associations were then tested, by controlling for other exogenous variables that could potentially influence each of these three variables. Three different variants of the model were estimated

econometrically. In the first variant, each of the endogenous variables is taken to influence the other two. The second variant demonstrates a causal connection running from growth to poverty to health, which is essentially a recursive system. A third variant is estimated by making growth and health interdependent on each other and then both affecting poverty. The results can essentially be summarised in three points. Per capita health expenditure is unambiguously and positively related to health status; i.e. higher per capita health expenditure is seen to improve health status in all the three equations. While the conclusions based on these results on the linkages between poverty, health and growth would vary depending on which model one believes in, the results do seem to indicate that poverty is improved by improved health status. Finally, growth and health status are positively linked and seems to have a two-way relationship. While in cross-sectional data, higher per capita income is seen to result in better health status, pooled cross-section and time series data must necessarily consider a two-way relationship of growth in income and health. The results indicate that higher growth affects health status on the one hand, and better health status reinforces the trends in growth of income on the other.

What do these results imply? Over the years it has been observed in India that though poverty has declined to some extent, health status of the population remained considerably low. These results seem to indicate that further reduction in poverty is probably not possible without significant improvements in the health condition of the population. Secondly, health conditions can be improved by improved investment in health, among other exogenous variables. Health sector investment needs to be made on a large scale as rise in health expenditure yields both higher growth and better quality of life. The low values for the estimates of elasticities probably emanate from the fact that most of the states have actually incurred a considerably low level of per capita health expenditure. Hence, it would be misleading not to recognise the importance of the policy implication of increased health expenditure.

Among some of the other exogenous variables – literacy and industrialisation seem to improve both health outcome and growth on the one hand, and reduce poverty on the other, as is evident from the elasticity estimates. These results are not surprising; the role of education in improved heath status is a finding that has been time-tested. Educated labour develops awareness to remain healthy, results in higher growth by enhancing the technical efficiency, and at the same time experience higher earnings due to rise in productivity thus leading a better standard of living.

Industrialisation also accelerates growth and improves the standard of living both by narrowing the size of population below the poverty line and generating better health outcomes. Higher productivity and higher

earnings that are likely to result from industrialisation are possibly the driving force behind this.

What are the policy implications from these results? The main implication seems to be that improved health outcomes are necessary for improved rates of growth of income, especially over time. At the same time, higher growth enables the system to generate better health outcomes. Better health will also lead to lower poverty. Accompanied by improved investment in education and growth-promoting areas like industry, an increased investment in health might be a necessary condition for putting countries on a path of accelerated growth.

Data sources

Reported cases due to communicable diseases include Diphtheria, Poliomyelitis, Tetanus, Whooping Cough, Measles, Enteric Fever, Viral Hepatitis, Dog bites/Rabies, Syphilis, Gonococcal infection, Tuberculosis.

Figures have been taken from *Health information of India* for the year onward 1985, from different yearly volumes ; for the previous years figures have been taken from *Health Statistics of India,* (different yearly volumes) .

Morbidity is defined as the number of reported cases to total population (per '000) population)

Infant Mortality Rate, Crude Birth Rate, Crude Death Rate, Life Expectancy Rate: Figures have been taken from *Compendium of India's Fertility and Mortality Indicators 1971-1997.*

Figures for literacy rates have been taken from *Health Information of India,1994* for the years and from *Family Welfare Programme in India, 1992-93.*

Employment: usual status (principal and subsidiary) workers are taken from various rounds of NSS.

Poverty figures have been taken from *The Indian Journal of Labour Economics, vol. 40(1), Jan-Mar 1997.* For1999-2000, the figures were obtained from *Times of India,*

Per capita health care expenditure in Rupees (in current prices), share of health care expenditure in total government expenditure (in current prices), share of medical & public health expenditure in total health care expenditure (in current prices), per capita health care expenditure in Rupees (constant prices): *Figures have been taken from Health care Expenditure by Government of India by Reddy and Selvaraju.*

Density, Percentage of urban population to total population, sex ratio, schedule caste and schedule tribe population: figures have been taken from Population *Censuses ,1971, 1981 and 1991.*

Figures on expenditure on poverty comprise expenditure on rural development and poverty alleviation programmes. These are plan outlay taken from various Annual Plans, Government of India. The list of programmes taken for various years are as follows:

(a) 1974-75: Small Farmers Development Agencies, Tribal Development Agencies, drought Prone Area Programme, Pilot plus Intensive Rural Employment Projects.

(b) 1977-78: Small Farmers Development Agencies, Drought Prone Area Programme, Tribal Development Agencies, Hill Area Development Agencies, Pilot Programme of Integrated Rural Development, Desert Development Programme, Food for Work Programme, Rural Links Road Programme.

(c) 1983-84: Integrated Rural Development Programme (IRDP), Training of Rural Youth for Self-Employment (TRYSEM), National Rural Employment Programme (NREP), Drought Prone Area Programme, Desert Development Programme, Community Development and Land Reforms.

(d) 1987-88: IRDP, TRYSEM, NREP, Rural Landless Employment Guarantee Programme, Jawahar Rojgar Yojana(JRY) Drought Prone Area Programme, Development of Women and Children in Rural Areas (DWCRA), Community Development, Land Reforms Special Employment Programmes

(e) 1993-94: IRDP, TRYSEM, DWCRA, JRY, Drought Prone Area Programme, Desert Development Programme Land Reforms and Employment Assurance Schemes

References

1. Barro, Robert J. (1991). Economic Growth in a Cross-Section of Countries. Quarterly Journal of Economics, Vol 106, pp

2. Barro, Robert J and Sala-i–Martin (1992). Convergence, Journal of Political Economy, Vol. 100.

3. Becker, Garym K. Murphy and R. Tamura (1990). Human Capital, Fertility and Economic Growth. Journal of Political Economy. Vol 98, pp.

4. Gumber, Anil and Lincoln Chen. Measurement, Seasonality and Clustering of Morbidity. Some Correlates from a Longitudinal Study in Rural Bangladesh. Gujarat Institute of Development Research. Working Paper No. 77.

5. Mitra, Arup, A.Varoudakis and M. Veganzones (1998). State Infrastructure and Productive Performance in Indian Manufacturing. OECD, Development Centre Technical Paper No. 139.

6. Stark, Oded (1995). Altruism and Beyond: An Economic Analysis of Transfers and Exchanges within Families and Groups. Cambridge University Press.

7. Over, Mead (1991). Economics for Health Sector Analysis: Concepts and Cases. Economic Development Institute. World Bank.

8. World Bank (1993). The World Development Report. Investing in Health: World Development Indicators.

9. World Bank. Living Standard Measurement Surveys. Working Papers 1- current.

10. Zweifel, Peter and Friedrich Breyer (1997). Health Economics. Oxford University Press.

APPENDIX 3

Evolution of Health Policy in India

Rachel Chatterjee

The Historical Context

Modern medicine and structured healthcare were introduced in India during the colonial period. Prior to this, practitioners, who were inheritors of a caste-based occupational system, provided healthcare within their homes. Institutions that functioned as hospitals were the Indian equivalent of western almshouses and infirmaries, providing free drugs and care to the sick and the infirm. It is believed that the ayurvedic system of medicine, the dominant formal Indian system of medicine became stagnant after the 10th century AD. Unani-Tibb, based on Greek medical theory, received greater state patronage, and during the Mughal period, hospitals were established, financed by the rulers as well as wealthy persons and rich traders. Health was considered a social responsibility and state and philanthropic intervention were highly significant.

The first medical establishment of modern medicine was set up by the Portugese in Goa in 1510. The English East India Company set up its first hospital in 1664 in Madras. As the needs of the British population grew, a more organised medical establishment, the Indian Medical Service was established, catering mainly to the armed forces. By the early 19th century, hospitals for the general population were established. These facilities however had a distinct racial and urban bias. Rural health care expansion in a limited way began in India from 1920 onwards, when the Rockefeller Foundation entered India and started preventive health programmes in the Madras Presidency in collaboration with the government, and gradually extended its support for similar activities in Mysore, Travancore, United Provinces and Delhi. The focus of the Foundation was on developing health units for preventive care in rural and semi-rural areas, in addition to support for malaria research and medical education. (Bradfield, 1938)

The intervention of the Rockefeller Foundation is historically very important in terms of the direction it set in the development of health care services in rural India. It paved the way for the ideology that rural areas need more preventive health care or 'public health', and less hospitals and medical care. The result was that medical care activities of the State were developed mainly in the urban areas, and rural areas were deprived of medical care within their reach. The same differential treatment for urban and rural areas has continued even after Independence.

During the colonial period, hospitals and dispensaries were mostly state owned or state financed, with the private sector playing a minimal role.

However, in terms of individual practitioners, the private health sector was dominant. The earliest data available for private practitioners is for the year 1938, when an estimated 40,000 doctors were reported to be active. Of these only 9,225 or 23% were in public service, and the rest in private practice or private institutions (Bradfield, 1938).

This historical overview reveals the remarkable continuity in the pattern of development of health care services from the colonial period to the present.

Evolution of Health Policy

The evolution of health policy in India takes us back to pre-independence days. In 1938 the Indian National Congress established a National Planning Committee (NPC) under Jawaharlal Nehru. The NPC constituted a sub committees on national health, under the chairmanship of Col. S.S. Sokhey. On the basis of an interim report of the National Health Sub-Committee presented to the NPC in August 1940, the NPC resolved that:

a) India should adopt a form of health organization, in which both curative and preventive functions are suitably integrated, and administered through one agency.

b) Such an integrated system of health organization can be worked only under state control. It is, therefore recommended that the preservation and maintenance of the health of the people should be the responsibility of the state.

c) There should be ultimately one qualified medical man or woman for every 1000 population, and one (hospital) bed for every 600 of population. Within the next ten years the objectives aimed at should be one medical man or woman for every 3000 of population, and a bed for every 1500 of population. This should include adequate provision for maternity cases.

d) The medical and health organization should be so devised and worked as to emphasize the social implications of this service. With this object in view the organization should be made a free public service, manned by whole-time workers trained in the scientific method.

e) Adequate steps be taken to make India self-sufficient as regards the production and supply of drugs, biological products, scientific and surgical apparatus, instruments and equipment and other medical supplies... No individual or firm, Indian or foreign, should be allowed to hold patent rights for the preparation of any substances useful in human or veterinary medicine (NPC, 1948).

18th October 1948 marks a watershed in health policy formulation when the Health Survey and Development Committee was constituted under the chairmanship of Sir Joseph Bhore. This Committee, which endorsed the NPC resolve, prepared a detailed plan for a National Health Service for the country. The Plan proposed providing universal coverage to the entire population, free of charge, through a comprehensive state-run salaried health service. The Bhore Committee Report remains, to the present, the most comprehensive health policy and plan document ever prepared in India. In formulating its plan for a National Health Service the Bhore Committee set itself the following objectives:

1) The services should make adequate provision for the medical care of the individual in the curative and preventive fields and for the active promotion of positive health;
2) These services should be placed as close to the people as possible, in order to ensure their maximum use by the community which they are meant to serve;
3) The health organization should provide for the widest possible basis of cooperation between the health personnel and the people;
4) In order to promote the development of the health programme on sound lines, the support of the medical and auxiliary professions, such as those of dentists, pharmacists and nurses, is essential; provision should, therefore, be made for enabling the representatives of these professions to influence the health policy of the country.
5) In view of the complexity of modern medical practice, from the standpoint of diagnosis and treatment, consultant, laboratory and institutional facilities of a varied character, which together constitute "group" practice, should be made available.
6) Special provision will be required for certain sections of the population, e.g. mothers, children, the mentally deficient etc.
7) No individual should fail to secure adequate medical care, curative and preventive, because of inability to pay for it.
8) The creation and maintenance of as healthy an environment as possible in the homes of the people as well as in all places where they congregate for work, amusement recreation are essential.

The Bhore Committee's District Health Scheme, also called the Three Million (representing an average district's population) Plan, was to be organized in a 3-tier system "in an ascending scale of efficiency from the point of view of staffing and equipment. At the periphery would be the primary unit, the smallest of these three types. A certain number of these primary units would be brought under a secondary unit, which would perform the dual function of providing a more efficient type of health service at its headquarters and of supervising the work of these primary units. The headquarters of the district would be provided with an organization which would include, within its scope, all the facilities that

are necessary for modern medical practice as well as the supervisory staff who will be responsible for the health administration of the district in its various specialized types of service."

The minimum requirement recommended by the Bhore Committee was:

- 567 hospital beds per 100,000 population, as against the existing 24
- 62.3 doctors per 100,000 population, as against the existing15.87
- 150.8 nurses per 100,000 population, as against the existing 2.32

The organizational structure of the National Health Scheme, as proposed by the Bhore Committee, included a primary unit for every 10,000 to 20,000 population with a 75 bedded hospital served by six medical officers including medical, surgical and obstetric and gynecology specialists, and supportive paramedical staff. This primary unit should have adequate ambulatory support to link it to the secondary unit when the need arises for secondary level care. Each province should have the autonomy to organize its primary units in the way it deemed most suitable for its population but there was to be no compromise on quality and accessibility. The deciding factor should be easy access for that unit of population.

Secondary Unit: About 30 primary units or less should be under a secondary unit. The secondary unit should be a 650 bed hospital having all the major specialities: medical, surgical, obstetrics and gynaecology, paediatrics, infectious diseases, malaria and tuberculosis, with a staff of 140 doctors and supporting para medical and other staff.

District Hospital: Every district centre should have a 2500 beds hospital providing tertiary care with 269 doctors, and supporting para medical and other staff. The hospital should have 300 medical beds, 350 surgical beds, 300 Ob. & Gy. Beds, 540 tuberculosis beds, 250 pediatric beds, 300 leprosy beds, 40 infectious diseases beds, 20 malaria beds and 400 beds for mental diseases. This distribution was based on the epidemiological profile the Committee had constructed based on their enquiry. A large number of these district hospitals would have medical colleges attached to them. However, each of the 3 levels should have functions related to medical education, and training, including internship and refresher courses.

In addition, certain diseases were singled out for special inputs that would be needed to control and / or eradicate them. They were singled out because they constituted a major problem then. And most of them, 54 years later, continue to constitute a major problem in the country. These diseases were malaria, tuberculosis, small pox, cholera, plague, leprosy, venereal diseases, hookworm disease, filariasis, guinea-worm disease, cancer, mental diseases blindness and diseases of the eye. A detailed plan to deal with them was outlined. This plan was to be executed as a part and parcel of the general health services.

The Committee also made specia recommendation for the constitution of a State Health Service. It recommended that all services provided by the health organization should be free to the population without distinction and it should be financed through tax revenues. It further recommended that the health service should be a salaried service with whole-time doctors who should be prohibited from private practice.

In the early years after independence, the Indian State was engrossed in supporting the process of accumulation of capital in the private sector through large scale investments in capital goods industry, infrastructure and financial services. Industrial growth was the keyword. Social sectors like health and education were low priority areas. Economic services, from the first plan to the ninth plan, were allocated over four fifths of the resources, and social sectors such as health, education, water supply and housing have continued to receive only residual resources.

It was not until 1983 that India enunciated a formal National Health Policy. Prior to this policy, health planing was through the Five-Year Plans and based on recommendations of various Committees. During the **first two Five-Year Plans,** the basic structural framework of public health care delivery system remained unchanged. Urban areas continued to get over three-fourths of medical care resources, whereas rural areas received "special attention" under the Community Development Programme (CDP). Within CDP the social sectors received very scant attention. In fact CDP, for all practical purposes, meant agricultural development.

Health sector organization under CDP was a diluted form of the Bhore Committee recommendations. It proposed a primary health unit per development Block (in the fifties this was about 70,000 population spread over 100 villages) supported by a secondary health unit (hospital with a mobile dispensary) for every three such primary health units. The aim of this health organization was "the improvement of environmental hygiene, including provision and protection of water supply; proper disposal of human and animal wastes; control of epidemic diseases such as malaria, cholera, small pox, TB etc.; provision of medical aid along with appropriate preventive measures, and education of the population in hygienic living and in improved nutrition."

It is clear from the above statement of objectives of the health organization under CDP that medical care was given the least priority. In contrast, in the urban areas, which developed independent of CDP, hospitals and dispensaries, which provided mainly curative services (medical care), proliferated. Thus at the start of the third Five Year Plan, there was only one Primary Health Unit per 140,000 rural population (14 times, less than what the Bhore Committee recommended) in addition to one hospital per 320,000 rural population. In sharp contrast, urban areas had one hospital per 36,000 urban population and one hospital bed per

440 urban residents (rural areas had 1 hospital bed per 7000 rural population.

The Mudaliar Committee was set up in 1959 to evaluate the progress made in the first 2 Five-Year Plans, and to make recommendation for the future development of health services. The report of the Committee recorded that disease control programmes had substantial achievements in controlling certain virulent epidemic diseases. Malaria was considered to be under control. Deaths due to malaria, cholera, smallpox etc. were halved or sharply reduced and the overall morbidity and mortality rates had declined. The death rate had fallen to 21.6% for the period 1956-61. The expectation of life at birth had risen to 42 years. However, the tuberculosis programme had failed to control its spread. The report also pointed out that for a million and half estimated open cases of tuberculosis, there were not more than 30,000 beds available. The Mudaliar Committee further admitted that basic health facilities had not reached at least half the nation. It observed that the PHC programme was not given the importance it should have been given, and that there were only 2800 PHCs existing by the end of 1961. Instead of the "irreducible minimum in staff recommended by the Bhore Committee, most of the PHCs were understaffed, large numbers of them were being run by ANM's or public health nurses in charge'. The Committee suggested measures to improve the service condition of doctors and other personnel in order to attract them to rural areas. The Committee also recommended that instead of expansion of PHCs consolidation should take place, and then a phased upgrading and equipping of the district hospitals with mobile clinics for the treatment of non-PHC population. The Committee insisted that medical education should get a large share of public health resources in the belief that improvement in the technical excellence of medical care and substantial addition to medical manpower would ultimately change the country's health status. In the next two plan periods, allocations for training of doctors, especially specialties, increased. This was reflected in a large increase in medical college seats. However, the outturn of nurses and other auxiliary personnel continued to stagnate. During this period, urban health infrastructure continued to increase to meet the growing demands for medical care, funded mostly by state governments. The Centre was investing in preventive and promotive programmes, whereas state governments focused their attention on curative care – some sort of an informal division of tasks had taken place, which continues even to the present.

The **Third Five Year Plan,** launched in 1961, addressed the deficiencies affecting PHCs, and directed attention to the shortage of health personnel, delays in the construction of PHCs, buildings and staff quarters and inadequate training facilities for the different categories of staff required in the rural areas. The Third Five-Year Plan highlighted inadequacy of health care institutions, doctors and other personnel in rural areas as being the major shortcomings at the end of the second Five-Year Plan. It suggested a realistic solution to the problem of

insufficient doctors for rural areas: "a new short term course for the training of medical assistants should be instituted and after these assistants had worked for 5years at a PHC, they could complete their education to become full fledged doctors and continue in public service". The Medical Council, however, opposed this recommendation and hence it was not pursued. Urban health structure continued to expand and proposed outlays for new Medical Colleges, establishment of preventive and social medicine and psychiatric departments, completion of the All India Institute of Medical Sciences and schemes for upgrading departments in Medical Colleges for post graduate training and research, continued to be high.

Faced with a rising birth rate and a falling death rate, the Third Plan stated that "the objective of stabilizing the growth of population over a reasonable period must therefore be at the very center of planned development". It was during this period that Government agencies began to actively participate in pushing population control. This was also the time when family planning became an independent department in the Ministry of Health. In 1963, the **Chadha Committee** recommended the integration of health and family planning services and its delivery through one male and one female multipurpose worker per 10,000 population. In 1966, the **Mukherjee Committee,** set up to review the staffing pattern and financial provision for the family planning programme, recommended introduction of targets, payments for motivation and incentives to acceptors. It suggested reorganization of the FP programme into a vertical programme like malaria, and recommended addition of one more health visitor per PHC, to supervise the ANMs for targets under this programme.

The **Fourth Five-Year Plan**, which began in 1969 with a 3-year plan holiday, continued on the same lines as the Third Plan. It recognized again the need to strengthen the PHC programme. It pleaded for the establishment of effective machinery for speedy construction of buildings and improvement of the performance of PHCs by providing them with staff, equipment and other facilities. For the first time, PHCs were given a separate allocation. It was reiterated that the PHC base would be strengthened along with, sub divisional and district hospitals, which would be referral centers for the PHCs. The importance of PHCs was stressed in terms of the communicable diseases programme. This emphasis was due to the spurt in the incidence of malaria, which rose from 100,000 cases annually between 1963-65, to 149,102 cases. Family Planning continued to get an even greater emphasis with 42% of health sector plan allocation going to it. It was during this period that water supply and sanitation were separated and allocations made separately for these sectors under Housing and Regional Development.

It was in the **Fifth Plan** that the government acknowledged that despite advances in terms of reduction in infant mortality rates and increase in life expectancy, health infrastructure and manpower were still inadequate

in the rural areas. The objectives of the Fifth Five-Year Plan focussed on addressing these deficiencies:

1) Increasing the accessibility of health services to rural areas through the **Minimum Needs Programme (MNP)** and correcting the regional imbalances.
2) Developing referral services by removing deficiencies in district and sub-division hospitals, and by providing specialist attention to common diseases in rural areas.
3) Intensifying efforts for the control and eradication of communicable diseases.
4) Effecting quality improvement in the education and training of health personnel.

The methods by which these goals were to be achieved were through the Minimum Needs Programme, the Multi-Purpose Workers Training Scheme, and priority treatment for backward and tribal areas.

The **Kartar Singh Committee** in 1973 recommended the conversion of uni-purpose workers, including ANMs, into multi-purpose male and female health workers. It recommended that each pair of such workers should serve a population of 10,000 to 12,000. Thus the multi-purpose health worker's (MPHW) scheme was launched, with the objective of integrating various vertical programmes into the primary health care package for rural areas.

The **Shrivastava Committee** was constituted in 1975 to look into medical education and supportive manpower. In respect of medical education, the Committee called for a halt to the opening of new medical colleges. The Committee emphasized that there was no point in assuming that by increasing the pool of doctors, they would go to rural areas, as there were complex socio-economic dimensions governing this issue. The main recommendation of the Committee was to have part-time health personnel selected by the community from within the community. They would act as a link between the MPHW at the sub-centers and the community. Thus their option for rural areas was the Community Health Worker scheme. Earlier in 1967, the **Jain Committee** report on Medical Care Services had made an attempt to devolve medical care to rural areas by recommending strengthening of such care at the PHC and block / taluka level, as well as further strengthening district hospital facilities. The Jain Committee also suggested integration of medical and health services at the district level with both responsibilities being vested in the Civil Surgeon / Chief Medical Officer. But recommendations of this Committee, which is the only Committee since Independence that focussed on medical care in rural areas, were not considered seriously.

In the middle of the Fifth Plan, a state of National Emergency was proclaimed and during this period (1975-77) population control activities

were stepped up, which unfortunately included forced sterilisations. With the end of the Emergency, however, this policy was abandoned. In the Fifth Plan, water supply and sanitation received greater emphasis. One of the important objectives in the MNP was to provide drinking water to all villages suffering from chronic scarcity of water. The outlay during this plan period for water supply was Rs. 10,220 millions, almost equal to the amount allocated to the health sector

The **Sixth Plan** was greatly influenced by the Alma Ata declaration of **Health for All by 2000 AD** (**WHO**), and the **ICSSR – ICMR Report** ,1980. The plan conceded that " there is a serious dissatisfaction with the existing model of medical and health services with its emphasis on hospitals, specialization and super specialisation, and highly trained doctors, which is availed of mostly by the well to do classes. It is also realized that it is this model which is depriving the rural areas and the poor people of the benefits of good health and medical services". The plan emphasized the development of a community-based health system. The strategies advocated were:

a) Provision of health services to the rural areas on a priority basis.
b) The training of a large cadre of first level health workers, selected from the community and supervised by MPHWs and medical officers of the PHCs.
c) No further linear expansion of curative facilities in urban areas; this would be permitted only in exceptional cases, dictated by felt need.

The Plan emphasized that horizontal and vertical linkages had to be established among all the interrelated programmes, like water supply, environmental sanitation, hygiene, nutrition, education, family planning and MCH. The objective of achieving a net reproduction rate of 1 by 1995 was reiterated.

The Sixth and Seventh plans are different from the earlier ones in that they emphasised efficiency and quality through increasing privatisation. The Sixth and Seventh Five Year Plans state: ' the success of the Plan depends crucially on the efficiency, quality and texture of implementation... a greater emphasis in the direction of competitive ability, reduced cost and greater mobility and flexibility in the development of investible resources in the private sector (by adapting) flexible policies to revive investor interest in the capital markets'.

The **National Health Policy (NHP) of 1983** was announced during the Sixth plan period. The Policy recommended "universal, comprehensive primary health care services which are relevant to the actual needs and priorities of the community at a cost which people can afford". The salient features of the 1983 Health Policy are:

a) It emphasized a preventive, promotive and rehabilitative primary health care approach.
b) It recommended a decentralized system of health care, the key volunteers and paramedics), and community participation.
c) It called for an expansion of the private curative sector, which would help reduce the government's burden.
d) It recommended the establishment of a nationwide network of epidemiological stations that would facilitate the integration of various health interventions.
e) It set up targets for achievement that were primarily demographic in nature.

During the decade following the 1983 NHP, rural health care received special attention and a massive program of expansion of primary health care facilities was undertaken in the 6th and 7th Five Year Plans to achieve the target of one PHC per 30,000 population and one sub centre per 5000 population. This target has more or less been achieved, though a few states are still deficient. Various studies analysing rural primary health care have observed that, though the infrastructure is in place in most areas, primary level services are grossly underutilized because of poor facilities, inadequate supplies, insufficient effective person-hours, poor managerial skills of doctors, faulty planning of the mix of health programs and lack of proper monitoring and evaluatory mechanisms. Further, the system being based on the health team concept, has failed to work because of the mismatch between training and the work allocated to health workers, inadequate transport facilities, non-availability of appropriate accommodation for the health team and an imbalanced distribution of work-time for various activities. In fact, many studies have observed that family planning, and more recently immunization, get a disproportionately large share of the health workers' effective work-time.

With regard to the private health sector the NHP clearly favours privatization of curative care. It talks of a cost that "people can afford", thereby implying that health care services will not be free. The development of health care services post-NHP provide evidence that privatization and private sector expansion in the health sector has occurred rapidly, that in the name of primary health care, the state has still kept the periphery without adequate curative services (while the states support to curative services in urban areas continues to remain strong) and that the state health sector's priority program still continues to be population control.

India's health policy too has been moving increasingly in the direction of selective health care. From a commitment to comprehensive health care on the eve of Independence, and its reiteration in the 1983 Health Policy, there has been a narrowing down of concern for family planning; immunization and control of selected diseases. In keeping with the selective health care approach, the **Eighth Plan** adopted a new slogan – instead of 'Health for All by 2000 AD', it chose to emphasize 'Health for

the Underprivileged'. Simultaneously, it continued the support to privatization. During the Eighth Plan period, an **Expert Committee on Public Health Systems** to review public health was set up. The recommendations of this Committee have formed the basis for the Ninth Plan health sector strategy to revitalize the public health system in the country to respond to health care needs in changed times.

The **9th Five-Year Plan** by contrast to earlier Plans, provides a good review of earlier policies and interventions, analysing earlier experience in order to plan future strategies. There are a number of innovative ideas in the Ninth Plan. It is refreshing to note that reference is once again made to the Bhore Committee Report and to contextualise the current scenario within the recommendations the Bhore Committee. In its analysis of health infrastructure and human resources, the Ninth Plan says that consolidation of PHCs and SCs, and assuring that the requirements for their proper functioning are made, is an important goal under the Basic Minimum Services Programme. Thus, given the fact that it is difficult to find physicians to work in PHCs and CHCs, the Plan suggests creating part-time positions, which can be offered to local qualified private practitioners, and / or offering the PHC and CHC premises for after-office hour's practice against a rent. It also suggests putting in place mechanisms to strengthen referral services. The Plan has proposed horizontal integration of all vertical programmes at district level to increase their effectiveness as also to facilitate allocative efficiencies.

Another welcome suggestion is evolving state-specific strategies, recognising the fact that states are at different levels of development and have different health care needs. The Ninth Plan also shows concern for urban health care, especially the absence of primary health care for the urban poor, and the complete reliance on secondary and tertiary services even for minor ailments. It recommends for provision of primary health care services, especially in slums, and providing referral linkages at higher levels.

The Ninth Plan also reviews the 1983 National Health Policy in the context of its objectives and goals and concludes that a reappraisal and reformulation of the NHP is necessary, so that a reliable and relevant policy framework is available, not only for improving health care, but also for monitoring health care delivery systems and measuring the health status of the population in the next two decades. In this context, it is critical of the poor quality of data management and recommends drastic changes to develop district level databases so that more relevant planning is possible. The Ministry of Health and Family Welfare is presently working on a new Health Policy document. A draft version which came out in June 1999 was found wanting and is being reworked presently.

The Ninth Plan reviewing the population policy and the family planning programme, refers to the Bhore Committee Report, and asserts that the

core of this programme is maternal and child health services. The **National Population Policy** has been announced in the middle of 2000, in which demographic goals, are placed in a larger social context. The Ninth Plan laments that in all the years since independence, allocations to the health sector have not reached even two percent of plan resources. Despite this pronouncement, the same inadequate resource allocations for the health sector continue.

Conclusion

The neglect of the public health sector is an issue larger than health policy making. The demand on public resources from the productive sectors of the economy (which directly benefit capital accumulation) is considered more urgent than the social sectors, and therefore the latter gets only residual attention from the State. Unfortunately, health is seen by both central and state governments as a consumption good, and not as an investment good. It is not yet the thinking in finance ministries that expenditures on healthcare, leading to improvements in health status, can in turn promote economic growth. The solution for satisfying the health needs of the people, lies not merely in health policies and plans, but in changing mind-sets of governments, and effecting structural changes in the political economy that will facilitate adequate allocations to the social sectors and implementation of progressive health policies.

APPENDIX 4

Basic Principles of Ayurvedic Medicine And Its Materia Medica

Ram Harsh Singh

Ayurveda is one of the most ancient medical sciences of the world. It is considered as the Upaveda of Atharvaveda and thus has its origin from Vedas, the oldest recorded wisdom on earth. It has survived through two sets of original authentic texts each consisting of three books viz., (1) Vrhattrayi i.e. the three big books namely Caraka Samhita (600 B.C.), Susruta Samhita (500 B.C.) and the Samhitas of Vagbhata (600 A.D.); (2) Laghutrayi i.e. the three small books namely Madhava Nidana (900 A.D.), Sarngadhara Samhita (1300 A.D.) and Bhava Prakasa (1600 A.D.). All these texts were originally written in Sanskrit and were in the form of an encyclopedia dealing with all aspects of life, health, disease and treatment. The approach is essentially philosophic, holistic and humanistic. Ayurveda is a more life and health oriented system than disease and treatment oriented one. It presents a total life science and visualises the total health of the total human-being in a holistic way.

Ayurveda advocates a complete promotive, preventive and curative system of medicine and appears to have been practised in ancient times in the form of eight major clinical specialities of medicine namely (1) Kayachikitsa (internal medicine), (2) Salya Tantra (surgery), (3) Salakya (diseases of eye, ear, nose, throat), (4) Kaumarabhrtya (paediatrics, obstetrics and gynaecology, (5) Bhutavidya (psychiatry), (6) Agada Tantra (toxicology), (7) Rasayana Tantra (nutrition, rejuvenation and geriatrics), (8) Vajikarana (sexology). Thus it indicates that Ayurveda was already a well developed system of medicine in ancient times.

The Approach

The extensive knowledge and wisdom about all aspects of medicine available in the Ayurvedic texts is very rich. It is really intriguing to think about the approaches, methods and tools which were used to discover such an advanced form of knowledge. Certainly these were not the crude physical experimental methods. The methodology would have been definitely intuitive, experiential and perceptual. Ayurveda like all other systems of ancient Indian learning made discoveries through the most subtle sources namely the *Paramanas,* viz., (1) *Pratyaksa* (direct perception), (2) *Anumana* (logical inference), (3) *Aptopadesa* (verbal and authentic documentary testimony), (4) *Yukti* (experimental evidence) etc. In view of the above nature of the Ayurvedic knowledge, it is suggested that all studies and investigations, directed towards revival of this great ancient science in present times should follow three main methodological

parameters viz. (1) Historicity. (2) Linguistics and (3) Comparative evaluation with contemporary sciences like western medical science.

If we examine the Ayurvedic concepts in proper historical perspectives with correct linguistic interpretations viewing the same in the light of comparable contemporary knowledge, it may not be difficult to reach the genuine meaning. While undertaking the comparative studies one has to appreciate that Ayurveda and the contemporary western modern medical sciences have very different approaches. If comparisons are made without taking into account the distinct approaches there is always a chance of being mislead. The obvious distinctions between Ayurveda and western medicine are that (1) Ayurveda is essentially an experiential science in contrast to western modern medicine which is an experimental science, (2) Ayurveda has a holistic and totalistic approach in contrast to western modern medicine which is analytical and reductive in its approach, (3) Ayurveda is a function (physiological) oriented science in contrast to modern medicine which is structure or organ oriented, in other words the latter does not believe in a function unless it is identified as related to a structure, while Ayurveda looks at the whole organism as a total indivisible being which has to function as a whole, to exist as a whole.

The Fundamental Principles

The Macrocosm-Microcosm Continuum

Ayurveda is based on the laws of Nature. The theory of *Lokapurusa-samya* (macrocosm-microcosm continuum) is the most important principle of Ayurveda. The individual human being is the miniature replica of the universe. The individual and the universe both are essentially *Pancabhautika,* i.e., made up of five basic physical factors or elements namely *akasa* (ether/space), *vayu* (air/motion), *teja* (fire/radiant energy), *jala* (water/cohesive factor) and *prthvi* (earth/mass). The individual (*purusa*) and the universe (*loka*) remain in constant interaction with each other and also derive and draw materials from each other in order to maintain their normalcy and homeostasis. This exchange follows the law of *samanya* and *visesa* (homologous vs. heterologous) on the simple principle that a similar/homologous matter increases the similar, while a dissimilar/heterologous matter decreases or depletes the same in the body. The interaction and exchange between *loka* and *purusa* continues in a natural way as the man breaths air, drinks water and consumes food articles available in the nature. So long this interaction is wholesome and optimum; the man is in optimum health. When this harmonious interaction breaks, a state of disease, starts. Hence the main principle of treatment of a disease is nothing but to restore harmony between the *loka* and the *purusa* and to restore normal balance of *pancamahabhutas* in the body and mind with due homeostasis.

The Ayu And Panca Mahabhuta Theory

Ayurveda conceives life (*ayu*) as a four dimensional entity comprising of *sarira* (physical body), *indriya* (senses), *sattva* (psyche) and the soul or *atma*, i.e., the conscious element. Thus the individual being is a comprehensive psychophysico-spiritual unit which is highly dynamic and is in constant interplay with the cosmos. As stated earlier the gross human body is *pancabhautika*, i.e., it consists of a proportionate combination of five *mahabhutas*. The *panca mahabhuta* theory is essentially a theory of physics. The *panca mahabhuta* represent the five essential aspects of the matter namely

(1) The mass as earth or *prthivi*,
(2) The cohesion as water or *jala*,
(3) The motion as air or *vayu*,
(4) The radiant energy as fire or *teja*,
(5) The space as the ether or *akasa*.

The Theory Of Tridosa

The five physical attributes of *pancamahabhuta* constitute three major biological components of the living body called *tridosa*, i.e., the three *dosas* viz. *vata*, *pitta* and *kapha*. The entire body's function is explained in terms of these *dosas*. They are called *dosa* because of their inherent tendency to get vitiated and to vitiate each other. *Vata* is the biological product attribute of predominance of air and space; *Pitta* is the product attribute of predominance of fire while *Kapha* is the product attribute of earth and water factors of the *pancamahabhuta*. Thus the *tridosa* theory of Ayurveda is essentially a biological application of the *panca mahabhuta* theory of Hindu physics. Sometimes the three *dosas* are understood as the three conceptual constructs developed by the propounders of Ayurveda to explain the human physiology in an unique holistic way. Apparently the total human body consists of a mass of solid substratum added over it with an intensive interplay of chemical activity and an energy pool of motion and movement. All these three aspects coexist in a genetically predetermined proportion and function in a manner complementary to each other in the interest of the overall function of the total organism inspite of their opposite properties and functions. Out of the above, the solid substratum of the body is represented by *Kapha*, the chemical moieties by the *Pitta* and the motional energy component by the *Vata*. The existence of the three *dosas* can be felt in the gross body as a whole and can also be traced at the molecular level. Each cell of the body consists of a mass substratum, a chemistry and an operative energy. They are the *kapha*, *pitta* and *vata* aspects of the cell organelle respectively. The proportion of the three has to remain in an appropriate range of normalcy. This range of proportion varies from organ to organ, tissue to tissue, cell to cell. For example a nerve cell i.e. a neuron in the

brain may have higher value of *vata* activity than the other two *dosas, while* a cell of an endocrine gland-like the cells of the thyroid has more of *pitta,* and the relatively inert cells of the bone tissue like the osteocytes or muscle cells may have more of *kapha* function than others.

The Dosa Prakrti, i.e., Constitution

The relative proportion of the three *dosas* is very important. The genetically determined relative proportion of the three *dosas* within the normal range is called *dosa prakrti.* Depending upon a variety of prenatal factors there develops a particular pattern of relative preponderance of one or the other of the three *dosas* in an individual's constitution and this genetically determined normal preponderance is responsible for determining the total personality makeup representing the sum total of his physique, physiology and psyche. Thus the *dosa prakrit* is an important consideration in the understanding of human life, health, disease, disease susceptibility, preventive and promotive health care and treatment requirements of a patient. The Ayurvedic texts describe in detail the physical, physiological and behavioural features of the persons of different *prakrtis.* Ordinarily the texts describe seven types of *dosa prakrtis.*

The Trigunas, i.e., Qualities Of Mind

The *pancamahabhutas* are represented in the psyche of an individual in terms of the three *gunas* of the *manas* or mind i.e. *triguna* viz. *sattva*, *raja* and *tama.* The *akasa tattva* is represented in *sattvaguna. Vayu* and *teja* are represented in *rajoguna* while *prthivi* and *jala* are represented in *tamoguna.* The *tamoguna* represents mass and inertia while the *rajoguna* represents dynamicity and activity. The *sattva* is the state of complete balance. Depending upon the genetically determined relative preponderance of one or the other of the three *gunas* the psychic makeup of an individual varies. This variation is categorised as three major *manasa prakrtis* further subdivided into sixteen subtypes or traits. In principles an average normal individual is the total combination of all the 16 traits. However one of the traits may predominate giving characteristic features to him and that becomes his mental type or *manasa prakrti.*

Svabhavoparamavada And Self Healing

Ayurveda propounds an important theory of natural self-cure and spontaneous healing through the doctrine of *'svabhavoparamavada'.* According to Ayurveda the human body is inherently endowed with an unique power of self defense and spontaneous healing against injury and disease. The body heals itself and a natural cure follows after every injury and insult. The role of medicine is only to assist the Nature.

Basic Causes Of Disease

Inspite of the rich resource of natural resistance and immunity of the body technically termed as *vyadhiksamatva*, people do suffer from a variety of mental and physical disorders warranting medicinal interventions. Hence, it is necessary to write a few lines about the causes of disease as conceived in Ayurveda. Ayurveda propounds that the primary cause of all diseases is the failure of harmony between the man and his environment i.e. the interaction of the microcosm with the macrocosm referred to in Ayurveda as the *purusa* and the *loka*. Fundamentally the *loka-purusa* interaction takes place at the level of three factors i.e. (1) *Kala* or time factor and its chronobiological influences, (2) *Buddhi* or intellect of man as the major source of thought information and (3) *Indriyarth* or the objects of the five sense organs as the source of stressful information from the macrocosm to the microcosm. The normal functions of *Kala*, *Buddhi* and *Indriyartha* are the important attributes of the life process. But their unwanted malfunctions classically termed as *ayoga*, *atiyoga* and *mithyayoga* are considered as the primary cause of disease. The *ayoga*, *atiyoga* and *mithyayoga* of *kala*, *buddhi* and *indriyartha* are termed as *kalaparinama*, *prajnaparadha* and *asatmyendriyartha samyoga* respectively and are considered the primary cause of all diseases. All other causes of ill health known and described in different schools of medicine are secondary to these primary factors which are essentially environmental factors. Thus the cause of the disease according to Ayurveda lies in the environment and so also the cure is to be found in the Nature.

Evolution Of A Disease And Dosika Rhythm

When an individual is indisposed through the above mentioned etiological factors, the disease process ensues in the form of *tridosika* arrhythmia and vitiation of *dosas* which may lead to irreversible diathesis giving rise to a full fledged disease. Susruta Samhita a leading Ayurvedic classic describes six stages of the evolution of a disease depicting them as the specific opportune stages for applying appropriate therapeutic interventions. These stages are appropriately termed as *satkriyakala*, viz., (1) *Sancaya* (stage of accumulation of *dosas*), (2) *Prakopa* (stage of vitiation), (3) *Prasara* (spread), (4) *Sthana-samsraya* (localisation) (5) *Vyakti* (stage of manifestation) and (6) *Bheda* (stage of chronicity and complications). The precision adopted in describing these stages of disease process in relevance to the needed therapeutic intervention is a unique concept and exhibits the intensity and purpose of an observation. The basic philosophy behind the concept of *kriyakala* is to emphasize the need of early detection of a disease and an appropriate timely therapeutic intervention so that the disease process may be reversed towards normalcy without waiting for cure of an end stage disease to manifest. An Ayurvedist will be likely to detect the defect right at the moment when the

seed of the disease is just sown. As a matter of fact the stage of *sancaya* is the seed stage of the disease.

The Agni And Ama

In the above context it is often questioned, why the *Dosas* start getting accumulated. Rather what is the main triggering factor which is responsible to precipitate the *kriyakala*. Among many factors *Agni* the digestive and metabolic fire of the body is considered the most important factor. There are thirteen types of *Agnis* in the body which are responsible for digestion of food and metabolism at different levels. When the *Agni* becomes weak, a number of unwanted unripe by-products of digestion and metabolism start forming and accumulating in the body at different levels from gross to the molecular level, from local GIT level to the systemic level over tissues and cells. Such products are called *Ama* and those act as toxic and antigenic materials. The presence of *Ama* renders an *Ama state* in the body which is characterised by increasing impermeability and sluggishness of the body channels named *srotas*. Such a state of the body allows *Sancaya* of *Dosas* which is the first *kriyakala* and the subsequent sequence of events follow as a compulsive phenomenon. It is in view of this fact that Ayurveda categorically emphasises that all disease are the product of weak *Agni* and in turn the main principle of treatment of all diseases in Ayurveda is to restore and to strengthen the *Agni,* i.e., the digestion and metabolism.

The Ayurvedic Diagnostics

The diagnosis in Ayurvedic medicine is not always in terms of the name of a disease, but is in the form of a description of the disease process depicting the pattern of vitiation of *dosas* and *dushyas*, the seat of morbidity, i.e., the organ or *srotas* involved and the quality of life, health and personality of the patient. All this demands a very extensive interrogation and examination of the patient. Ayurveda makes a two-fold approach to diagnostics viz., (1) Examination of the patient i.e. Rogi-pariksa; (2) Examination of the disease, i.e., *Roga-pariksa*. *Rogi-pariksa* is essentially concerned with ascertaining the constitution of the individual and status of his health and vitality. It is not meant for the diagnosis of the disease. The emphasis on ascertaining the constitutional background and evaluation of the status of health in a diseased person is an unique concept of Ayurveda. Ayurveda advocates to undertake this part of clinical examination keeping in view the fact that such informations about the patient are always of great help in presuming the diagnosis in prognostication and in deciding the overall line of management and treatment of the patient. Caraka, the foremost authority on Ayurveda describes a tenfold methodology for this part of clinical examination which consists of (1) *Prakrti* (constitution), (2) *Vikrti* (disease susceptibility), (3) *Sara* (quality of tissues), (4) *Samhanana* (compactness of the body), (5) *Pramana* (anthropometry), (6) *Satmya* (adaptability), (7)

Sattva (mental stamina), (8) *Aharasakti* (digestive power), (9) *Vyayamasakti* (physical strength), and (10) *Vaya* (age and rate of aging).

The *Roga-pariksa* or pathological examination is carried out with the view to diagnose the present disease. This is usually done in three parts viz. (1) Interrogation for main complaints and history, (2) General examination by popular eight-fold examination including pulse, urine, stool, tongue, skin etc. and (3) Systemic examination of the whole body including the thirteen gross channels, the *srotamsi* spread over the *sadangas* or the six major parts of the body viz., head-neck, chest, abdomen and the extremities. The pulse reading is considered as one of the most important aspects of clinical examination. Having acquired necessary experience and expertise an Ayurvedic physician is supposed to know a lot about the health and disease of his patient through pulse reading. Many physicians claim to depend entirely on pulse reading for making a diagnosis although classical Ayurveda does not make any such claim.

Promotive And Preventive Health Care

Ayurvedic medicine is essentially promotive and preventive in approach. However, it also provides a comprehensive system of curative medicine for the treatment of the sick adapting a holistic approach. In accordance with the four dimensional concept of *Ayu* or life, Ayurveda conceives a four dimensional definition of 'health'. Susruta, one of the classic authors on Ayurveda defines health as '*svasthya*', i.e., a state when an individual is in a state of '*samya*' or balance of the three *Dosas*, the thirteen *Agnis*, the seven *Dhatus* and the *Malas*, i.e., he is in the state of total biological equilibrium besides being in the state of sensorial, mental and emotional and spiritual well-being (*Prasanna*). Thus Ayurveda presents the most complete definition of health for the first time. The Ayurvedic texts describe a comprehensive schedule of health regimen for preservation of health as a code of health conduct popularly known as '*svasthavrtta*'. This includes the daily code of health conduct (*Dincarya*), conduct for the night (*Ratricarya*), conduct in relation to various seasons (*Rtucarya*) etc. Details about life style, diet, exercise, personal and social hygiene (*Sadvrtta*) have been described. Extensive information is available on nutrition and dietetics. Ayurveda also describes in detail the role of periodical biological purificatory measures i.e. *Pancakarma* and consumption of restorative remedies called *Rasayana* for promotion of health, longevity and immunity i.e. *Vyadhiksamatva* or resistance against disease.

The Cure And Its Approach

The object of curative treatment in Ayurveda is to restore balance of *Dosas* (*Dhatusamya*) because according to Ayurveda a disease is nothing but a state of imbalance of *Dosas* or in other words loss of equilibrium or the homeostasis. The therapeutic attempt to restore balance is done by

(1) Augmenting the weakened *Dosas*, (2) Decreasing the increased *Dosas* and (3) Preserving the normal ones. This is done by utilising appropriate diets, drugs and activities drawn from the Nature on the principle of *Samanya* and *Visesa* (homologous vs heterologous). According to the classical doctrine of *Samanya* and *Visesa* a similar or homologous material received from outsides enriches the similars in the body and a dissimilar or heterologous material depletes its counterpart in the body. This is the concept of *samanya* and *visesa* in Ayurveda and is considered the fundamental basis of all actions, natural or artificial in Ayurveda. This is the law of Nature and the same is adapted by a physician in the treatment.

The Three Streams Of Therapy

Ayurveda describes three main streams of therapeutic intervention which may be complementary to each other but most often are used specifically for certain specific categories of ailments. The three classical therapeutic streams are : (1) *Daivavyapasraya cikitsa* (divine therapy), (2) *Yuktivyapasraya cikitsa* (rational therapy), and (3) *Sattvavajaya* (psychotherapy). The divine therapy is specially indicated in *karmika* diseases i.e. the diseases caused by actions of the past life and where no definite acquired cause is traceable and where no rational therapy is effective. The divine therapy is often practised in tune with astrology. Stars, stones, *mantra, japa*, oblations, prayers etc. are the usual therapies for this purpose. This is a kind of astrotherapy. It is neither a psychotherapy nor a therapy of biological significance. Ayurveda describes psychotherapy separately as *Sattvavajaya* and biological therapy as *yuktivyapasraya cikitsa*. The *yuktivyapasraya cikitsa* is the rationally planned therapy taking into account the doctrine of *Pancamahabhuta, Tridosa, Agni, Ama* etc. following the principle of *Samanya* and *Visesa* (homologous vs heterologous). This is essentially a rational biological therapy aiming at restoration of balance or homeostasis (*Dhatusamya*).

The Rational Ayurvedic Therapy

The rational Ayurvedic treatment is carried out in two parts viz. (1) *Samsodhana* or purificatory therapy and (2) *Samsamana* or curative treatment. The *Samsodhana* therapy also popularly known as *Pancakarma* therapy aims to purify the body from gross to subtle levels and to clean the channels of the body to enable free flow of nutrients, medicaments and metabolites. The living human body consists of innumerable channels called *Srotas*. Due to ill-health, wear and tear these channels, get blocked and sluggished. Ayurveda advocates that these channels should be cleaned by *Samsodhana* measures in order to enable the organism to heal itself by spontaneous recovery and also to enable the medicaments to reach the target sites more easily. Thus *Samsodhana* is considered a prerequisite for all kinds of medications and

therapeutic interventions. A number of procedures are described for *Samsodhana karma*. From practical point of view it is practised in two forms : (1) External purification by way of oleation, fomentation and massage where a therapist uses oil bath, heat and physical pressure of massage as the tools of the treatment to soften and mobilise the *Malas* or impurities. External purification measures liquefy the impurities and push them to *kosthas* i.e. gross channels (excretory system) from where they get easily excreted or are expelled with the help of major internal purificatory procedures of *Samsodhana karma*. Thus these external purificatory measures like oleation, fomentation and massage are considered as preparatory measures for the major internal purificatory therapies. (2) Internal purification is the major intervention and consists of *Vamana* (emesis), *Virecana* (purgation), *Anuvasana vasti* (oleos enema), *Asthapana* (non-oleos enema) and *Sirovirecana* (snuffing). These are popularly known as *Pancakarma* or five-fold therapy.

In principles the *Samsodhana karma* is followed by specific *Samsamana* or curative treatment which consists of rationally planned diet, drug and life style. While formulating a scheme of *Samsamana* treatment the physician keeps in view the *Prakrti* or nature of the patient and components of his *Vikrti* or morbidity namely the pattern of vitiation of *Dosas*, *Dhatus* and the *Agni* etc. He takes the help of *Pancabhautika* composition of drugs and diets including their *Rasa, Guna, Virya, Vipaka* and *Prabhava* and follows the law of *Samanya* and *Visesa* (homologous vs heterologous).

The Ayurvedic Materia Medica

The antiquity of Indian Materia Medica goes back to the period of Vedas when certain Vedic Samhitas mention the use of many herbs. Rigveda the oldest literary document presents the knowledge of medicinal herbs in Osadhi-sukta (RV. 10: 47, 1-23). More elaborate descriptions are available in Atharvaveda. However, inspite of the descriptions about these materials one does not find any precise concept of pharmacology in Vedas. The materia medica in true sense with description of the properties of drugs and their therapeutic usage and pharmacology seems to have emerged only through the Ayurvedic classics like Caraka, Susruta and Vagbhatta Samhitas, the former two being historically pre-Buddhist. Caraka Samhita the foremost Ayurvedic classic text devotes the first twelve chapters on Ayurvedic materia medica arranging the drugs in fifty groups according to their action on different functions of the body or on different symptoms of diseases. Susruta Samhita too describes drugs and their botanical categories in detail. Further details are available in subsequent treatises like Astanga Samgraha, Astanga Hrdaya and medieval texts like Bhava Prakasa and several Nighantus i.e. special texts dealing with drugs. The rich literature and lively traditional use of Ayurvedic drugs in popular practice in India attracted the attention of many western scholars and studies on these drugs began in early

nineteenth century. The contemporary literature is worth reference. Ayurveda considers all substances as medicine if used for specific indications and with appropriate formulation, i.e., *yukti*. Caraka proclaims that there is nothing on this earth which is not a medicine: *'Nanausadhibhuta jagati kincit'* (CS. Su 1:69). Accordingly Caraka categorises all the substances in three groups: (1) Animal products viz. honey, secretions, bile, fat, marrow, blood, flesh, excreta, urine, skin, semen, bones, tendons, horns, nails etc.; (2) Mineral products, i.e. the materia medica obtained from earth viz. the metals like Mercury, Gold, Silver, Copper, Lead, Tin, sand lime and Arsenic, Gems, salt, red chalk, Antimony etc. and (3) Vegetable products. The parts of vegetable products used for medicinal purpose are the roots, leaves, bark, pith, exudation, stalk, juice, sprout, cinders, latex, buds, flowers, fruits, oils, ashes, thorns etc. In another context Caraka has described four kinds of principal oils, five kinds of milk and six kinds of plants for medicinal use.

It may be mentioned that the vegetable and animal products cannot be stored for a long period. The vegetable drugs usually become inert after a year.

Thus the Ayurvedic medicine utilises a wide range of materia medica mostly natural products viz., herbs, minerals, animal products and marine originates. They are used for indications in different conditions of health and disease in order to restore the state of balance of milieu interior or *Dhatu-samya* on the basis of their *Pancabhautika* composition on the principle of *Samanya* and *Visesa,* i.e., homology-heterology. The *Pancabhautika* composition of the materials is adjudged in terms of *Rasa* (taste), *Guna* (physical property), *Virya* (biological property and drug potency), *Vipaka* (pharmacodynamics of drug metabolites) etc. Some of these may possess specific action in the body of pharmacologic nature irrespective of their *Pancabhautika* composition probably because of the presence of certain pharmacologically active constituents. This is called *Prabhava.*

Ayurvedic texts describe elaborate methods of formulation of the natural products including their collection and taxonomy, purification, extraction, combination development and posology.

The materia medica of the plant origin is the richest source of medication in Ayurveda. The Ayurvedic physicians use vegetations of all range like trees, shrubs, herbs, aquatic vegetations as well as plants submerged under water. The Ayurvedic texts give specific indications for the selection of the parts of medicinal value in a particular plant such as roots, stems, bark, leaves, flowers, fruits, seeds etc.

It is considered that all parts of a plant are not equally effective. Medicinal activity remains concentrated in a specific part of the plant and hence the same should be chosen for medicinal use. Similarly there

seems to be a profound seasonal variation in the medicinal activity of different herbs and plants. Hence they should be collected for medicinal use in an appropriate season. For example it has been observed that *Sankhapuspi* (Convolvulus pluricaulis) has maximum medicinal activity in its leaves and flowers as compared to its other parts. The activity is maximum in samples collected during the spring season i.e. late winters while its activity goes down to minimum during the rainy season (Udupa and Singh, 1991).

Besides the above considerations a drug collector should always be careful in choosing a plant which should be apparently healthy, mature and free from pollution. The Ayurvedic texts also advocate collecting medicinal material in an auspicious way with all respect to the source and cleanliness. After collection from nature or cultivated resource the raw plants should be dried in shade and suitably cleaned before sending the same for manufacturing final products.

The Pharmacodynamics

Ordinarily the Ayurvedic materia medica is not pharmacologic in the real sense. Most of the materials used as medicine in Ayurveda act more in terms of nutrition dynamics than through drug dynamics. Ayurvedic drugs are soft medications and are more near to food. The action is proportionate to the *Pancabhautika* composition which in turn is responsible for the *Rasa* (taste), *Guna* (physical property), *Virya* (biological property) and *Vipaka* (attributes of drug metabolism) of the respective material. Depending upon the above factors a drug affords to produce its effect on the *Dosas*, the *Vata*, *Pitta* and *Kapha*. A drug and/or a food possessing the *Pancabhautika* properties i.e. *Rasa*, *guna*, *virya*, *vipaka* etc. similar (*Samanya*/homologous) to the nature of a particular *Dosa/Dusya*, increases the same in the system and those with opposite property (*Visesa*/heterologous) deplete the same.

However, there are certain Ayurvedic drugs which are said to produce specific pharmacological action in the body irrespective of their gross *Pancabhautika* composition and *Samanya-Visesa* consideration. This category of drug action is called *Prabhava* and is possibly attributable to the presence of some specifically active principle/chemical constituent in that drug.

The Ayurvedic Pharmacology

The basic foundation of the Ayurvedic pharmacology was laid down by the theory of *Pancamahabhuta* which is considered the physicochemical basis of the human body as well as the diet and the drugs. The actual pharmacotherapeutics in Ayurveda appears to have been based on the doctrine of *Tridosa* which was developed to explain the biological

functions of the body and the attributes of health and disease in terms of their equilibrium and disequilibrium respectively. Restoration and preservation of equilibrium of *Dosas* is the prime objective of pharmacotherapeutics in Ayurveda which is achieved through the principle of homology and heterology (*samanya* and *visesa*) of *Pancamahabhutas* and in consequence of *Tridosas*. As also stated earlier, in general the Ayurvedic drugs act as molecular nutrients for different organs and tissues and their action is explained more on nutrition dynamics than on actual pharmacodynamics. Such a holistic concept of drug action is to be considered in terms of the composition, metabolism and action of a medicinal material. In this context Ayurveda further evolves certain unique concepts on which the Ayurvedic pharmacology in based. They are called *Dravya Guna Samgraha* i.e. seven *Padarthas* of *Dravyaguna* i.e. seven limbic pharmacodynamics as mentioned below :

1. *Dravya* (drug or substance)
2. *Guna* (physical properties)
3. *Rasa* (taste)
4. *Vipaka* (drug metabolism)
5. *Virya* (potency, biological)
6. *Prabhava* (specific action/potency)
7. *Karma* (drug action)

Dravya is the material which is used as diet or drug. All other attributes mentioned above are to be considered as the qualities of the *Dravya*. *Rasa* (the taste) is significant as it is directly perceivable and represents symbolically the *Pancabhautika* composition of a particular *Dravya* or the medicinal material but also as an indicator of its *Pancabhautika* composition because the *Rasa* i.e., taste of a material is constituted by the predominance of one or more of the five *Mahabhutas* in a material. Thus the action of a drug is determined in certain cases by the *Rasa* alone or in co-consideration of certain other attributes. However, it may be mentioned that *Rasa* is not a stable attribute. It ceases to exist after loosing contact with the *Rasanendriya* i.e. tongue. *Rasa* operates only during the period falling between the original contact of the drug with the tongue till the start of its digestion. A drug when administered orally has to undergo digestion before its assimilation. All this brings about major transformation of the material. The final transformation is called *Vipaka*. *Vipaka*, which refers to drug metabolism, is responsible for the drug action such as the action of a drug on *Dosas* etc. Although Caraka describes *Vipaka* to be of three types using words signifying taste viz. *Madhura* (sweet), *Amla* (sour) and *Katu* (pungent) but it is necessary to emphasise that *vipaka* is not perceived like *Rasa* (taste) but is inferred from its action on the three *Dosas, Dhatus* and *Malas*. The *Madhura, Amla* and *Katu Vipakas* promote *kapha, Pitta* and *Vata Dosas* respectively. This is why Susruta prefers to categorise *Vipakas* in two groups naming them (1) *Guru* or heavy and (2) *Laghu* or light because of

the respective *Pancabhautika* composition. In this reference it has to be noted that the *Bhutas* too are of two categories viz. (1) *Guru: Prthivi* and *jala*; (2) *Laghu: Teja, Vayu* and *Akasa*. However their *Tridosika* attributes too can be visualised accordingly. The *Madhura Vipaka* is essentially *Guru* while *Amla* and *katu Vipakas* are *Laghu*.

Virya is the power or potency responsible for the action of the drug. It is essentially the biological property which needs to be protected and preserved in a drug because if the *Virya* is destroyed or decayed, there may not be any action. This is why Ayurveda always asserts the proper collection, preservation and formulation or manufacturing of a drug in proper season, proper age of the plant and its proper part for medicinal use. Prof. P.V. Sharma considers *virya* as the power of a drug which resides in the active principle or active fraction or active chemical constituent of the drug. He further admits that *virya* of a drug can be isolated from a drug and its action can be tasted on *Tridosika* attributes and *Sadupakramika* therapeutics considering *virya* to be of six types, two for each *Dosa*, one to increase and the other to decrease as per following scheme.

Sat Virya	**Sadupakrama**	**Vata**	**Pitta**	**Kapha**
Guru	Brmhana	Decrease	-	-
Laghu	Langhana	Increase	-	-
Usna	Svedana	-	Increase	-
Sita	Stambhana	-	Decrease	-
Snigdha	Snehana	-	-	Increase
Ruksa	Ruksana	-	-	Decrease

The *Prabhava* is specific potency while *Virya* is the potency in general. *Virya* is responsible for *Dosapratyanika* activity while *Prabhava* is responsible for specific *Vyadhipratyanika* effect. The *Prabhava* refers to the drug specificity in terms of specific tissues and disease-entities where *Dosa* and *Dusya* both are involved in a particular organ or tissue for which a particular drug is specifically responsive because of the presence of a particular constituent. If one views the concept from this angle, the *Virya* and the *Prabhava* appear to be overlapping concepts. As a matter of fact Susruta does incorporate *Prabhava* in *Virya* itself. However Caraka provides prominence to the concept of *Prabhava* according to which the *Prabhava* is the specific drug action irrespective of *Gunas* or gross constituents of a drug while *Virya* is always explainable in relation to the *Gunas* or the gross material properties of the drug. This is why the following expressions are used : (1) *Prabhava* is *Dravya Prabhava* i.e. specific action of the drug; (2) *Virya* is the *Guna prabhava* i.e. action of the properties (Sharma, P.V.).

As a matter of fact the *virya* is nothing but the nonspecific biological potency of the drug which is needed for the *Pancabhautika* action of the drug in terms of its *Gunas* on the principle of *samanya* and *visesa*. This

kind of action is fundamentally not different from the action expected through *Rasa, Guna* and *Vipaka*. Such an action is a holistic drug action more of a nature of molecular nutrient not really of the nature of a specific pharmacological activity. Whereas *Prabhava* is the specific action of a drug which can be described as its pharmacological response referable to an active principle (Singh, RH, 1998).

Gunas are the physical properties of a drug or material. The action of a drug or diet or a life style in general is broadly determined by these *Gunas*. Ayurvedic materia medica conceives 20 *Gunas* described in ten pairs of opposites to be utilised to maintain balance in the body and in the 'Nature' on the principle of *samanya* and *visesa* as mentioned below.

Guru (heavy)	:	*Laghu* (light)
Sita (cold)	:	*Usna* (hot)
Snigdha (unctuous)	:	*Ruksa* (rough)
Manda (dull)	:	*Tiksna* (sharp)
Sthira (immobile)	:	*Sara* (mobile)
Mrdu (soft)	:	*Kathina* (hard)
Visada (non-slimy)	:	*Picchila* (slimy)
Slaksna (smooth)	:	*Khara* (rough)
Suksma (fine)	:	*Sthula* (gross)
Sandra (solid)	:	*Drava* (liquid)

The Mineral Materia Medica

Ayurveda uses extensively minerals and ashed metals as medicine because in contrary to herbal products the mineral products are long lasting and more efficacious. It is also claimed that such preparations become therapeutically more safe and effective when they become old. These mineral products, when processed with *Bhavana dravyas*, adopt their medicinal properties. These minerals are subjected to various systematic processes of *Sodhana* or purification, *Marana* or oxidation etc. before their induction as medicine. The final products, which are in the form of ashes or *Bhasmas* and/or organometallic compounds, are claimed to be more effective than the herbal drugs and are prescribed in much smaller doses.

The mineral materia medica of Ayurveda is classified into *Rasa, Maharasa, Uparasa, Sadharana Rasa, Loha* or *Dhatu* (metals), and *Ratna* (gems and precious stones). The term *'Rasa'* in this context is ordinarily reserved for Mercury though it also covers any mineral or metal in the generic sense. This is why the entire subject dealing with mineral materia medica is called Rasa-Sastra and all the drugs of this category are called *Rasausadhis*. However, P*arada* or Mercury is the principal *Rasa*. The popular medieval text on Rasa-Sastra called Rasa Ranta Samuccaya classifies the mineral materia medica of Ayurveda as below :

(1) Rasa	:	1. Parada (mercury)
(2) Maharasa	:	2. Abhraka (mica)
		3. Vaikranta (turmaline)
		4. Maksika (pyrites)
		5. Vimala (marcasite pyrite)
		6. Silajatu (bitumen)
		7. Tuttha (copper sulphate)
		8. Capala (bismuth ore)
		9. Kharpara (calamite/smithsonite)
(3) Uparasa	:	10. Gandhaka (sulphur)
		11. Gairika (hematite/red ironoxide)
		12. Kasisa (ferrous sulphate)
		13. Sphatika (alum)
		14. Haratal (orpiment)
		15. Manahsila (arsenic disulphide)
		16. Anjana (collyrium)
		Souviranjana (stibnite)
		Rasanjana (yellow mercury oxide)
		Sroto-anjana (antimony sulphide)
		Puspanjana (zinc oxide)
		Nilanjana (lead sulphide)
		17. Kankustha
(4) Sadharana Rasa	:	18. Kampillaka
		19. Samkhiya (arsenic)
		20. Navasadara (ammonium chloride)
		21. Karpada
		22. Vahnijara
		23. Sindura (red oxide of lead)
		24. Hingula (red sulphide of mercury)
		25. Mrddarasrnga (plumbi oxidam)
(5) Lauha (metals)	:	
Siddha Lauha	:	26. Svarna (gold)
		27. Rajata (silver)
		28. Lauha (iron)
		29. Tamra (copper)
Puti Lauha	:	30 Naga (lead)
		31. Vanga (tin)
Misra Lauha	:	32. Pittala (brass)
		33. Kamsya (kansa)
		34. Varta lauha
(6) Ratna (gems)	:	35. Vaikranta (flour spar)
		36. Suryakanta (sun stone)
		37. Hiraka (diamond)
		38. Chandrakanta (moon stone)
		39. Mukta (pearl)
		40. Mani (red gem)
		41. Rajavarta (lapis lazuli)
		42. Panna (emerald)

43. Pukharaja (topaz)
44. Gomeda (onyx)
45. Padmaraja (ruby)
46. Pravala (coral)
47. Vaidurya (cats eye)
48. Nilama (sapphire)

Mineral-Metal Processing Procedures

Sodhana (purification and *Marana* (oxidation) are the basic procedures described for processing the minerals for medicinal use. Minerals contain many impurities which may prove harmful to the human body if used alongwith the therapeutically useful material. Different methods are described to purify the metals/minerals. The generic procedure consists of making thin pieces of the material and heating the same to red hot and then dipping the same in a series of liquids one after another several times, each time heated and quenched in sweet oil, butter milk, cow urine, sour gruel and *kulattha*, a kind of vetch. This processing purifies the metal from its common impurities. This is called *sodhana*. After this processing, what remains is only the pure metal required for further processing/ashing.

Some relatively soft minerals can be used directly after *sodhana* or purification. But the majority of minerals like metals and gems are subjected to the process of *marana* or ashing or oxidation to make a *Bhasma*. It is the *Bhasma* form (ashed organometallic) of the metal/mineral which is used for medicinal purpose. The *marana* procedure ordinarily consists of combining the chosen pure metal with another breaking mineral triturating the same with selected vegetable juices etc. then making into a bolus closed in a crucible and burnt under high temperature several times till it gets calcined and becomes easily powderable *Bhasma*. More and more triturated and burnt better and better is the *Bhasma* as it becomes fine particled and ash like free from active metal in metal form. One may continue to burn the metal hundred to thousand times to make the finest *bhasma* which may float on water when subjected to the *tarana* test i.e. to test the lightness and fineness of the *bhasma* when floated on water.

Such a *bhasma* ordinarily does not contain active metal. The metal is converted into an ash or oxide and is usually in the form of an organometallic compound formed with a number of organic materials used for trituration as *bhavana dravya*. As such if properly prepared a *bhasma* should not have the toxic effects of the original metal. However there is always a need to analyse such products to assess the chemical composition and toxicity level and the dose should be accordingly determined.

The Pharmaceutics

Ayurveda describes five fundamental methods of use of fresh vegetable drugs i.e. *Bhaisajya-kalpana*. The five basic methods are : (1) *Kalka* (paste), (2) *Svarasa* (fresh expressed juice), (3) *Curna* (powder), (4) *Phanta* (hot infusion or light decoction) and *Hima* (cold infusion), (5) *Kvatha* (decoction). The fresh green and or dry plant drugs are processed in the above mentioned five basic formulations for direct prescription on daily basis as per need and suitability of the material and feasibility. These five forms of preparations are collectively called *panca kasaya kalpana*. Ayurveda also prescribes many drugs in the form of milk extract or *ksirapaka* viz., *Rasona ksirapaka, Arjuna ksirapaka, Bhallataka ksirapaka* etc. Probably this procedure is adopted in case of drugs which contain milk soluble or fat soluble active constituents.

For long term use and storage other formulations are advocated viz. *Ghanasattva* (concentration), *Putapaka* (roasting), *Avaleha* (malt), *Vati* (pills), *Asava* and *Arista* (fermented extracts) etc. *Ghanasattva* is the dry concentrated material made by drying the decoction in order to make it in the form of pills of suitable size and dosage. *Avaleha* is a malt preparation of natural drugs made by concentrating decoctions added with other necessary remedies, preservatives and flavours for lickable administration. Certain medicines are prepared in the form of *Khanda* i.e. drug sweet formulations. The *Asavas* are the cold percolation extracts of herbs and fruits with minimal self generated alcoholic content after fermentation. Similarly the *Aristas* are the similar natural alcoholic preparations of herbs and fruits which are essentially prepared by fermenting the decoctions.

Ayurveda advocates the local and oral use of a number of drugs in the form of medicated oils and *Ghrtas* for which elaborate pharmaceutical methods of *Taila* and *Ghrtapaka* are described in *Rasa-Sastra* texts. This kind of formulation is used in case where oil/fat is needed as a vehicle or for oleation effect such as for massage etc. or in case of drugs which possess active principles soluble in fat.

Single And Compound Formulations

As stated earlier Ayurveda always adopts a holistic approach in medication. It uses whole crude plant drug, which is supposed to be the mixture of many constituents some of which are pharmacologically active, some may be nutrients while some others may be the antidotes to take care of the potential side effects. The whole thing is a natural combination which has had allowed the life of the plant. Thus even a single drug used in Ayurveda is a mixture. But in practice it would be seen that Ayurveda uses not only single plant drugs but also the complex compounds of many herbs and plants mixed together. There seems to be in existence comprehensive principles for combining different herbs in a

formulation. Some of the constituent herbs are put-in for synergistic action, some as antidotes, some to help assimilation of the main drug while some are added for additional therapeutic effect needed in the indication of the proposed compound.

Many times Ayurveda advocates herbomineral compounds too, where several herbs are mixed with certain metals and minerals. Common examples are *Arogyavardhini, Navayasa lauha, Sutasekhara rasa* etc. Addition of metals and minerals in herbal formulations have many advantages. The metals and minerals increase the potency of the compound, act as trace elements to allow the reach of the drug at target sites and to act as preservative for the overall compound.

Besides the classical formulations described in Ayurvedic classics and medieval texts, in modern times many neoformulations are being developed by physicians and pharmaceutical industries to produce more safe, effective and convenient medicaments. The present Ayurvedic drug market is full of such formulation products. They are becoming popular because they are available in acceptable form, shape and presentation on the line of modern drug presentations. Such tablets, capsules, syrups, malts, granules, creams, ointments etc. are being produced in growing number. While formulating such products, the producers are utilising the practical experience of certain successful practitioners and the results of some current scientific researches in the field of Ayurvedic medicine. However, there is need for careful planning of dosage concentration of neoformulations.

Bibliography

1. Achyuta Laxmi Pathi (1944) : Ayurveda Siksa : in 13 volumes, Tain Bhaskarodaya Press, Jamnagar.

2. Antia, N.H. (1981) : Report on 'Health for All : An Alternative Strategy'. Joint Panel of Indian Councils of Social and Medical Sciences Research, Govt. of India, New Delhi.

3. Bhava Misra (16th cent. A.D.) : Bhava Prakasa in 2 volumes, Ed. by Mishra, B.S., Chaukhamba Publications, Varanasi.

4. Caraka, Caraka Samhita (700 BC) English Translation and Ed. by Sharma, P.V. Chaukhamba Orientalia, Varanasi, India.

5. Dash, Bhagwan and Kashyap, Lalitesh (1981 to 1982) : Diagnosis and Treatment of Diseases in Ayurveda. In 5 vols. Concept Publications Company, New Delhi.

6. Dwarakanath, C. (1956) : Fundamental Principles of Ayurveda, reprinted 1999 Chaukhamba Surbharati Publication, Varanasi, India.

7. Frawely, David (1989) : Ayurvedic Healing : Motilal Banarasi Das Publications, New Delhi.

8. Karnick, C.R. (1994) : Pharmacopeial Standards of Herbal Plants in 3 volumes, Sri Satguru Publications, New Delhi.

9. Kirtikar and Basu (1984) : Indian Medicinal Plants in 4 Volumes. Periodical Expert Book Agency. India.

10. Madhavakara (9th cent. A.D.) : Madhava Nidana, (Ayurvedic Clinical Diagnosis) in 2 volumes, English Translation and Commentary by Singhal et al. Chaukhamba Publications, Varanasi.

11. Mamgain, P. and Singh, R.H. (Supervisor) (2000) : A study on Hrdroga and evaluation of certain Ayurvedic cardioprotective drugs. Ph.D. thesis Kayachikitsa, Banaras Hindu University, India.

12. Nadkarni, K.M. (1982) : Indian Materia Medica in 2 volumes : Popular Prakashan, Bombay.

13.. Pushpangadan (1992) : Proceedings of First International Conference on Ethnopharmacology, Trivendrum, India.

14. Rao, S.K. Ramachandra (1985) : Encyclopedia of Indian Medicine in 3 Volumes. Popular Prakashan, Bombay, India.

15. Rastogi, R.P. and Mehrotra, B.N. (1993) : Compendium of Indian Medicinal Plants in 3 Volumes. CDRI Lucknow and Publication and Information Directorate, New Delhi, India.

16. Sarngadhara, Sarngadhara Samhita (13 cent. A.D.) : Commentary by Srikantha Murthy, K.R.; Ist Edn., Chaukhamba Publications, Varanasi.

16. Sushruta, Susruta Samhita (700 BC) Ed. Singhal, G.D. et al Chaukhamba Surbharati, Varanasi, India.

17. Sharma, P.V. (1972) : Indian Medicine in Classical Age, Chaukhamba Publications, Varanasi, India.

18. Sharma, P.V. (1996) : Classical use of Medicinal Plants, Chaukhamba Publication, Varanasi, India.

19. Sharma, P.V. (1994) : History of Medicine in India, Pub. Indian National Science Academy, New Delhi, India.

20. Singh, M.P., Singh, R.H. and Udupa, K.N. (1982) : Antifertility Activity of Benzene Extract of Hibiscus rosa-sinensis flowers in Female albino rats. Planta Medica Vol. 44 : 171-174.

21. Singh, R.H. (1992) : Preventive and Social Medicine in Ayurveda. In History of Medicine in India : Indian National Science Academy, New Delhi.

22. Singh, R.H. (1998) : The Holistic Principles of Ayurvedic Medicine Chaukhamba Surbharati Prakashan, Varanasi, India.

23. Singh, R.H. (2000) : Ayurveda in India Today. Proc. International Symposium on Traditional Medicine WHO Kobe Centre, Japan.

24. Singh, R.H. (2000) : The unique holistic principles of Ayurvedic Diagnostics and cure. Proc. World Sanskrit Conference p. 123, Ministry of Human Resource Development New Delhi.

25. Smit, H.F., Woedenbag, H.J., Singh, R.H., et al (1995) : Ayurvedic herbal drugs with possible cytostatic Activity. Jour. Ethnopharmacology 47(2): 75-84.

26. Smit, H.F., Woerdenbag, H.J., Jwaving, J.H., Singh, R.H. et al. (1997) : Selection and Evaluation of Ayurvedic herbal drugs useful in the treatment of malignant swelligns. Jour. European Ayurvedic Society 5: 113-128.

27. Udupa, K.N. (1974) : Advances of Research in Indian Medicine. Banaras Hindu University Publication Cell, BHU, Varanasi, India.

28. Udupa, K.N. (1958) : The Udupa Committee Report on Indigenous Systems of Medicine in India. Ministry of Health, Govt. of India New Delhi Publication.

29. Udupa, K.N. and Singh, R.H. (1970) : Science and Philosophy of Indian Medicine. Pub. Shri Baidyanath Ayurveda Bhawan, Nagpur, India.

30. Vagbhatt, Astanga Sangrah (300 AD) : Ed. Murthy Srikantha : Chaukhamba Prakashan, Varanasi, India.

31. Warrier, P.K. and Nambier, V.P.K. (1993-1996) : Indian Medicinal Plants - A Compendium of 500 Species; in 5 volumes, Orient Longman Ltd., Madras, India.

32. WHO (1978) : Health for All by 2000 AD. Alma Ata Declaration. World Health Organisation, Geneva.

34. WHO (2000) : General guidelines for Methodologies on Research and Evaluation of Traditonal Medicine. World Health Organisation, Geneva.

35 Zimmerman, Francis (1990) : Ritu Satmya, The seasonal cycle and the Principle of Apropriateness. Soc. Sc. and Medicine Vol. 14 B pp. 99-106 Pergaman Press.

36. Zysk, Kenneth, G. (1996) : Medicine in Veda. Indian Edition Motilal Banaras Das, New Delhi, India.

APPENDIX 5

Health Systems in Andhra Pradesh

Rachel Chatterjee

Situation Analysis

With a land area of 2.75 lakh square kilometers, Andhra Pradesh is the fifth largest State in India. It is also the fifth most populous state in the country. Its estimated population is 76 million in mid-2000, which accounts for 7.6 per cent of the country's population. The estimated growth rate of population in 1999 is 1.35 per cent per annum, which is the third lowest among the major states of India after Tamil Nadu (1.13 per cent) and Kerala (1.15 per cent). At this rate of increase, the population of Andhra Pradesh is projected to touch 100 million mark by the year 2020. However, if the demographic goals set in the State Population Policy of 1997, are achieved within the time frame, the population of the State is expected to touch 88 million by 2020. About 30 per cent of the people of the State live in urban areas.

The State is divided into 23 districts distributed in three regions, i.e., Coastal Andhra, Telengana and Rayalseema. There are significant differences among and within these regions in socio-economic development, cultural beliefs and practices. Annexure I (attached) presents the population size, its growth rate, density, percentage of urban population and percentage of scheduled castes and scheduled tribes in different districts of Andhra Pradesh according to the 1991 census.

The more prosperous coastal region of the state, housing its rice-bowl, has a higher density of population, a lower growth rate and better demographic, health and socioeconomic indicators than the other regions (Table 1).

Table 1

Region / State	CBR in 1996*	CDR In 1996*	Female literacy Census 1991 (%)	Per capita Agricultural value in 1995 (Rs.)**	Infrastructure Development Index 1995**
Coastal Andhra	20.6	2.12	36.6	3043	108.0
Rayalseema	23.9	2.75	30.7	2363	91.1
Telangana	24.7	2.89	29.2	1566	93.7
Andhra Pradesh	22.8	2.54	32.7	2234	104

Source: * Balasubramanyam (1999), IIHFW
**Centre for Monitoring Indian Economy (2000)

Socio-economic indicators and health status

The percentage of scheduled castes and scheduled tribes constitute nearly 22 per cent of the total population. There is, however, considerable variation in the percentage of SCs and STs in different districts, with Khammam showing a high of 42 per cent, and Hyderabad a low of 10 per cent. In the Indian context, poverty has social and cultural dimensions, and economically weaker sections normally belong to the lowest caste group. The poorer health outcomes among SCs and STs in the state also

reflect the relationship between health and socio-economic status (Table 2).

TABLE 2
Literacy and Child Mortality by Caste, 1998-99

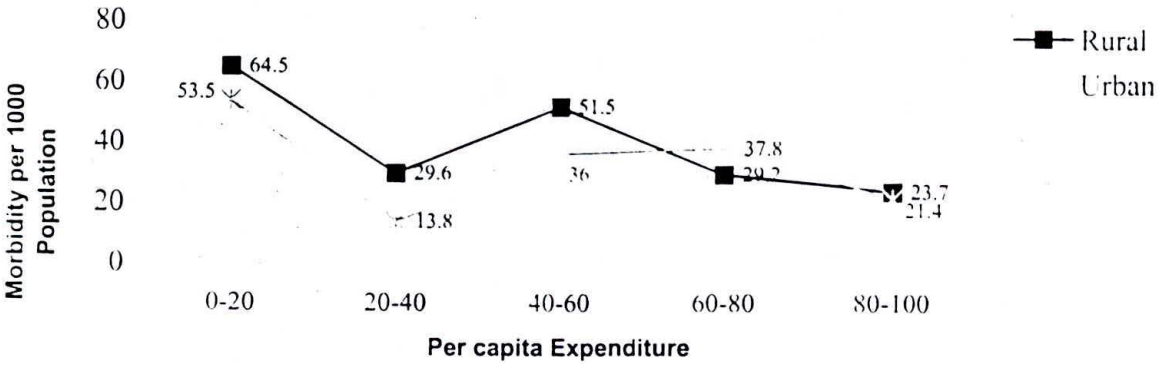
Caste / Tribe	Percent illiterate among ever married women age 15-49	Infant mortality rate	Under – 5 mortality
SC	76.0	95.4	122.4
ST	88.6	(103.6)	(115.9)
Other backward classes	70.1	69.7	89.5
Other	43.3	47.1	64.7
All	63.8	70.8	91.3

Source: NFHS - 2

Poverty and Ill Health

The relationship between poverty and health status is complex and constitutes a vicious circle. There is enough evidence to reveal that poverty and health have an inverse relationship. The converse is also true: ill health leads to poverty. In many families due to expenses incurred for treatment and loss of wages on account of ill health, families have been reduced to impoverishment. Breaking this vicious circle will largely depend upon both reduction of poverty and improvement of health status. A study estimating incidence of illness by per capita expenditure group in Andhra Pradesh indicates that, in general, there is an inverse relationship between incidence of illness and per capita expenditure affirming the relationship between ill health and poverty (Figure 1).

Figure 1
Morbidity by Per capita Expenditure, Andhra Pradesh, 1986-87



Source: P. Satya Sekhar, 1997, Economic & Political Weekly, Vol.32, No 12, March 1997

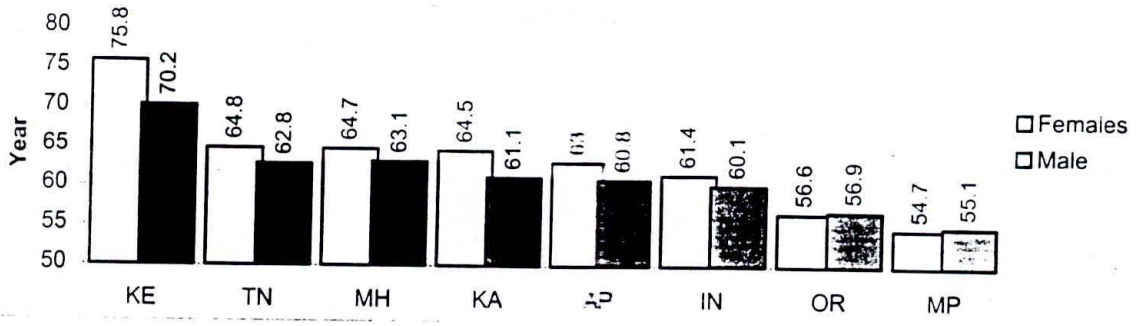
Health Status

Life expectancy is an indicator of the health status and socio-economic development of a given population. In Andhra Pradesh it is estimated at 60.3 for males and 62.8 for females in 1991-95[1]. This is slightly higher than the national average of 59.7 for males and 60.9 for females, but is

[1] Registrar General of India 1997

lower than life expectancy in the other southern states and Maharashtra (Figure 2).

Figure 2
Life Expectancy in Andhra Pradesh and select States



Source: Registrar General, Census of India, 1997

Other major mortality and fertility indicators are indicated in Table 3 below:

Table 3
Demographic and Health Indicators of Andhra Pradesh

	1971-73	1981-83	1991-93	1995-97
CBR	34.1	31.2	24.9	23.2
TFR	4.5	3.9	2.8	2.6*
CDR	15.8	10.7	9.2	8.4
IMR	109.0	81.0	69.0	65.0
Neonatal	65.0	56.3	48.8	49.1
Post-neonatal	44.0	24.5	20.3	15.9
Peri-natal	66.1	50.8	53.1	49.5

Note: *Average of 1995 and 1996 only
Source : SRS, various years, Registrar General, Census of India

While the birth rate is steadily declining in the state, mortality rates are a major cause of concern. The adult mortality rate is one of the highest in the country, and is stagnating in the 90s[2]. The situation with the infant mortality rate is worse, with the neo-natal component showing no decline at all in the nineties.

A comparison of the performance of Andhra Pradesh in respect of health outcomes with other States reveals that it is the poorest performer amongst the four Southern States, but is a middle performer in relation to the other States (Annexure – II). Table 4 below compares the state's performance with southern states.

Table 4
Health Outcomes in Andhra Pradesh and Select States

	IMR	CMR	TFR	% of children with anaemia (6-35 months)	% of women with anaemia (15-49 years)
India	67.6	94.4	2.9	74.3	51.8
A.P.	**65.8**	**85.5**	**2.3**	**72.3**	**49.8**
Kerala	16.3	18.8	2.0	43.9	22.7
Tamil Nadu	48.2	63.3	2.2	69.0	56.5
Karnataka	51.5	69.8	2.1	70.6	42.4

Source: SRS, Registrar General of India, & NFHS – 2, IIPS and ORC Macro, 2000

[2] James 1997

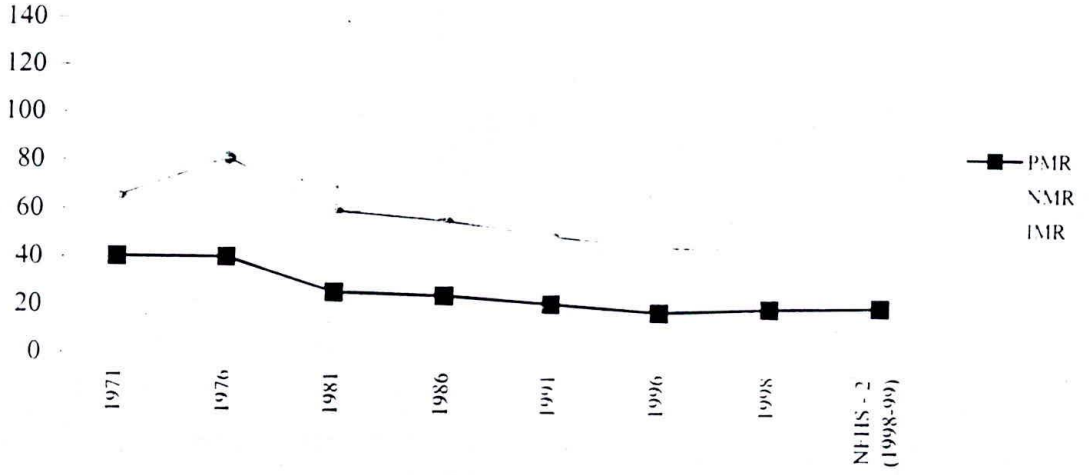
Infant Mortality and Maternal Mortality

Infant mortality and maternal mortality are recognised as sensitive measures to assess the health status of a population. There is no reliable data at all-India and State-level on Maternal Mortality Ratio (MMR). NFHS 2 estimates MMR at the all- India level to be 540 per 100,000 live births, but has not estimated state-level MMRs in view of the inadequate sample size. Sample Registration Survey (SRS) figures estimate MMR for A.P. in 1998 to be 159 per 100,000 live births, which is considered a gross underestimate. A study sponsored by WHO in Anantapur District in 1994-95 estimated maternal mortality to be as high as 830 deaths for 100,000 live births[3]. Studies in 5 districts of Andhra Pradesh in 1997[4] have estimated the MMR to be 712 deaths per 100,000 live births. However, since data was limited to three PHCs in each district only, it is inadequate to assess the maternal mortality ratio. It appears reasonable to put the estimate of maternal mortality in the state at around 450 per 100,000 live births. This is unacceptably high.

While there has been a decline in infant mortality in the State from around the mid 70s, this decline plateaued off during the mid 80s, picked up again during the period 1989 to 1993 and thereafter, plateaued again around 65 per thousand live births. This is relatively high when compared to the Southern States as also West Bengal and Maharashtra. Infant mortality can be decomposed into two components: neonatal (first 28 days) and post-neonatal mortality (29 days to one year). Neonatal mortality results from endogenous factors relating to the mother and to delivery practices. Post-neonatal mortality, on the contrary, occurs due to exogenous components of the larger environment[5]. The decline in post-neonatal mortality has been quite consistent in Andhra Pradesh over the last 25 years. It continues to decline and its present level of 21 per thousand live births is lower than all India average of 27. This reduction is primarily due to the control of vaccine-preventable diseases and improved management of diarrhoeal diseases and acute respiratory infections. The decline in neonatal mortality, however, has been sluggish since the 1980s, and currently constitutes nearly 70 per cent of total infant mortality in the State, and at 46 per thousand live births is almost equal to the all-India level of 46.1 per thousand live births (Figure 3). The high levels of neonatal mortality are a reflection of the poor socio-economic and health status of mothers in the State.

[3] Bhatia 1985
[4] IIHFW, 1997
[5] James et al, 2000

Figure 3
Neo-natal, Post-neonatal and Infant Mortality Decline in Andhra Pradesh



Source: SRS, various years; NFHS 2

Gender differentials and its impact on Mortality

An important dimension of health status is gender differentials. The sex ratio in the State which has always been unfavourable to women, has been declining steadily since 1951. Other parameters also work to their disadvantage (Table 5).

Table 5
Gender Differentials in Selected Indicators, Andhra Pradesh

Indicator	Female	Male
Sex Ratio (No.of women per 1000 men)	984	1000
Literacy rate (%)	46	67
School attendance (%)		
6-10 years	83	88
11-14 years	55	71
Child mortality rate (1 to 4 years)	**28**	**17**
Percentage of children		
Under weight (weight-for-age)	40	35
Stunted (height – for – age)	40	37
Wasted (weight-for – height)	9	9
Children breastfed (in months)	23	28
Not immunized	5	4
Percentage of sick children taken to hospital for		
Diarrhoea	64	73
ARI	66	72

Source : NFHS – 2, IIPS and ORC Macro (2000).

Gender differentials have serious generational consequences. Low literacy amongst women (the State is on par with Bihar in terms of female literacy), coupled with low nutrition levels explain the endogenous factors that have resulted in high levels, of neonatal mortality. The high incidence of malnutrition amongst women in the State is a cause of great concern. As per NFHS II, 49.8 per cent of women suffer from anaemia, and more than 37 per cent of married women have a body mass index (BMI) less than 18.5 per cent, indicating a very high prevalence of

nutritional deficiency. Nutrition status of children also remains a serious problem with 38 per cent of children under three being under-weight, 39 per cent being stunted and 9 per cent being wasted. 72.3 per cent of children between 6 and 35 months are anaemic[6]. The low nutritional status contributes to substantial morbidities and mortality among children.

Fertility Transition in the State

Fertility continues to decline in Andhra Pradesh against all odds. Analysis of time series data indicates that fertility in Andhra Pradesh seems to have remained more or less stable at around a total fertility rate (TFR) of 5.5 per woman during the 50s and early 60s. From 1966 fertility decline accelerated, with an estimated TFR of 5.2 in 1971-76 (the period before and during Emergency) and 4.5 in 1976-81. Fertility again remained almost constant at around a TFR of 3.9 for four years from 1981 to 1984 (perhaps a carry-over of the Emergency family planning programme backlash), and then it declined steadily in the next few years to reach 2.5 in 1998[7]. NFHS 2 carried out in 1998-99 has revealed that, on an average, women in Andhra Pradesh now give birth to only 2.3 children. While urban fertility has reached replacement level (2.07), fertility in rural areas is about 10 percent above the replacement (2.32)[8].

Rapid fertility decline has occurred in the state mainly due to a significant increase in contraceptive prevalence. NFHS 2 reveals that about 60 percent of married women are currently using some modern method of contraception, a substantial increase from 47 percent at the time of NFHS 1 in 1992-93. Female sterilization and male sterilization (4 percent) together account for 96 percent of overall contraceptive prevalence. During the last few years, Andhra Pradesh has consistently stood first among all the states of India, in terms of sterilisation performance.

In assessing the fertility impact of contraception, age and parity of acceptors of family planning methods are important determinants. NFHS 2 showed that among all the states of India, the lowest median age of 23.6 years for women at the time of sterilization has been recorded in Andhra Pradesh. The survey also revealed that about 40 percent of married women began using contraception when they had 3 or fewer living children. This pattern of first acceptance of contraception at low parities means that family planning has a larger demographic impact than it would if contraceptive use were initiated later. The growing number of couples accepting sterilization at younger ages and at lower parities has made a significant impact in reducing the fertility level[9].

With a female literacy rate of 33%, a median female age at marriage of 15.3 years and a high infant mortality rate, the State is no better than the BIMARU states on these counts. However, its performance in terms of

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[6] NFHS 2
[7] SRS
[8] NFHS 2
[9] James et al. 2000

fertility reduction defies the predominant argument that social development is the key to fertility decline. The state proves that neither a high level of female literacy nor a low infant mortality rate is a necessary condition for the onset of a rapid decline in fertility. This is also evidenced by district level fertility rates (Annexure – III). Comparatively low levels of fertility are recorded in the north coastal districts of Srikakulam and Vizianagaram where the female literacy levels are only around 23% and IMR is as high as 77 and 99 per thousand live births respectively. No particular geographical pattern can be derived from the data. All the districts in coastal Andhra and Rayalseema have fertility below four by 1991. Many districts in Telengana region, considered to be the backward region of Andhra Pradesh, have also achieved this level by 1991 census year[10].

Two broad explanations have been postulated for the decline in fertility in the State. The first is that fertility decline in the State has occurred based on the diffusion hypothesis. The essence of the diffusion of theory is that information or behaviour of one person can have spillover effects on the motivation of another, which could be either positive or negative[11]. This spill- over effect has both geographic and social dimensions. Geographic diffusion is the locational spillover effect. Social diffusion can occur through different means, for example, education, mass media, Government IEC programmes and so on. An attempt to analyse fertility decline in Andhra Pradesh through the diffusion theory does not explain fertility decline fully. For example, while the decline primarily emerged in the coastal region of the State, it did not follow a diffusion process in the neighbouring districts, but begin to occur across all the districts of Andhra Pradesh, simultaneously.

The second argument is that the fertility decline in Andhra Pradesh has occurred due to the family welfare and pro-poor programmes implemented by the Government since the early 1980s[12]. Pro-poor policies have included the implementation of the Rs 2 per kg rice scheme through a vigorous public distribution system, large allocations for pro-poor schemes and the strong promotion of group-lending schemes for women. There are currently 3.66 lakh women's groups in the state, covering 50 lakh rural women, who have mobilized a phenomenal corpus fund of Rs.810 crores by 2000. Group-based lending programmes for women have been established to have had significant impact on reproductive behaviour even in Bangladesh[13]. Other factors that have been quoted as having an impact on fertility is the percentage of women working outside the home and exposure to mass media. Andhra Pradesh has the largest percentage of working women amongst the states of India. An analysis[14] of factors that could have contributed to fertility decline from NFHS I data, in respect of three states – AP, Tamilnadu and UP – has concluded that

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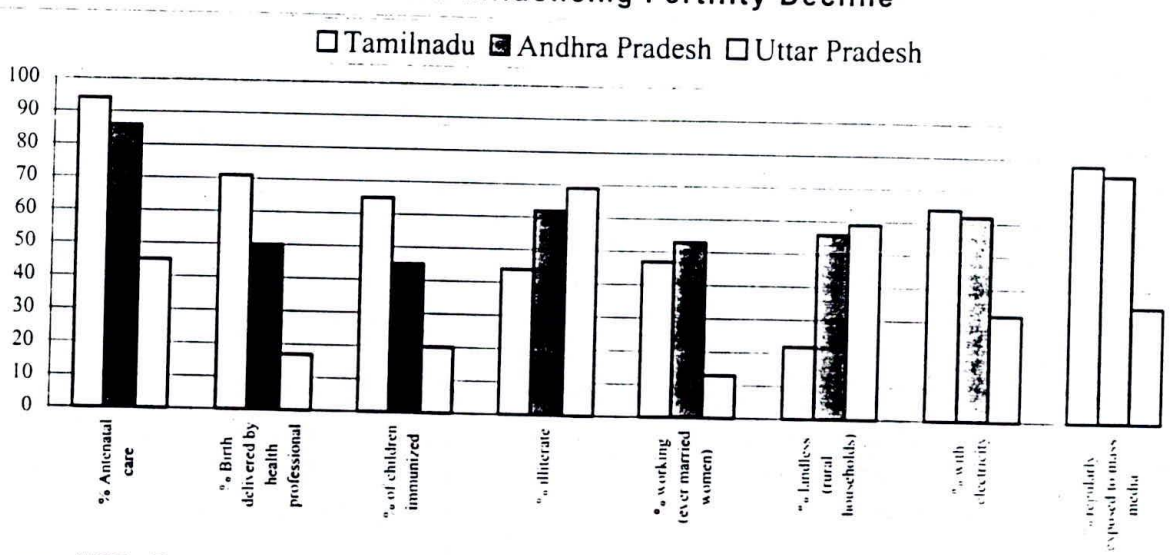
[10] Ibid
[11] Montogomey and Casterline, 1998
[12] James et al, 2000
[13] Pitt et all 1999.
[14] IIPS, Bombay, 1997

effective delivery of mother and child healthcare services, exposure to mass media and working outside the home appear to be factors strongly linked to fertility decline.

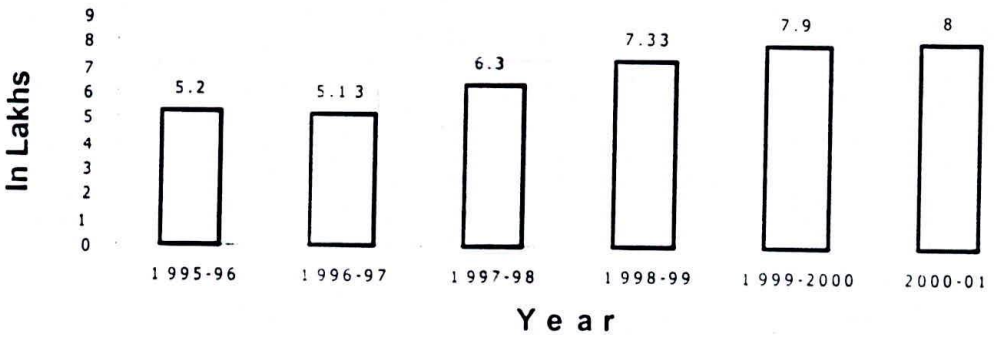
Figure 4
Factors influencing Fertility Decline



Source: IIPS, Bombay, 1997.

Amongst all these factors, it is likely that the effective delivery of the family welfare programme and better governance in the implementation of pro-poor programmes, have had a major impact on fertility reduction. The same system, which has delivered good immunisation and ante-natal services, has provided subsidised food, has implemented pro-poor programmes, has also promoted the small family norm. Since trust has been built up between the provider and the community, the family planning message, conveyed through the same system, has been quite readily accepted. Family planning performance in the late 1990s clearly evidences the impact of specific policies and strategies of the government on contraceptive acceptance. The state government in 1997 announced a Population Policy with specific strategies to implement the programme more effectively. Decentralization was the key strategy for more effective management. District population stabilization societies were formed and authority and funds devolved to local levels. District Collectors were made the Executive Chairmen of the district-level societies and held responsible for the effective implementation of the programme. The programme thus moved out of the confines of the Medical and Health Department with flexibility to implement the programme as per local need. Service Centers for sterilization were increased and re-furbished. Simultaneously, a massive training programme for surgeons in more convenient surgical techniques double-puncture laparascopy and no-scalpel vasectomy-were undertaken. In order to address the insecurity relating to survival of children, a Health Insurance Scheme was implemented through New Assurance India Ltd, wherein a cover of Rs. 20,000 towards hospitilisation charges for a period of five years was assured for the acceptor of sterilisation and his/her two children, subject to a maximum of Rs 4000 per year. Institutional deliveries were promoted through the "Sukhibhava" scheme, through which Rs.300/- was given to every woman who came to a

public health institution for delivery. Rs.15 crores was allocated from the State budget for interventions under the State Population Policy. Additionally, Rs. 35 crores was allocated from State funds towards enhanced compensation for loss of wages for the acceptor of sterilization (increased from Rs.300 to Rs.500 per acceptor). Most importantly, the programme had the backing of the political leadership. The Chief Minister has made family planning central to the development process of the state. It is the favoured topic in all grama sabhas during the Janmabhoomi programme, with the Chief Minister taking the lead in these discussions. (Appendix I gives the details of State Policy, interventions and strategies and a more detailed analysis of the causes for fertility decline in the state). The state has achieved a record 8 lakh sterilisations during the year 2000-2001. The dramatic impact of these measures is clearly revealed in the figure below:



Source: Commissionerate of Family Welfare

So far, empirical evidence linking fertility decline to state policies and interventions is not available. An attempt has been made[15] in recent times to link fertility with village level welfare programmes and family planning activities using data from the national family health survey. The regression analysis demonstrates that village specific factors such as IEC meetings on family planning at village level, which basically measure the Government's role in family planning, have a significant impact on contraceptive use in the State. This suggests that there is an alternative to the Kerala model, that social and economic development need not be a precedent for major social change, and that an effective government, through its policies and able management, can enable fertility reduction.

Morbidity and burden of Disease

Andhra Pradesh has made progress in the reduction of morbidities – prevalence of leprosy has been reduced from 124 per 10,000 population in 1983 to 5.6 by 2000, no cases of guinea worm disease have been reported since 1997, and no fresh polio cases have been reported in 2000. However, the state is plagued with increased incidence of TB, malaria and ARI, and HIV / AIDS has reached alarming prevalence levels.

[15] Towards a Demographic Transition, KS James & SV Subramanian, CESS, 2000

There is, simultaneously, a marked increase in the incidence of non-communicable diseases.

No reliable estimates of morbidity rates are available at the state level in India. An ASCI study on the burden of disease in the state in 1995 estimates that communicable diseases account for 54 per cent, non-communicable diseases 30 per cent, and injuries account for 16 per cent of the percentage of DALYs lost due to the disease burden. Amongst communicable diseases, respiratory infections and perinatal conditions account for 10.3% and 10.1% respectively. Other major causes for DALYs lost include TB(7.8%), diarrhoeal diseases(6.8%) and childhood illnesses(4.6%). In the non-communicable category, cardiovascular conditions account for 10.5% and injuries for 13.2%[16]. Table 6 shows a comparative burden of disease estimate for Andhra Pradesh and four major States. The pattern is similar across States.

Table 6
Burden of Disease – India and States

	Category	India*	**Andhra Pradesh**	Karnataka	Punjab	West Bengal	Uttar Pradesh
% DALY Lost	Category 1	56.4	**54.0**	56.5	53.5	56.0	62.0
	Category 2	29.0	**30.0**	28.0	29.0	28.0	26.0
	Category 3	14.6	**16.0**	15.5	17.5	16.0	12.0

Category 1: Communicable diseases
Category 2: Non-communicable diseases
Category 3: Trauma and Injuries
Source : New Directions in Health Sector Development at the State Level, World Bank, 1997

NFHS 1 and 2 have given prevalence rates for diseases covered under national disease control programme. Table 7 indicates the estimated prevalence in Andhra Pradesh.

Table 7
Number of Persons per 1000 Suffering from Select Disease, Andhra Pradesh

	1992-93			**1998-99***		
	Rural	**Urban**	**Total**	**Rural**	**Urban**	**Total**
Partial Blindness	56.0	39.0	**51.4**	-	-	-
Complete Blindness	7.0	12.3	**8.4**	-	-	-
Tuberculosis	4.3	3.3	**4.1**	4.56	6.95	**5.92**
Leprosy	1.0	1.8	**1.2**	-	-	-
Malaria during last three mont	22.5	11.1	**19.4**	56.33	26.13	**48.51**

Source : NFHS 1 and 2, IIPS Bombay and ORC Macro, 1995 and 2000
Note : NFHS 2 replaced blindness and leprosy with asthma and jaundice

The prevalence of TB and Malaria has increased significantly during this period. While the prevalence of TB is higher in urban areas, the prevalence of malaria in rural areas is almost doublethat in urban areas. (A detailed analysis of the state's performance in respect of diseases covered under National Disease Control Programmes is in Appendix - II).

[16] ASCI 1995

HIV/AIDS in Andhra Pradesh

Given the high prevalence levels. strategies to contain the spread of HIV/AIDS demand special mention. The State has the dubious distinction of having the second highest prevalence rates in the country, the first being in Maharastra. The first case of HIV was detected in the State of Andhra Pradesh in 1986. The gravity of the problem became apparent, however, only in April 1998, through the Sentinel Surveillance System established in 4 regions of the state to assess the prevalence levels in the category of STD and ANC clinic attendees. The shocking figures of 22.53% and 1.53% for STD and ANC clinic attendees respectively, disbelieved initially, were confirmed during the second round in August 1998, with prevalence rates showing 22% and 2.15% respectively for these two groups. The 3rd round of surveillance conducted in August 1999 was even more worrying. It recorded a big increase of 7.05% in one year in the category of STD clinic attendees and 0.28% in the ANC category. The third round indicated that both prevalence levels and spread were high.

The state government has, since 1998, intensified efforts to contain the prevalence and spread of HIV/AIDS. Some of the steps taken by the AP State AIDS Control Society are:

- 108 targetted interventions have been started for high-risk groups (truck drivers, street children, sex workers, men having sex with men, slum population, and prison inmates), with the objective of containing the spread at the starting point. Implemented through 106 NGOs, interventions address issues relating to STD cure and behavioural change. AP's work in the areas of sex workers, prison inmates and street children are considered as "best practices"
- 28 STD Clinics in the State have been fully equipped with adequate drugs, supplies and trained personnel, through which 1.27 lakh STD cases have been treated.
- Family Health Awareness Campaigns are conducted twice a year to identify and cure STDs in every village in the state
- Blood safety is promoted by supporting and monitoring 142 blood banks and ensured that only safe blood is available for transfusion
- A massive and sustained IEC campaign is under way utilising all forms of media (electronic, print, visual, folk art) and , to enhance general awareness on HIV/AIDS. Political leadership, elected representatives, religious leaders and celebrities have been roped in for the general awareness campaign. The awareness level in urban areas is currently 88%[17] and in rural areas is estimated to be 55.3%[18].
- "Convergent Community Action" (CCA) has been launched, involving all self help groups, to generate awareness and to

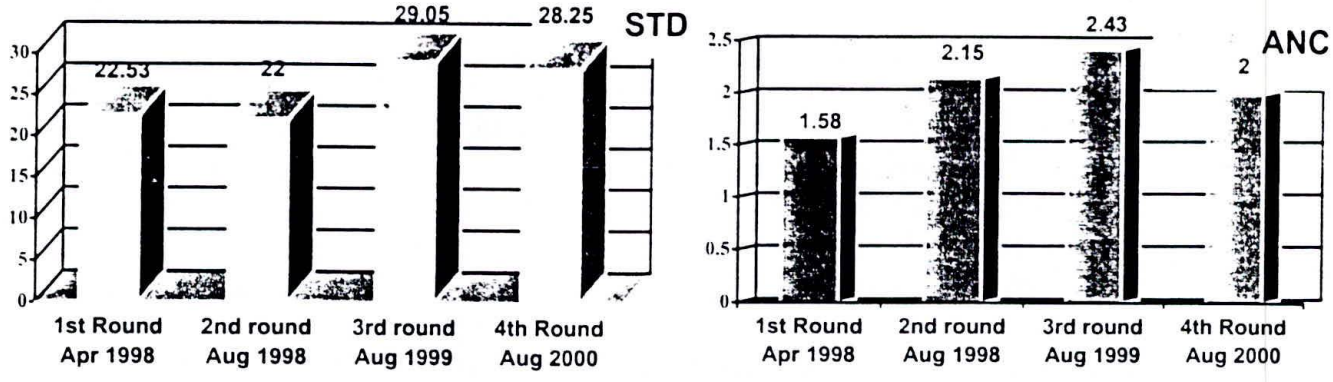
[17] TNSM, 1998
[18] NFHS 2

sensitise the community to issues relating to HIV / AIDS patients. HIV/AIDS has become a central theme in the Janmabhoomi Programme. Industrial houses have been involved in workplace interventions, and support mobilised through the CII

- 4 care and support centres and 23 Voluntary Counselling and Testing Centres have been established. Telecounselling, an interactive voice response system, with a common toll-free number throughout the state, has been established through which around 17000 persons have been counseled so far
- Student specific approaches have been formalised with the introduction of the subject in the syllabus of 10th class and above, and through the NSS in all universities of the state
- A massive training programme has been launched. Apart from the training of public sector medical officers and paramedics, RMPs and PMPs are also trained to identify and refer RTI/STD cases. 620 NGOs working in other sectors have been trained for general awareness, counselling and referrals. In all, around 9500 personnel are trained so far
- The programme has the full backing of the political leadership with the Chief Minister "breaking the silence" on AIDS, talking about prevention and control in various fora, including a full – fledged discussion in every session of the State Assembly.

The above efforts appear to have had a positive impact. The 4th Round of Sentinel Surveillance (August to October 2000) reveals that the prevalence rates of HIV among STD clinic attendees has just started plateauing at 28.25% and among the ANC clinic attendees has dipped to 2.00% (Figure 6). The state needs to intensify and sustain these efforts.

Figure 6
Bar-Chart on STD/ANC prevalence rates from 1998 to 2000



Non Communicable Diseases

Non-communicable diseases already account for a huge share of the burden of disease. The cause of death statistics published by the Registrar General of India for rural areas also gives the percentage distribution of deaths under different disease categories. The estimated

death rate and percentage of death for a few non-communicable diseases are presented in Table 8.

Table 8
Death Rate and percentage of death for a few non-communicable diseases, Andhra Pradesh, Rural 1993

Diseases	Death Rate per 1000 Population	Percentage of Deaths
Heart attack and other heart disease	86.6	8.9
Cancer	36.3	3.7
Diabetes	4.5	0.5
Accidents and Injuries	97.0	10.0

Source: Estimated from Cause of Death Statistics (Rural), Registrar General, Census of India,1993

By 2020 it is estimated that non-communicable diseases will account for 57% of the DALYs lost. An under-financed and over-burdened public health system will find it difficult to deal with this epidemiological transition with its high-cost-per-episode disease profile.

Public Health Infrastructure and Access

Access to healthcare includes physical, economic and social access. The geographic location of health facilities is of prime importance to physical access and has a bearing on costs of healthcare. No doubt, the government has built up substantial health infrastructure in the state. Primary health care is delivered through a network of 1428 primary health centres and 10568 sub-centres, secondary care through 175 community health centres, 56 area hospitals and 21 district hospitals and tertiary care through 31 teaching hospitals. However, as per population norms, the State is still short of 1317 sub-centres, 573 primary health centres and 254 community health centres (Table 10).

Table 9
Primary and Secondary Health Care

Type of Facility	Norms	Current	Requirement	Shortfall *
Sub Centres	1 per 5,000 population in plains are 1 per 3,000 in tribal and hills areas	10,568	11,885	1,317
PHCs	1 per 30,000 population in plains ar 1 per 20,000 in tribal and hill areas	1,386 **	1,889	503
CHCs	1 per 100,000 population	218	472	254
Government Hospitals (upto 30 beds)	no norms	144	-	-
Project Hospit	no norms	6	-	-

* as per norms and 1991 census population figures
** includes 20 Government Dispensaries and 48 Local Fund Dispensaries
Source: Department of Health & Family Welfare, Government of Andhra Pradesh, 2001

Unfortunately, the distribution of the these facilities is extremely uneven, and there are regions in the state, particularly in the tribal belt, where access to public health facilities is extremely difficult, given the distances, terrain and poor communication facilities. A comparison of the population

and the maximum radial distance covered by a PHC in Andhra Pradesh as compared to Southern States shows that the state is at a disadvantage Table 10).

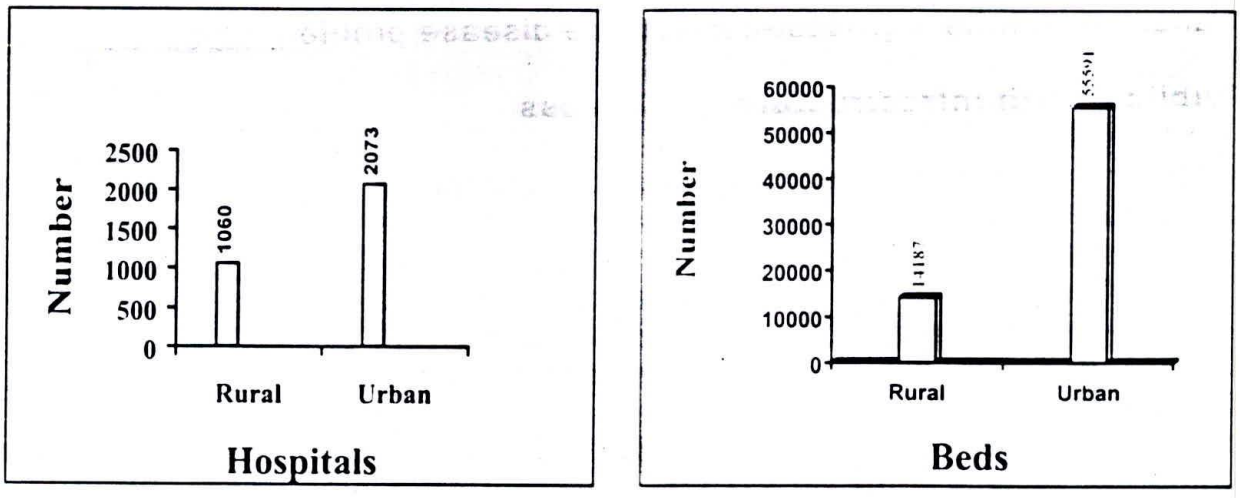
Table – 10

Sl. No		Population Covered by a PHC	Radial Distance (km) covered by a PHC
1.	India	27,364	6.58
2.	**A.P.**	**29,719**	**7.25**
3.	Kerala	22,311	3.43
4.	Tamil Nadu	25,614	5.24
5.	Karnataka	18,537	5.96

Source: Rural Health Statistics,MHFW,GOI, 1999

Urban-rural differentials in terms of hospitals and beds are significant (Figure 7).

Figure 7
Urban Rural Location of Public Hospitals and Beds in Andhra Pradesh



Source: CBHI, 1998

There has also been a consistent decline in the per capita number of public hospitals, dispensaries and beds dispensaries in the 1990s (Table 11).

Table 11
Distribution of Hospital and Dispensaries, Beds and Doctors Per Lakh Population at Different Levels of Hospital

Type of Hospit	Hospitals & Dispensaries		Beds		Doctors	
	1990-91	1997-98	1990-91	1997-98	1990-91	1997-98
Primary	2.54	2.17	14.26	12.3	4.31	3.96
Secondary	0.21	0.22	12.92	12.87	1.61	1.58
Tertiary	0.06	0.05	18.16	16.11	3.34	3.97

Note : Year 1997-98 year data is provisional
Source : Computed from Statistical Abstract of Andhra Pradesh for different periods, Impact and Expenditure Review, Health Sector, Mark Pearson et al, DFID Health Systems Resource Centre, 2001

Thus there are serious problems of physical access to public healthcare in many regions of the state and the situation is not improving. Coverage of outreach services provided through public health facilities also suffers. An ANM, who is required to walk distances up to 10 kms (and this is quite

common in the tribal belts of the state), is less likely to provide outreach services in such villages/habitations.

Compounding the problem of physical access to facilities itself, is the problem of absenteeism, especially of doctors in PHCs and sub-district hospitals. It is unofficial knowledge in the state that around 80% of doctors do not live at the PHC headquarters. Though the figure is better for ANMs, the problem persists with this cadre also (around 40%). The result is that PHCs remain under-utilised and there is an over-crowding of secondary / tertiary level hospitals. The lack of an effective referral system further aggravates this situation. It also results in higher treatment costs for ailments that could have been dealt with at a lower cost at the primary level.

Performance Review

The NFHS has recorded coverage under key preventive health services delivered by the public sector. A comparison between States reveals that Andhra Pradesh is amongst the best performing states in terms of contraceptive use and women receiving antenatal care. In respect of children receiving full vaccinations, which is put at 59 per cent, it is in the middle-performing group of States (Annexure – IV). Table 12 below compares the state's performance with southern states.

Table – 12
Coverage under Key services

	%of Children Receiving All Vaccina-tions	% Married Women Using any Contrac-eptive Methord	Sterili-sation	% of Pregnant Women Receiving at least1 Ante Nata Check Up	% of Pregnant Women Receiving at least 2 Tetanus Toxid Injections	% Pregnant Women Receiving Folic Acid	% Instit Deliverie	% of Births Attended by Health Profession	% of Children Receiving at least 1 Vitamin A Supplemen
All India	42	48.2	36	65.4	66.8	57.6	33.6	42.3	29.7
A.P.	**58.7**	**59.6**	**57**	**92.7**	**81.5**	**81.2**	**49.8**	**65.2**	**24.8**
Kerala	79.7	63.7	51	98.8	86.4	95.2	93	94	43.6
Tamil Nadu	88.8	52.1	46	98.5	95.4	93.2	79.3	83.8	16.2
Karnataka	60	58.3	52.1	86.3	74.9	78	51.1	59.1	48.4

Source : NFHS 2, IIPS and ORC Macro, 2000

Organisation of the Department

The Department of Health, Medical and Family Welfare is one of the largest Departments in terms of human resources with around 85,000 employees. On any given day, over 1.5 lakh persons are attended to in health facilities across the state. And this figure includes only allopathic systems and the major directorates. Appendix III gives details of the organization of the Department.

Public Health Financing

Public expenditure on health is low at 1% per cent of the Net State Domestic Product. This compares poorly with an already poor all-India average of 1.4%. However, private expenditure levels in the State are very high with the result that overall spending on health at 7.4% is above the national average of 5.5%[19]. Per capita government health expenditure in Kerala is Rs.111, in Tamilnadu Rs.100, in Karnataka Rs.93 and in Andhra Pradesh Rs.66. The poor allocations to the public health sector could be the major cause for AP ranking the lowest among the southern states in terms of morbidity and mortality. The only states which have a lesser per capita expenditure are Bihar (Rs.51), Uttar Pradesh (Rs.55) and Madhya Pradesh (Rs.63) (Table 13).

Table – 13
Health Spending for Major States in India, 1993

State	Per Capital Annual Health Exp.			Government Health Expenditure as % of NSDP / NNP	Household Health Exp. As % of Household Income	Total Health Exp. As % of NSDP / NNP
	Govt.	Household	Total			
Kerala	111	482	593	1.8	11.9	9.5
Himachal Pradesh	209	370	579	3.2	6.7	8.9
Bihar	51	223	274	1.4	6.1	7.5
Orissa	74	276	350	1.6	8.2	7.4
Andhra Prad	**66**	**421**	**487**	**1.0**	**7.8**	**7.4**
Karnataka	93	360	453	1.3	8.8	6.5
Rajasthan	83	196	279	1.6	4.2	5.4
Uttar Pradesh	55	175	230	1.2	4.5	4.9
Gujarat	78	259	337	1.0	4.7	4.4
Madhya Prad	63	168	231	1.2	6.9	4.3
Tamil Nadu	100	202	302	1.4	6.5	4.2
West Bengal	73	154	227	1.2	3.4	3.8
Haryana	83	267	350	0.8	4.1	3.4
Punjab	110	282	392	4.5	6.2	3.2
Maharashtra	85	259	344	0.8	5.4	3.2
Assam	66	96	162	1.1	2.4	2.8
All – India	84	250	334	1.4	6.0	5.5

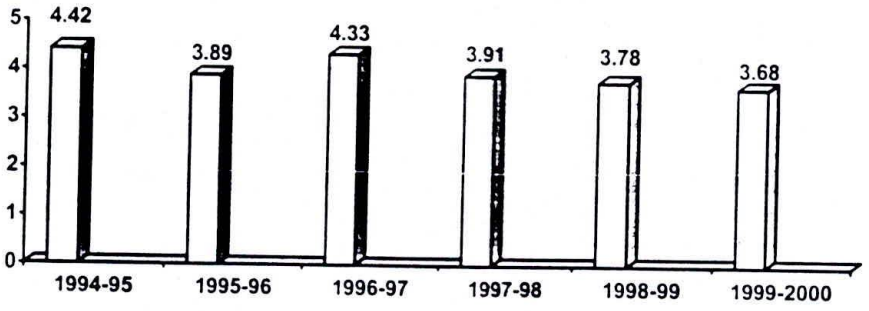
NSDP : Net State Domestic Product; NNP : Net National Product
Source: Shariff et al. (1995-96)

Though public expenditure has been increasing in both real terms (Rs 11.14 billion in 1998-99) and per capita terms (Rs.149 in 1998-99) at current prices, this is largely due to investment in the secondary hospital sector through the World Bank-aided First Referral Health Systems Project. While plan expenditure has grown rapidly because of externally aided projects, the share of plan expenditure devoted to primary healthcare has reduced from over 90% of expenditure in 1994-95 to 67.7% in 1998-99. The share of non-plan resources for primary healthcare has fluctuated between 35% to 40%, and real per capita non-plan expenditure

[19] Shariff et al. 1995-96

for the health sector has actually declined between 1994 and 1998.[20] Thus, a large share of public expenditure is devoted to the secondary and tertiary sectors. This situation is now sought to be rectified through the World Bank-aided primary health component of the AP Economic Restructuring Project which commenced in 1998, (Rs.350 crores) and the proposed DFID's sector-wide aid, commencing in 2002. Despite increased allocations to the health sector, the percentage share of the health budget to the total budget is declining (Figure 8).

Figure – 8
Percentage share of Health Budget to Total Budget

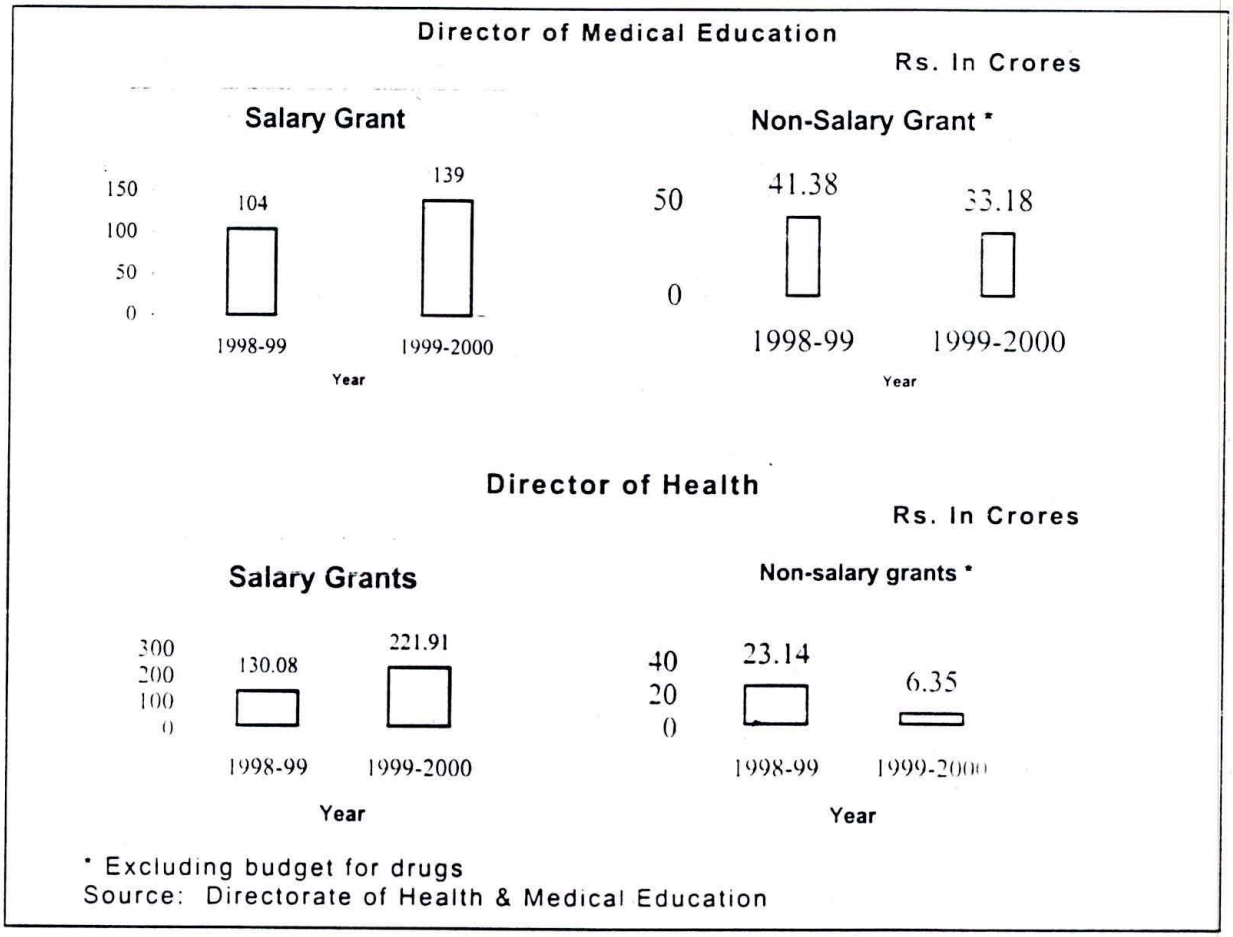


Source: Department of Health and Family Welfare

In terms of financing sources, non-plan expenditure is financed almost exclusively by the Government of Andhra Pradesh, while plan expenditure is financed by Government of A.P., Government of India and donors. A large portion of both plan and non-plan funds are spent on establishment costs, with too little remaining for non-salary essentials such as drugs, consummables, maintenance of equipments/buildings, sanitation and so on. An analysis of 1998-99 and 1999 – 2000 accounts indicates that with the implementation of State PRC recommendations, non-salary grants have been drastically reduced, in particulars for the primary health sector (Figure 9). While the secondary hospitals have not felt the pinch because of project funds, the primary health centres have faced the brunt, reflected perhaps in the low utilisation patterns in the state.

[20] Impact and Expenditure Review, Health Sector, Mark Pearson et al, DFID Health Systems Resource Centre, 2001

Figure – 9



* Excluding budget for drugs
Source: Directorate of Health & Medical Education

Equity

A study[21] assessing the impact of public health expenditure on the poor based on the National Sample Survey, 52nd Round, reveals that the major portion of public expenditure is not benefiting the poor. Except for immunization services, the rich are the main users of public sector facilities, with the top quintile accounting for almost 40 per cent of impatient days in public hospitals and the bottom quintile accounting for just over 10 per cent. An exception is childbirth, where the poorer groups make for greater use of public facilities accounting for almost 5 times more in patient days than the top quintile. The table below indicates the distribution of public subsidies by quintile.

Table 14
Distribution of Net Public Subsidies by Level of Care by Quintile (Rural and Urban)

	Quintile 1	Quintile 2	Quintile 3	Quintile 4	Quintile 5	Total Subsidy
Short Hospitalisation	18.1 (11.1)	17.0 (14.3)	16.6 (20.6)	30.5 (26.4)	17.8 (27.6)	49.6% (57.1%)

[21] Who benefits from public health spending in India, Ajay Mahal et al, NCAER, 2000

Hospitalisation	14.8 (8.4)	14.4 (13.0)	15.0 (18.2)	25.5 (26.9)	30.4 (33.5)	83.0% (86.1%
PHC and others	20.5 (20.3)	21.6 (20.7)	33.5 (21.7)	15.2 (20.3)	9.2 (17.0)	10.6% (9.1%)
Immunisations	29.3 (23.7)	23.0 (22.2)	21.5 (22.0)	17.9 (19.6)	8.4 (12.5)	6.4% (4.8%)
Total	16.3 (10.2)	15.7 (14.1)	17.4 (18.7)	23.0 (26.0)	26.7 (31.0)	100%

Note : All India Figures in Brackets.
Source: Impact and Expenditure Review, Health Sector, Mark Pearson et al, DFID Health Systems Resource Centre, 2001

The study also reveals that the top quintile is hospitalised over 7 times more frequently than the lowest, and almost 10 times more often in rural areas. In terms of outpatient visits, the top quintile made 65% more outpatient visits than the bottom quintile in urban areas and 125% more in rural areas. In terms of immunization, a child in the top quintile has on average 4.6 immunization shots, whilst a child from the lowest quintile has 3.8. The top quintile account for 27% of all in-patient days associated with childbirth, despite the fact that they only account for 10.9% of children aged under one.

The poor make relatively more use of the public sector. For the poorest quintile, 61.9% of inpatient days were spent in public facilities compared to 28.5% for the top quintile. However, it must be borne in mind that the poor still make significant use of the private sector[22].

Cost of Healthcare :

A comparison of NSS data (42nd & 52nd Rounds) reveals that the costs of healthcare have grown much faster in the state than the country as a whole, and the rise was much greater for inpatient care than for outpatient care. For inpatient care, costs grew at 93% for rural and 58% for urban population, as compared to 31% and 26% at the all-India level. For outpatient care, the increase was 16.3% and 19.2% in the State as compared to 15% and 15.5% at the all-India level[23]. This increase is a cause of great concern and needs to be analysed and addressed.

Private Sector

Data on the private sector in Andhra Pradesh, as is the case with the rest of India, is weak. The available data relates to the year 1994. There has been significant growth, in recent times, especially in the number of nursing homes. Of the estimated 79000 beds in the state in 1994, it was estimated that around 59 per cent were in the private sector, 35 per cent in the public sector and six per cent in the voluntary sector[24]. There are

[22] Ibid
[23] Ibid
[24] Impact and Expenditure Review, Health sector, Mark Pearson et al, DFID,2001

significant regional differences with the developed coastal region having many more private hospitals. Most of these hospitals are small (87 per cent have less than 30 beds). Almost all these hospitals provide obstretic services and less than half of them provide a broader range of services covering medical, surgical, obstetric and other specialties. The region-wise size and location is shown in Table 16 below.

Table 15
Private Hospitals by Size and Location

	1 to 9 beds		10 to 19 beds		20 to 29 beds		30 to 99 beds		100 to 249 beds		250+ beds	
	No.	Beds	No.	Beds	No.	Beds	No.	Beds	No.	Beds	No.	Beds
Coastal Andh	529	2751	623	7698	237	5128	129	5583	19	2737	1	296
Rayalseema	82	421	63	768	28	614	24	922	3	420	0	0
Telengana	260	1449	313	3947	188	4169	163	6623	15	2162	3	862

Source: Institute of Health Systems, Andhra Pradesh, 1996

The share of the private sector in delivery of hospital services is the highest of all states in the country. The private sector accounts for 72 per cent of total hospitalisations and over 85 per cent of outpatient services[25]. These figures indicate that the public sector plays a somewhat marginal role in the delivery of curative services in the state. Annexure – V gives details of utilization rates of public and private facilities, state – wise.

A study in Mahaboobnagar district[26] found that:

- even low income households spent large amounts on minor and major illness in the private sector
- that PHCs have a minor role in the treatment of minor illnesses and a negligible role in the treatment of major illnesses; Sub centres play a negligible role in the treatment of minor illnesses, and no role at all in the treatment of major disorders
- PHCs and SCs are primarily used for preventive MCH services such as ante natal check ups and immunisation, but rarely used for deliveries, despite the low cost. PHCs are also used for tubectomies.
- People prefer to go to a qualified private practitioners when available especially so for major disorders
- The main reasons for using a particular facility were its close proximity and lack of alternatives – over 80% - for both minor and major illness

[25] Ibid
[26] IIHFW, 1997

Relative Efficiency of the Private Sector

No comprehensive studies of the relative efficiency of the public and private sectors exist. In terms of unit costs, there is some relevant data.

A comparison of unit costs in 3 secondary public health facilities in Khammam District (Khammam District Hospital, Bhadrachalam Area Hospital Penuballi Community Health Centre) and a well-respected NGO facility (Peoples Polyclinic, Nellore) has been made[27]. Costs per unit of output seem to be highest in the district hospital (Rs.86,204 per bed), followed by the NGO facility (Rs.69,905 per bed), whilst the unit costs in the smaller area hospital and community health centre are somewhat lower. There are significant differences in how resources are spent and in the degree of cost recovery achieved. The Peoples Polyclinic spends a far higher proportion of its resources on non-salary costs (4 times more than the larger and busier district hospital – and almost 10 times per unit of output). In addition, whilst cost recovery in the APVVP facilities was less than 3%, the Polyclinic was able to more than cover all costs. While APVVP facilities receive greater financial support than the NGO facility, they are also far busier.

Quality of Care: Private versus Public

In terms of quality of care, NFHS II has attempted to present select quality indicators for both public and private health care in the State. Table 16 below indicates that while the private sector scores higher than the public sector on several indicators (cleanliness and attitude of staff), surprisingly, there is not much difference between the two in terms of waiting time.

TABLE 16

Quality of care Indicators for Visit to a Health Facility Within the Last 12 months Public / Private Source in Andhra Pradesh, 1998-99

Quality Indicator	Visit to a Health Facil		
	Public Sector	Private Sector / NGO	Total
Percentage who received services they went for			
Percentage who received service they went for	98.1	99.6	99.4
Median waiting time (minutes)	29.6	29.3	29.4
Average waiting time (minutes)	54.2	42.7	44.6
Percentage who said the staff spent enough time wi her	93.2	98.0	97.2
Percentage who said staff talked to her			
Nicely	57.6	71.6	69.2
Somewhat nicely	37.6	27.8	29.5
Not nicely	4.8	0.6	1.3

[27] Impact and Expenditure Review, Health Sector, Mark Pearson et al, DFID Health Systems Resource Centre, 2001

Percentage who said staff respected her need for privacy	80.1	85.4	84.5
Percentage who rated facility as			
Very clean	51.8	71.6	68.2
Somewhat clean	44.6	27.4	30.3
Not clean	3.6	1.0	1.4
Number visiting a health facility	469	2296	2765

Source : NFHS (1999)

KEY FINDINGS

The key findings from the above review are as under:

- Andhra Pradesh is fast approaching a replacement level of fertility and has proved that fertility reduction is possible even within the context of poor performing social and economic variables
- Health indicators in Andhra Pradesh, although better than national averages, still lag behind those of other southern states
- Coverage of key preventive services is also generally better than the national average, but is somewhat below that of the Southern states.
- In terms of curative services, the public sector plays a very minor role in the delivery of services. In terms of in-patient services, utilisation of the private sector is the highest of any state in India, and is well above the national average of 49.7 per cent. The utilisation of public in-patient facilities exceeds only that of Bihar and is comparable with that of Uttar Pradesh.
- There are significant differences in access to public health infrastructure, health indicators and service coverage both between and within districts, pointing to the need for a need-based planning and implementation strategy
- The state has a huge and double burden of disease, which an under-financed public health system is ill equipped to handle. Additionally, HIV/AIDS has assumed alarming proportions
- Andhra Pradesh spends more, in aggregate, on its health care than other states in India, but has worse health indicators. In terms of life expectancy at 61.8 years in 1991/5 AP ranks 8th out of the 15 major states[28]. A major cause for this dichotomy could be the fact that only around 13.6% of total expenditure is public expenditure, a large portion of which goes to secondary and tertiary care, whereas the state carries a large disease burden with huge externalities, requiring a preventive and promotive focus
- In terms of allocative efficiency, too much of non-salary grants is spent on the secondary and tertiary sector, given that the most cost effective health interventions for its disease burden are at the primary level
- Technical efficiency is low as too high a proportion of resources is spent on establishment costs with too little remaining for non-salary

[28] AP Economy in Brief, 1998

costs. Absenteeism of key staff, in particular, PHC doctors, is a major problem, leading to under-utilisation of PHC services The lack of adequate referral systems means that primary health services are bypassed, resulting in unnecessarily expensive treatment at higher levels and relatively low utilisation at primary levels

- The rich not only utilise health services more than the poor, but are the main users of public sector facilities, except for institutional deliveries, antenatal care and immunisations
- The poor make relatively more use of the public sector but still make significant use of the private sector

KEY HEALTH SECTOR POLICIES

There is no overarching state policy for the health sector as there is for population stabilization. Policies for the health sector are set out in different documents. Vision 2020 enunciates the goals, targets and approaches within which health policy is framed:

Goals

Indicator	1998	2000	2010	2020
a) Natural Growth Rate (Per 1000 population)	13.5*	12.0	8.0	7.0
b) Crude Birth Rate (per 1000 population)	22.3*	20.0	15.0	13.0
c) Crude Death Rate (per 1000 population)	8.8*	8.0	7.0	6.0
d) Infant Mortality Rate (per 1000 births)	66.0*	55.0	30.0	15.0
e) Maternal Mortality Rate (per 10 live births)	3.8**	2.5	1.2	0.5
f) Couple Protection Rate (Percen	59.6#	60.0	70.0	75.0
g) Total Fertility Rate (per women	2.25#	2.1	1.5	1.5

Sources: * SRS 1998, ** NFHS – I (1992-93); # NFHS – II (1998-99)

Targets

- reduced maternal and infant mortality rates
- reduced communicable disease burden
- spread of AIDS contained
- increased life expectancy
- families small and better spaced

Key Approaches

- women to have safe and successful pregnancies and child survival to be ensured
- effective prevention of communicable diseases, especially gastro-enteritis, malaria, TB, ARI
- delivering quality services for non-communicable disease esp. injury and trauma
- ensuring safety net for poor and disadvantaged groups

- increased technical and allocative efficiency of resource use and improved targeting of public subsidies for the poor through user charges for the better-off and insurance schemes
- improved quality of care/consumer satisfaction
- enhancing the role of the private sector
- enhancing consumer awareness and health – seeking behaviour through an effective information and education campaign

Policies and strategies for the health sector are also set out in a Statement on Health Policy laid on the Table of the House, the Report of an Expert Committee on Health Sector Reforms and on Administrative Reforms in the Department, and in the Cabinet Sub-Committee Report on Health and Population. Key strategies and activities, which will have a major role in achieving Vision 2020 goals, are discussed in a subsequent section.

Major Current Initiatives

The Government has initiated steps to improve public service delivery and performance through innovative programmes and strategies to specifically address issues relating to efficiency and effectiveness of public sector performance. The initiatives are:

- Performance Monitoring
- Human Resource Management
- Reform of drugs procurement and distribution systems
- User charges
- Decentralisation
- Initiatives for Disease Control
- Private Sector initiatives

Performance Monitoring

In order to improve performance in public health service delivery and to motivate public health personnel, a transparent system for performance assessment has been instituted in the Department for all directorates functioning under it. Output based performance indicators have been finalised and reporting frequency also fixed. Each institution is graded as A, B and C category based on the output measures. Performance criteria have been fixed with the consensus of health personnel. The data is collected regularly in secondary hospitals, where reporting is almost 100%, and a report is compiled, grading performance, and re-circulated to all concerned. In an attempt to involve stakeholders, the report is sent separately to the Chairperson of the society/committee of the facility. The same system is followed for PHCs, though the percentage of reporting is much lower. It is not started yet in tertiary institutions. The framework of performance monitoring for facilities at all the three levels of care is indicated below:

Performance Monitoring Framework

Level	Objectives	Output/Performance Indicators	Performance Against Indicators
APVVP (Secondary Hospitals)	Provision of hospital services according to guidelines on range of services and level of services	a) Output Measures 1.General Services : outpatient, inpatient, bed occupancy 2. Emergency Services : emergency OP, Emergency IP, emergency major and minor operations 3. Clinical Services : major/minor operations , tubectomies and deliveries 4. Diagnostic Services : X rays , ECG , lab tests , USG (b) Quality	monthly reporting against indicators with grading system results of quality satisfaction survey
Tertiary hospitals	Same as for secondary level	Output measures same as for secondary hospitals, but speciality-wise	Output indicators agreed, but non-compliance from hospitals to date
Medical Education	Provision of medical education as per norms and standards fixed by Medical Council of India	Indicators agreed for asst., associate and professors: no. of classes per month, CME hours per month, national/international papers published per month	
PHC Primary	Provision of preventive and limited curative services and effective implementation of vertical programmes.	a)Output measures relate to general services (OP).diagnostic services (lab tests),national control programmes (sterilisation, deliveries, ANC registration, full immunisations)and specific communicable diseases (GE/malaria deaths) b) Quality	monthly reporting against criteria with grading system quality surveys under consideration

Source: Adapted from Impact and Expenditure Review Health sector, Mark Pearson et al, DFID Health Systems Resource Centre, 2001

An attempt has been made to link performance to individual career advancement through the issue of government orders that the performance grade of facilities will be attached to the confidential rolls of doctors. There is also a move to reward good performance through the allocation of additional resources, so that busier hospitals get their due share.

Human Resource Management

Expenditures on health salaries represent around 75% of health expenditure. The extent to which doctors and paramedics man posts and work productively can have a major impact on quality and coverage of services. Government have felt that one of the most effective tools to motivate improved performance is a transparent transfer policy based on merit, and have initiated steps in this direction.

The impact of the functioning of the public health sector is best exemplified by the way PHCs are functioning. It is at this level that there is the highest level of absenteeism, leading to underutilisation and wastage of resources. Government has been of the view that a transparent transfer policy, which provides for rotation of doctors on a regular and impartial basis, will mitigate this problem to some extent. Accordingly draft rules, prescribing a transfer every three years, and allowing doctors to choose their places of posting from the locations notified, in order of merit, based on the grading given through the performance monitoring system, have been finalised. The draft rules have been referred to the Cabinet Sub Committee on Health for approval. The procedure, termed as 'counselling', is also transparent, with the list of doctors and grades, and the available locations to be publicly displayed. Each doctor will be called in order of merit, and the transfer order handed over to him on the spot, as per his choice, by a Committee comprising of the Director of Health, the Commissioner APVVP and the Director of Medical Education. Incidentally, all recruitments in the department for both medical and para-medical staff, have been undertaken through this procedure for the last 3 years, with MBBS marks being the criteria for doctors, and written examination marks being the criteria for para-medics. The merit list of candidates and list of vacant locations is publicly displayed, and each candidate is called in order of merit and the appointment order, with the place of posting as per his choice handed over to him on the spot by the Committee. The government has recruited more than 8000 doctors and para-medics in the last 3 years, without a single complaint from candidates or the media.

In order to address the problem of vacancies in tribal areas, Government has constituted a separate Tribal Health Service, and recruited doctors separately to these 300 and odd posts. The recruits sign a bond to work in the tribal areas for 5 years, after which they can opt to join the mainstream. Three years of tribal service is considered equivalent to five years of rural service, which is the eligibility criterion for in-service candidates for PG courses. They are also given an incentive amount of Rs. 1500 per month for working in difficult areas. There has been an improvement in the availability of doctors in tribal areas after the constitution of this service.

A Committee constituted by the government, including doctors' association representatives and finance and health departments, to address the issue of manpower shortages in the State has recommended in its report submitted in January 2001, that government may consider taking the services of doctors on contract or even on a part-time basis for chronic vacancies.

In Andhra Pradesh, doctors are neither permitted private practice, nor given a non-practising allowance which is seen as a strong disincentive, especially when it comes to recruiting and retaining specialists. Additionally, it could encourage malpractice at all levels – primary,

secondary and tertiary. The Committee referred to above has recommended that private practice continue to be banned, but that doctors be paid decent salaries, with 25% of basic pay as non-practising allowance. The Committee's report is under the consideration of the government.

Simultaneously, government has taken up a special drive to identify cases of prolonged unauthorised absence and have issued orders terminating the services of more than 500 doctors in the last 3 years. An impartial and transparent disciplinary policy is also sought to be instituted with one increment cut with cumulative effect for every year of unauthorised absence in pending cases. These initiatives have the support of the Doctors' Association.

In a bid to improve management skills, the state has launched a comprehensive training programme through the state level Human Resource Development Institute for continuing education of all levels of staff in the Department. A massive exercise has been undertaken for preparation of Departmental Manuals, clearly prescribing the duties and responsibilities of each category of functionary in each Directorate. These Manuals, which took a year in preparation, have been published in 2000 and distributed. Training modules for management of services of primary and secondary levels have been prepared and are under implementation.

While a beginning has been made for effective management of human resources, certain systemic issues remain unresolved. These need to be addressed on priority:

- low levels of remuneration
- promotion based on seniority not on merit
- some cadres (particularly supervisory) considered unproductive
- failure to supervise and monitor field performance effectively
- failure to enforce disciplinary action when poor performance is evident
- inability to reward good performance
- inability to retain staff in remote areas

In terms of manpower development for the health sector, the government has constituted an Expert Committee, with the Vice Chancellor of the University of Health Sciences as the Chairman to assess the manpower needs in the health sector, both medical and paramedical, and to make recommendations. Based on a preliminary assessment, the government has notified locations in rural areas for setting up private medical and dental colleges in each of the districts, as well as over 3000 paramedical institutions in various disciplines. This initiative is expected to address shortages of manpower needs to some extent.

Reform of Drugs procurement and Distribution Systems

Several surveys on consumer perceptions of public health services reveal two major lacunae non- availability of doctors and non- supply of drugs. In order to enhance drugs supply, a centralised Drugs Procurement and Distribution System has been put in place on the lines of the Tamilnadu model. Drugs are procured centrally through the AP Medical Infrastructure Corporation, following strict procedures for contracting and quality checks. All drugs are strip-packed and are only procured from manufacturing forms with GMP certificates. These drugs are distributed through 22 district warehouses. 53 drugs are eligible for purchase by PHCs and 290 drugs for tertiary level hospitals. A pass book system is in operation, giving the head of the facility the flexibility to lift the drugs he/she requires from the district stores. 10% of untied funds are released to PHCs and secondary hospitals, and 20% to tertiary hospitals to be utilized for emergent needs. While the system has resulted in certain improvements over the previous situation, there are yet concerns that need to be addressed[29]:

- the budget of Rs 60 crores, even if fully released, (only Rs.35 crores released in 1999-2000) amounts to around Rs. 8 per head of population. At the PHC level based on budget allocations, it amounts to only Rs.3.50. There is need to increase the budget based on an exercise estimating ideal drug requirement at a standard PHC
- the corporation is able to meet only around 70% of requirements, mostly due to a lack of timely releases
- quality monitoring needs to be strengthened
- the current list of eligible drugs needs to be reviewed. There has been a gradual upward creep in the length of the list
- there is need to train doctors on the rational use of drugs, and to adhere to standard protocols and guidelines
- there is need to evaluate performance after institution of the central procurement system in terms of availability, quality and costs of drugs
- there is need to expand this system to cover supplies and consumables also

User Fees

User fees are currently levied in the State in district, area and tertiary level hospitals. Below poverty line users are exempted from such payments. PHCs and Community Health Centres provide free services. While initially the Government had issued an order from the state level fixing user fee charges for secondary level hospitals, this ran into trouble with political parties organizing major demonstrations against user fees. Subsequently, Government constituted hospital committees to manage and monitor hospital services at the local level. A decision was taken to

[29] Impact and Expenditure Review, Health Sector, Mark Pearson etal, DFID,Health Systems Resource

delegate the authority to levy user fees to these committees and to permit them to charge at rates that were considered locally acceptable. Currently 76 hospitals in the secondary sector, and 22 out of 42 tertiary level hospitals are collecting user charges for OP, IP (bed charges) and diagnostic services.

The rationale behind this levy is three. The first is to ensure that public subsidies are better targeted for the poor who are exempted from payment of user fees. The second is to raise revenues for improving the functioning of the hospital. The third is to improve efficiency and accountability. An analysis of user fees collected in APVVP institutions reveals that collections are increasing every year, and currently account for 2.5% of non-salary expenditure. It is also seen that the number of users of these hospitals have not decreased since the institution of these charges (Table 17)

Table 17

Year	Amount Rs. In lakhs	Numbers (in lakhs)	
		OP	IP
1996-97	No fees	80.5	5.2
1997-98	24.29	88.8	5.7
1998-99	31.74	99.6	6.1
1999-2000	55.53	296.0	7.5

Source: Commissioner, APVVP, 2001

In view of the political overtones, user fee policy has not been formalised. The issues to be now addressed are as detailed below:

- Hospital committees have been informally authorised to collect user fees, set rates and decide exemptions. Some hospitals, both secondary and tertiary are not charging user fees yet. Users may not be able to distinguish between official and unofficial fees, due to the lack of transparency. A clear government position is therefore required
- if an effective referral system is to be promoted, user charges should be graded, with higher charges for similar services, at the tertiary level. This only underlines the need for a clear government stand
- rates and exemption procedures should be widely publicised, and display boards put up in prominent locations in the facility
- the exemption policy for the poor must be clearly enunciated at government level, and should not be left to the discretion of Committees. In addition to BPL cards, self-declaration appears to be a reasonable and practical procedure
- user fees should not be used as a replacement of regular budgets. The Finance Department of Andhra Pradesh has opened a separate budget head for user fees. If it is only for monitoring collections, this is desirable. However, if user fees are used as a replacement of regular budgets, the very objective gets defeated. International experience shows that not more than 20 per cent of running cost can be met through user fees. Even this level will not be reached, if user fees are used to make good budgetary gaps. The flexibility to gradually shift operating cost budgets from hospitals, which generate funds through such fees, to the primary level should be left with the departments of health

- user fees should be evaluated to obtain quick feedback regarding its impact on efficiency and equity objectives, and in particular, its impact on utilisation patterns by the poor and disadvantaged groups

Decentralization

In terms of the 73rd amendment, no component of the health sector has been handed over to panchayat raj institutions in the State. However, the state has undertaken other initiatives to decentralise healthcare administration and management. They are:

- constitution of Andhra Pradesh Vaidya Vidhana Parishad (APVVP) as an autonomous body, under an act of legislation, to be responsible for management of secondary hospitals
- constitution of Advisory Committees for PHCs, Hospital Development Committees for secondary hospitals and Hospital Development Societies for tertiary hospitals, to monitor and supervise delivery of services in these facilities
- constitution of district societies for implementation of specific programmes

APVVP was constituted in 1986 with the express objective of granting full autonomy, financial and administrative, to the secondary level of hospitals, in order to improve the efficiency and effectiveness of service delivery. In practice, however, such autonomy does not exist. The Governing Council of the APVVP has not been constituted for years and the Commissioner, APVVP, the Chairman of the Council, acts as another Head of Department. In administrative terms, since the staff of APVVP are on deputation from the department, they are subject to the same pulls and pressures in terms of transfers/administrative matters as regular department staff. It is necessary that these lacunae be addressed urgently. However, the initiative is not without advantages[30]:

- Financing procedures have been simplified with block grants for APVVP instead of budgetary allocations to individual hospitals. However, release of block grants at the State-level are subjected to the same procedural complexities and delays
- independent decision-making relating to maintenance of buildings/equipment and sanitation through contracting has resulted in improved performance
- the decision to improve resource mobilisation through user fees has been facilitated by its autonomous character
- there is evidence that a performance management culture is developing, much more so than in the regular directorates

In 1998, the State Government has constituted hospital development societies for tertiary hospitals and committees for district hospitals chaired by the District Collectors, hospital development committees for area and community hospitals chaired by the local MLA, and Advisory

[30] Impact and Expenditure Review, Health sector, Mark Pearson et al, DFID Health Systems Resource Centre, , 2001

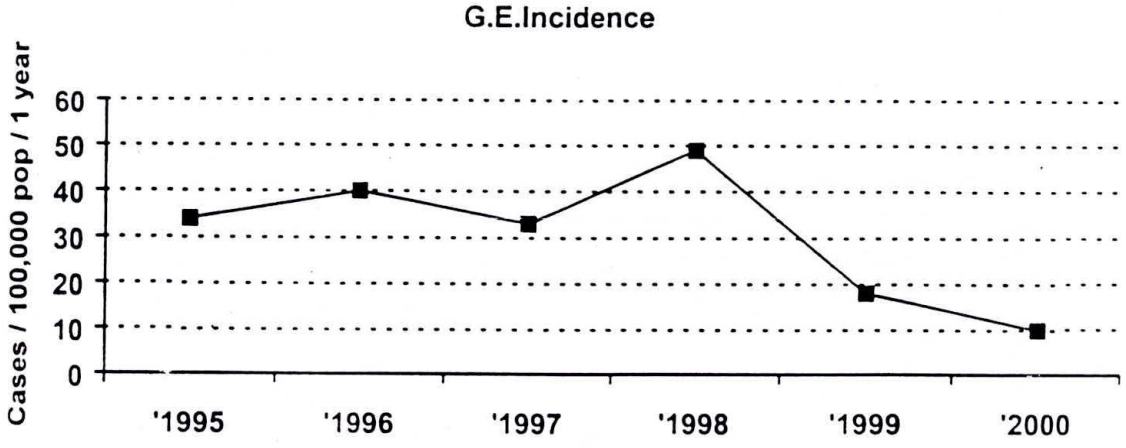
Committees for primary health centres chaired by the local body president. All these bodies have elected and community representatives. These bodies have been given specific responsibilities and authority detailed in printed manuals. Funds are also released to these societies/committees for maintenance of the facility and for sanitation. Building maintenance grants, earlier with the Public Works Department, have been withdrawn and released to these societies/committees. The societies/committees have been allowed to charge user fees and retain the same with them for improvement of the facilities. The State has also prescribed charges for (i) internship transfer from private colleges to government institutions and (ii) clinical attachment of private dental colleges and para-medical institutions to government institutions (hitherto free) and permitted retention at the facility level. The Societies / Committees have been authorized to rent out facilities in the premises such as Pharmacies, canteen, cycle stands etc., and retain these revenues. While it is as yet too early to assess the impact of these initiatives, the general perception is that there has been improvement in the maintenance of the facility as well as in its performance. Two tertiary level hospitals, one in Guntur and the other in Kakinada, are held up as models by the Chief Minister, as the societies were able to mobilise substantial donations, and the appearance of these hospitals are now are on par with private sector corporate hospitals.

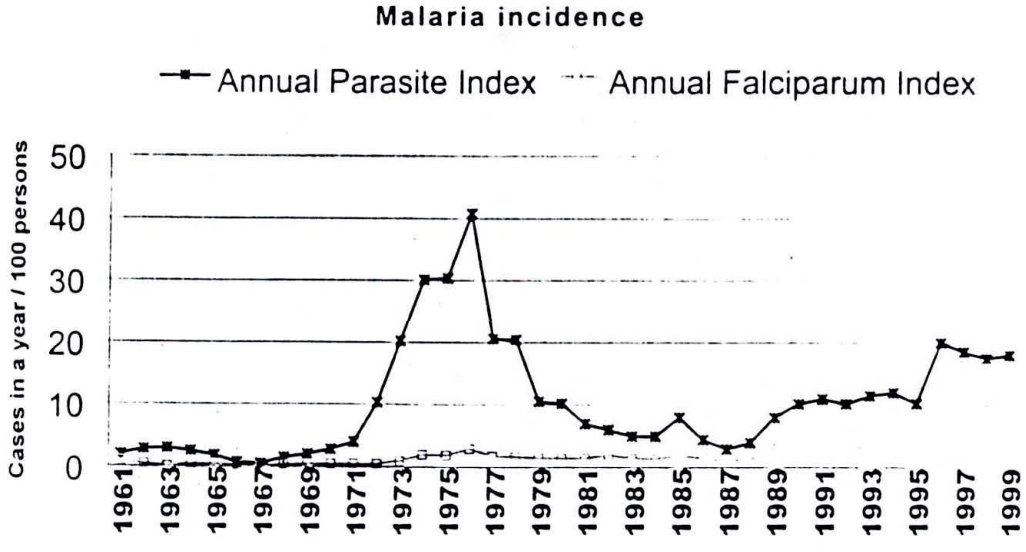
District Societies exist for population stabilisation, for blindness, AIDS, TB and malaria control. These societies have been constituted primarily to circumvent the funds flow problem, which is seen by the Department as a necessity, given the fiscal problems faced by the State. The state is now considering merging these societies for better coordination. While in theory, the District Health Officer has overall responsibility for the various disease control programmes, he is reluctant to take on this role, which results in compartmentalisation of programmes. Merging societies can mitigate compartmentalisation to some extent. However, since every programme has separate budget lines, which have to be accounted for separately, the advantage of merging appears to be limited. Financial management and accounting procedures need to be streamlined and strengthened.

Initiatives for Disease Control Programmes

Access to safe water, sanitation and a clean environment are significant factors in the prevention of communicable diseases, underscoring the need for inter- secotral co-ordination in the fight against disease. Initiatives for cross-sectoral co-ordination in the control of diarrhoeal diseases, malaria and Japanese Encephalitis in the state merit mention. The effort has been spearheaded by the Chief Minister himself with monthly video conferences weekly during high incidence seasons with the district collectors and the departments of health, water supply and sanitation, panchayat raj and municipal administration, District level teams comprising representatives of each department, inspect and maintain water supply sources and distribution systems, and ensure the

areas around them are kept clean for the prevention and control of diarrhoeal diseases. The teams also arrange to clear drains, stagnant water pools, clear shrub growth and garbage around habitations for mosquito source reduction. A massive campaign is launched ahead of the high incidence season for each of these diseases, spearheaded by the district collector, to educate the community on actions to prevent the onset of these diseases. The result of this co-ordination is seen in the figures of incidence. The incidence of G.E. shows an appreciable decline, while malaria appears to be contained.





Source: Directorate of Health, Andhra Pradesh, 2001

The government needs to take this initiative forward by:

- institutionalising co-ordination arangements through the establishment of inter-departmental committees at state and district-level with clear mandates and authority to take action
- ultimately devolving powers and functions to panchayat raj institutions for activities related to water supply, drainage, solid waste management and source reduction for mosquito breeding. This will address the current problem of compartmentalisation at the implementation level

- constituting similar inter departmental committees for non-communicable diseases – in particular, to address traffic accidents and tobacco-related diseases

Surveillance

Surveillance has been a weak point in the control of communicable diseases in the state. An initiative to use the GIS[31] platform to highlight specific villages, where malaria, Japanese Encaphilitis and GE incidence tends to be high, merits mention. Malaria and JE are focal diseases, the spread of which is essentially based on breeding sources in the area. Advance information on where the 'hotspots' are helps enormously in planning and implementing a prevention and control strategy. For malaria, two types of mapping on the GIS platform have been done:

(i) an annual profile, based on 8 years data, shows the distribution of villages in 3 categories
   - those where annual SPR has been greater than 3 in at least 7 out of 8 years
   - those where annual SPR is greater than 3 in 4-6 years out of 8 years
   - those where annual SPR is greater than 3 in less than 4 out of 8 years

(ii) since the incidence of malaria varies from month to month, a monthly profile based on 4 years data is also prepared. This is available for all malaria-prone districts for all 12 months

For JE too, village-wise incidence of JE between 1996 and 1999 have been mapped. Separate maps showing villages where JE has occurred for 2/3/4 consecutive years is also prepared. For GE, mandal-wise incidence in the previous 10 years has been mapped, but shows no particular pattern.

These maps clearly indicate the areas of high concentration and assist in focussing attention for prevention and control activities. Staff vacancies are also made good in the mapped areas through re-deployment / recruitment.

Vertical Versus Integrated

One of the issues constantly under debate relating to disease control programmes are vertical versus integrated programmes. Verticality ends at the level of the district programme officer in terms of all vertical programmes in Andhra Pradesh, except leprosy. Thereafter, human resources at the district level, are integrated. Even in the case of leprosy, staff are now carrying out HIV/AIDS control activities. The resurgence of malaria in the state is blamed largely on integration. The underlying problem, however, is less one of integration and more one of lack of skilled human resources at the peripheral level. Upon integration, malaria

[31] Geographical Information Systems

surveillance staff were dropped and their responsibilities passed on to multi-purpose health workers. The problem was that these workers were either not in place, as the state had a large number of vacancies (male health workers), or were unable to take on this additional workload (ANMs). As a result, prevention and control measures, and treatment of malaria cases suffered a setback. The lesson learnt is that precipitous integration, without alternate human resources and systems in place, is dangerous. The state has attempted to address this problem by appointing one trained community health worker in each habitation in the malaria endemic habitations at an honorarium of Rs. 300 per month, and by filling up male workers posts in the mapped high-incidence areas either by fresh recruitment or by re-deployment. For the TB control programme, the state proposes to use leprosy staff also for the DOTS strategy, as there are synergies in the administration of these two programmes. Expecting the multi-purpose worker to deliver the DOTS strategy appears unrealistic, as 50% of male workers posts remain vacant and ANMs are overburdened with their regular work.

Private Sector Initiatives

80% of care in Andhra Pradesh is provided by the private sector and it is essential that government oversee the private sector to address concerns relating to quality, access, efficiency and equity. The state has drafted legislation on standards to ensure improvement in the quality of care provided by the private sector. Special mention needs to be made of the procedure adopted by the government in framing the rules that fix the standards. A Committee, representing the interests of all stakeholders, has been constituted with the responsibility of laying down the standards for each type of medical establishment and formulating the rules. The Committee is chaired by a medical professional of standing and repute, with the Vice Chancellor of the University of Health Sciences, and representatives of the state medical council, the state branch of the IMA, the nursing homes association, the forum for super-speciality hospitals, the diagnostic clinics and laboratories associations and the government as members. Contentious issues, such as inclusion of provisions relating to cost-containment, social obligations, and the composition of the authority which will implement the legislation have been resolved amicably. There is consensus that costs of treatment and surgeries, room/bed rates, nursing charges and diagnostic test costs will be prominently displayed; that private medical establishments will discharge their social obligation and participate in public health programmes, and that an Appropriate Authority, chaired by a medical doctor of repute, and with representatives of all stakeholders will implement the legislation. The draft rules are currently under the consideration of the government. The government is understood to be considering enlarging the provision relating to the Chairman to include a retired judge or administrator of standing and repute.

In order to improve access to tertiary care, the state has permitted the setting up of 14 medical and 18 dental colleges only in identified

backward locations. This policy has paid dividends, with the private sector investing hugely in rural locations, taking specialist care closer to the people. Similarly it has permitted the setting up of 1801 para-medical institutions, based on need, in identified locations of the state.

A variety of public-private partnerships have been initiated in the state. In order to address the problem of maternal and infant mortality and to promote institutional deliveries and newborn care, a pilot is being implemented in Anantpur district, where 42 private nursing homes have been approved for undertaking deliveries for women below the poverty line. An amount of Rs. 300 will be paid to the nursing home per case. Since many women do not avail of private nursing home services because of the lack of transparency relating to rates, a mother and child health package, to promote ante-natal care, institutional deliveries and immunisation, has been negotiated with private nursing homes through the AP Private Nursing Homes Association and the state branch of the Indian Medical Association. Reasonable rates for different areas of the state have been agreed upon, and nursing homes that participate will have a board displaying details of the package and costs. This could be the precursor of an accreditation network.

In order to improve access to primary health and family welfare services, the government has contracted out the management of 192 urban health posts in 73 municipalities to NGO's. It has issued notification for handing over management of PHCs in the remote tribal areas of the state to NGOs. It is also partnering with a private trust hospital in Hyderabad for delivery of the DOTS programme in a given 5-lakh population. It has initiated a sucessful link volunteer scheme in the urban slums of Hyderabad, where a volunteer, selected by a group of 20 families, is trained in basic healthcare, and acts as the link between the community and the urban health post. This scheme involving 5581 link volunteers is implemented through 22 NGOs. It proposes similarly to train DWCRA group representatives as Village Health Workers/link volunteers in identified remote villages to improve access to basic health and family welfare services.

While the state has taken steps to better partner with the private sector, these interventions need to be co-ordinated within a coherent, articulated policy framework to meet stated objectives.

Future Direction

A Cabinet Sub Committee on Health and Family Welfare has been constituted to make specific recommendations to operationalise Vision 2020 and to achieve stated goals. Accordingly, the Committee has made recommendations with specific actions for the next five years. Details are in Appendix IV. Some key issues/activities that will have a major role in achieving Vision 2020 goals are mentioned below:

- Developing a financing strategy

- to increase the share of state budget to health from the current 4% to 10% and allocate a greater share of resources to primary and secondary health care
- to increase non-salary expenditure to 50% of total
- user fees in secondary and tertiary hospitals to cover a minimum of 10%-15% of costs
- to implement insurance for all public sector employees
- to ensure a safety net for poor through (i) piloting health insurance schemes for women's groups (3.66 lakh groups covering 50 lakh poor rural women)and (ii) creating a Sickness Fund for the Poor to address serious illnesses

- Prioritising funding and programme focus to reduce high maternal and infant mortality and the huge communicable disease burden in the state
- Strengthening surveillance systems
- Strengthening managerial and technical capacity and accountability at all levels through effective training programme and transparent performance assessment systems
- Equipping health institutions at primary and sub-district levels to diagnose serious non-communicable ailments for timely referral. Simultaneously developing simple and cost effective interventions to treat non-communicable diseases and equipping primary and sub-district level facilities to deliver these services
- Expanding public health infrastructure in areas of need, particularly tribal regions and urban slums
- Introducing the integrated base-hospital approach –since hospitals act as "islands", and referral networks are poorly developed, to make referral hospitals administratively responsible for overseeing and managing lower level units within its catchment area
- Promoting convergence between family welfare, health and ICDS: institutionalising co-ordination mechanism with other departments for integrated disease control
- Addressing issues of supply, demand, and development of human resources for the health sector by quickly acting on the recommendations of the Expert Committee.
- Articulating and implementing a coherent policy in relation to the private sector, both formal and informal
- Strengthening the surveillance, monitoring and evaluation process for improved performance and informed policy and decision making
- Increasing decentralisation and community participation through streamlining hospital advisory committees, the establishment of village health committees, and devolving powers to local bodies for water supply, sanitation, public hygiene and pollution control
- Enhancing advocacy and community education, for increasing consumer awareness and promoting health-seeking behaviour
- Enhancing advocacy for political commitment to the health sector

Annexure I

The size of Population and other social and demographic variables across distict in Andhra Pradesh, 1991

Distircts	Total Population (000)	Annual Exp. GR	Density Per Sq. Km.	% Urban	% SC	% ST
Coastal Andhra						
Srikakulam	2321	1.69	398	12.5	9.3	5.8
Vizianagaram	2111	1.57	323	17.2	10.4	9.0
Visakhapatnam	3285	2.43	294	39.8	7.8	14.3
East Godavari	4541	2.05	420	23.8	18.2	3.9
West Godavari	3518	2.02	454	20.7	17.9	2.4
Krishna	3699	1.93	424	35.8	16.6	2.5
Guntur	4107	1.79	361	28.9	14.0	4.4
Prakasam	2759	1.69	157	16.4	20.0	3.6
Nellore	2392	1.72	183	23.8	21.9	8.9
Rayalaseema						
Chitoor	3261	1.75	215	19.8	18.4	3.2
Cuddapah	2268	1.61	148	24.0	14.9	2.1
Anantapur	3184	2.22	166	23.5	14.2	3.5
Kurnool	2973	2.11	168	25.8	17.4	1.9
Telengana						
Mahaboobnagar	3077	2.30	167	11.1	17.6	7.4
Rangareddy	2552	4.72	341	47.2	17.2	4.3
Medak	2270	2.28	234	14.5	17.9	4.2
Nizamabad	2038	1.93	256	20.3	15.1	5.9
Adilabad	2082	2.39	129	23.1	18.5	17.0
Karimnagar	3037	2.21	257	20.5	18.6	2.7
Warangal	2819	2.03	219	19.4	17.2	13.7
Khammam	2216	2.35	138	20.2	16.3	25.2
Nalgonda	2852	2.24	200	11.9	17.7	9.7
Hyderabad	3146	3.35	14497	100.0	8.9	0.9
Andhra Pradesh	66508	2.17	242	24.2	15.9	6.3

Source : Census of India (1991)

Annexure – II

Comparative Health Outcome Indicators

	Infant Mortality Rate (SRS)	Child Mortality Rate (CMR) (SRS)	Total Fertility Rate (SRS)	% of Children with Anaemia (6-35 months)	% of ever-married Women with Anaemia (15-49 years)
All India	**72**	**94.4**	**3.2**	**74.3**	**51.8**
North					
Haryana	70	76.8	3.3	83.9	47.0
Himachal Pradesh	64	42.4	2.4	69.9	40.5
Punjab	54	72.1	2.6	80.0	41.4
Rajasthan	83	114.9	4.1	82.3	48.5
Central					
Madhya Pradesh	98	137.6	3.9	75.0	54.3
Uttar Pradesh	85	122.5	46	73.9	48.7
East					
Bihar	67	105.1	4.3	81.3	63.4
Orissa	98	104.4	2.9	72.3	63.0
West Bengal	53	67.6	2.4	78.3	62.7
West					
Gujarat	64	85.1	3.0	74.5	46.3
Maharashtra	49	58.1	2.7	76.0	48.5
South					
Andhra Pradesh	**66**	**85.5**	**2.5**	**72.3**	**49.8**
Karnataka	58	69.8	2.5	70.6	42.4
Kerala	16	18.8	1.8	43.9	22.7
Tamil Nadu	53	63.3	2.0	69.0	56.5

Source :

SRS 1998, NFHS 2

For major states, SRS estimates refer to 1998

For smaller states, the estimates refer to the period 1995-97

Annexture III

District-wise fertility estimates for 1981 and 1991 census years, and IMR and Female literacy rates for 1991

District	CBR		TFR		IMR 1991	Female Literacy 1991
	1981	1991	1981	1991		
Srikakulam	31.1	27.1	4.10	3.39	77	23.5
Vizianagaram	30.3	27.5	4.00	3.41	99	22.5
Visakhapatnam	31.9	29.0	4.00	3.41	73	34.6
East Godavari	29.5	29.0	3.80	3.42	54	42.3
West Godavari	31.8	26.1	3.90	3.00	65	47.0
Krishna	34.3	28.1	4.30	3.29	30	45.5
Guntur	32.7	26.8	4.10	3.16	38	35.9
Prakasam	34.3	28.3	4.60	3.53	46	27.1
Nellore	32.0	26.6	3.90	3.10	46	37.0
Chittoor	31.5	26.6	4.00	3.14	60	36.4
Cudddapah	34.8	26.9	4.50	3.35	44	32.4
Anantapur	35.5	30.4	4.90	3.88	70	27.6
Kurnool	36.8	32.9	5.00	4.28	68	26.0
Mahabubnagar	35.3	33.5	4.90	4.49	77	18.0
Ranga Reddy	36.0	31.1	4.80	3.87	56	36.9
Hyderabad	34.7	33.9	4.20	4.13	22	63.6
Medak	33.6	31.3	4.60	4.17	52	19.2
Nizamabad	32.3	27.5	4.10	3.31	41	21.3
Adilabad	35.3	30.2	4.60	3.84	51	20.6
Karimnagar	30.6	28.1	4.10	3.43	35	23.4
Warangal	34.0	31.6	4.60	4.08	59	26.1
Khammam	34.6	30.4	4.70	3.68	47	30.5
Nalgonda	33.7	32.9	4.50	4.32	58	24.9

CBR : Crude Birth rate per 1000 population

TFR : Total Fertility rate per woman

IMR : Infant mortality rate (number of infant deaths per 1000 live births)

Female Literacy : Percentage female literacy in the population aged 7+

Source : Registrar General, India (1997). District Level Estimates of Fertility and Child Mortality for 1991 and their Interrelations with other variables, Occasional paper No.1 of 1997 Census of India, New Delhi

Annexure - IV

Comparative Health Service Indicators

	%of Children Receiving All Vaccina-tions	% Married Women Using any Contrace-ptive Methord	Sterilisation	% of Pregnant Women Receiving at least1 Ante Natal Check Up	% of Pregnant Women Receiving at least 2 Tetanus Toxid injections	% PregnantWomen Receiving Folic Acid	% Instit. Deliveries	% of Births Attended by Health Professional	% of Children Receiving at least 1 Vitamin A Supplement
All India	42	48.2	36	65.4	66.8	57.6	33.6	42.3	29.7
North									
Delhi	69.8	63.8	28.6	83.5	84.9	77.8	59.1	65.9	32.7
Haryana	62.7	62.4	40.8	58.1	79.7	67	22.4	42	45.2
Himachal Pradesh	83.4	67.7	52.4	86.8	66.2	85.6	28.9	40.2	71.1
Jammu & Kashmir	56.7	49.1	30.7	83.2	77.7	70.8	35.6	42.4	36
Punjab	72.1	66.7	30.8	74	89.9	79.6	37.5	62.6	56.5
Rajasthan	17.3	40.3	32.3	47.5	52.1	39.3	21.5	35.8	17.6
Central									
Madhya Pradesh	22.4	44 3	38	61	55	48.9	20.1	29.7	24.4
Uttar Pradesh	21.2	28 1	15.6	34.6	51.4	32.4	15.5	22.4	13.9
East									
Bihar	11	24 5	20.2	36.3	57.8	24.1	14.6	23.4	10.2
Orissa	43.7	46.8	35.6	79.5	74.3	67.6	22.6	33.4	42
West Bengal	43.8	66.6	33.8	90	82.4	71.6	40.1	44.2	43.4
Northeast									
Arunachal Pradesh	20.5	35.4	20.7	61.6	45.6	56.3	31.2	31.9	20.9
Assam	17	43.3	16.6	60.1	51.7	55	17.6	21.4	15 4
Manipur	42.3	38.7	15.5	80.2	64.2	50	34.5	53.9	38.4
Meghalaya	14.3	20.2	6.5	53.6	30.8	49.5	17.3	20.6	24 7
Mizoram	59.6	57.7	45.4	91.8	37.8	72.7	57.7	67.5	70.6
Nagaland	14.1	30.3	12.2	60.4	50.9	42.5	12.1	32.8	6 8
Sikkim	47.4	53.8	24.8	69.9	52.7	62.4	31.5	35.1	45.8
West									
Goa	82.6	47 5	28.2	99	86.1	94.7	90.8	90.8	78
Gujarat	53	59	45.2	86.4	72.7	78	46.3	53.5	51.9
Maharashtra	78.4	60.9	52.2	90.4	74.9	84.8	52.6	59.4	64 7
Siouth									
Andhra Pradesh	58.7	59.6	57	92.7	81.5	81.2	49.8	65.2	24 8
Karnataka	60	58.3	52.1	86.3	74.9	78	51.1	59.1	48.4
Kerala	79.7	63.7	51	98.8	86.4	95.2	93	94	43.6
Tamil Nadu	88.8	52.1	46	98.5	95.4	93.2	79.3	83.8	16.2

Sources : NFHS 2 ,1999

Annexure - V

Inpatient Services - Utilisation Rates and Type of Provider

State	Utilisation (per 100.000 polpulation)			Share	
	Public	Private	Total	Public(%)	Private(%)
Andhra Pradesh	444	1,161	1,605	27.6	72.4
Bihar	198	516	714	27.7	72.3
Gujrat	540	1,176	1,716	31.5	68.5
Haryana	905	1,948	2,854	31.7	68.3
Himachel Pradesh	2,335	290	2,624	89	11
Karnataka	683	1,030	1,713	39.9	60.1
Kerala	2,944	4,537	7,481	39.4	60.6
Madhya Pradesh	579	445	1,023	56.5	43.5
Maharastra	791	1,726	2,518	31.4	68.6
North East	1,169	222	1,391	84	16
Orissa	1,163	158	1,321	88	12
Punjab	530	1,093	1,623	32.7	67.3
Rajastan	669	336	1,006	66.6	33.4
Tamil Nadu	848	1,290	2,138	39.7	60.3
Uttar Pradesh	440	566	1,006	43.8	56.2
West Bengal	1,088	353	1,442	75.5	24.5
Unweighted Average	958	1,053	2,011	50.3	49.7

Outpatient Services - Utilisation Rates and Type of Provider

State	Utilisation (per 100.000 polpulation)			Share	
	Public	Private	Total	Public(%)	Private(%)
Andhra Pradesh	775	4,543	5,318	14.6	85.4
Bihar	229	2,600	2,829	8.1	91.9
Gujrat	877	3,089	3,965	22.1	77.9
Haryana	1,012	6,129	7,142	14.2	85.8
Himachel Pradesh	3,760	6,010	9,770	38.5	61.5
Karnataka	872	3,028	3,900	22.4	77.6
Kerala	3,390	7,594	10,984	30.9	69.1
Madhya Pradesh	1,026	3,112	4,138	24.8	75.2
Maharastra	667	4,477	5,144	13	87
North East	1,887	2,581	4,468	42.2	57.8
Orissa	2,006	2,827	4,833	41.5	58.5
Punjab	693	8,084	8,778	7.9	92.1
Rajastan	1,171	1,647	2,819	41.6	58.4
Tamil Nadu	1,456	3,446	4,902	29.7	70.3
Uttar Pradesh	367	5,804	6,172	6	94
West Bengal	826	5,248	6,074	13.6	86.4
Unweighted Average	1,313	4,389	5,702	23	77

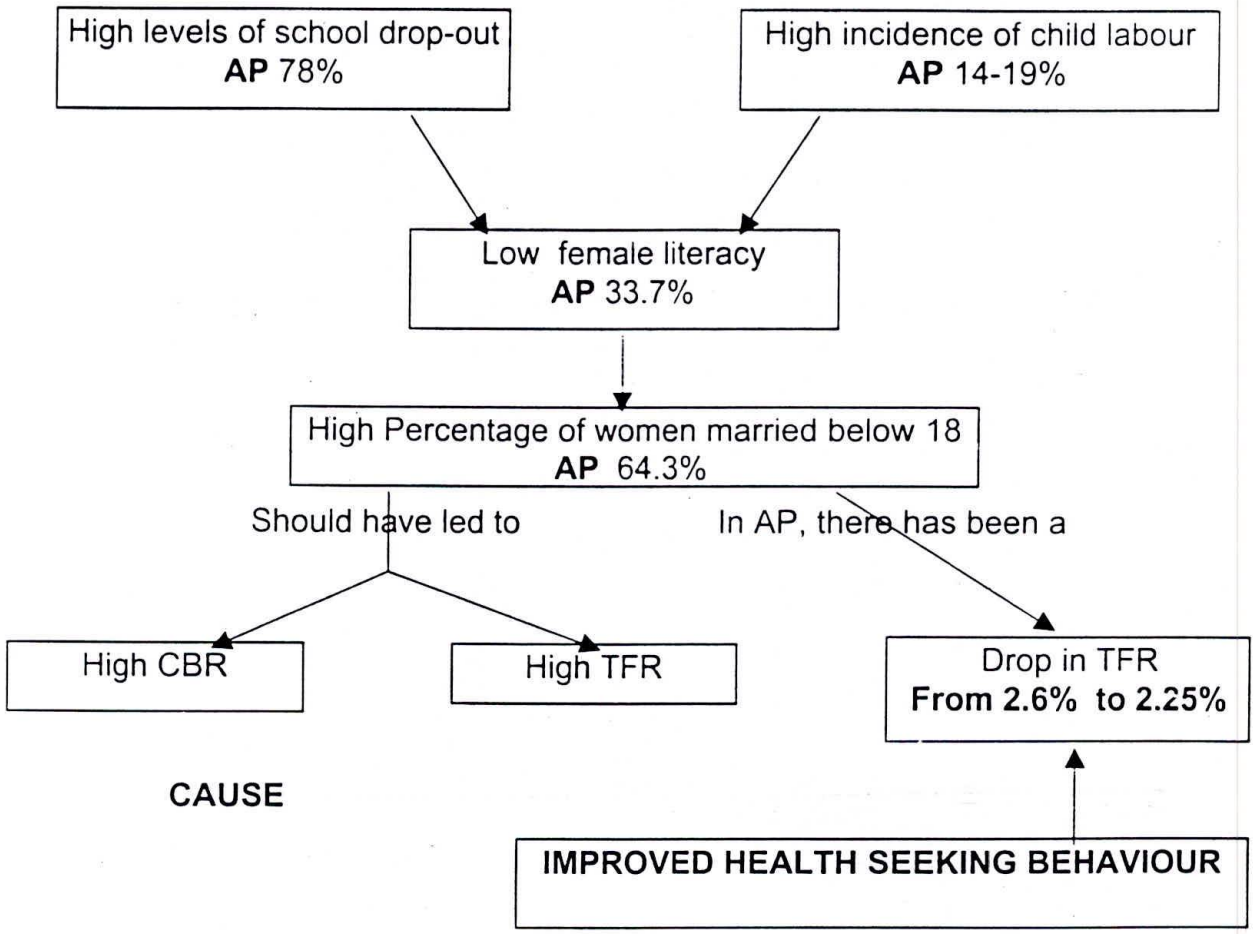
Source : NSS 52 nd Round.

Appendix 1

Positive Trends In Demographic and Service Indicators of Andhra Pradesh as Per National Family Health Survey - I & II

Sl. No	Indicators	NFHS- I (1992-93)	NFHS – II (1998-99)
1.	Crude Birth Rate (CBR)	24.1	22.3 (SRS 98)
2.	Higher Order Births	41.0	31.2
3.	Couple Protection Rate (CPR)	45.3	59.6
4.	Total Fertility Rate (TFR)	2.6	2.25
5.	ANC receiving women	86.6	92.7
6.	Safe Deliveries	49.3	65.2
7.	Infant Mortality Rate (IMR)	70.4	65.8
8.	Full Immunisation	45.0	58.7

2. Low TFR despite poor social indicators



3. Causes for declining TFR in Andhra Pradesh

A. AP Population Stabilisation Policy, 1997-98

- AP was the first state in India to announce a comprehensive population policy with the following demographic goals to be achieved by 2020:

Sl No	Indicator	Goal
1.	Natural Growth Rate (NGR)	8/1000
2.	Crude Birth Rate (CBR)	15/1000
3.	Crude Death Rate (CDR)	7/1000
4.	Infant Mortality Rate (IMR)	15/1000
5.	Maternal Mortality Rate (MMR	0.5/1000
6.	Couple Protection Rate (CPR)	75%
7.	Total Fertility Rate (TFR)	1.5/ woman

- Key strategy followed
  - Improved RCH Approach
  - People-centred approach
- Collaboration with other departments for:
  - Enhancing literacy
  - Reducing child labour
  - Reducing malnutrition among mothers and children
  - Increasing age at marriage
  - Socio-economic and political empowerment of women
- Translating goal into activities

B. Value- added service delivery

- De-centralised structures to implement SPP with PHC Advisory Committees and District Population Stabilisation Societies positioned.
- Freedom with funds at grass-root to manage population control activities.
- Enhancing the quality of services rendered
  - Strengthening the physical infrastructure
    - 160 FRUs and 626 PHCs built.
    - 477 PHCs renovated
  - Recruitment done frequently to reduce vacancies to a minimum
  - Streamlining drug supplies through centralised stores.
  - Positioning equipment required for mother and child care at service delivery points.
  - Innovative techniques like single/double puncture laprascopy , non-scalpel vasectomy and Murthy technique introduced.
  - Extensive Inter Personal Communication by village level functionaries like ANMs, VAOs, VDOs, AWWs, teachers etc.
  - Effective community mobilisation using community-based formal and informal groups and through local bodies

C. Innovative services

1. Maternal and child health care

- Doctors of PHCs visit villages twice a week particularly for FW services
- 215 Round the Clock PHCs functional to provide services for normal delivery
- Providing specialist services of gynaecologist and paediatrician once a week at the PHC for detecting/treating high-risk cases.
- Providing specialist services of gynaecologist and paediatrician once a week at the FRU for referral and emergency cases.
- Weekly clinics at village level for STI/RTI care.
- Pulse polio campaigns
- ORT and ARI Campaigns

2. Family Planning services

- Effective logistics management by systematic program implementation
- Increase in PHCs from 1100 to 1390 in 1999
- Doubled the quantity of drugs, materials and consumables at PHCs.
- Skill training for 286 surgeons in DPL and NSV
- Raise in compensation for loss of wage for sterilisation from Rs.120 to Rs.500.
- 'Aarogyaraksha' medical insurance scheme for FP acceptors and their children extended to 2 lakh families per anum
- Awards for best performing MOs, para-medical staff and eligible couples from districts.
- Expanding MTP services to avert unplanned child birth
- Expanding sustainable use of Condoms & Pills by undertaking social marketing

D. Bureaucratic Commitment

- Very strong bureaucratic commitment at all levels in the State particularly at the district level for Family Welfare Programmes
- Support by bureaucracy results in :
  - Effective delivery of Family Planing Services
  - Motivation, awareness generation to accept small family norms
  - Mobilising community participation
  - Tailored Family Welfare Programme to suit local needs
  - Deployment of machinery (money, people & infrastructure) at their disposal to support and plug the gaps in Family Welfare Programme.

E. Political Commitment

- Exemplary leadership of the Hon'ble Chief Minister of Andhra Pradesh in adopting SPP & allotting an annual budget of Rs.15 crore.
- Personal interest shown by the Hon'ble Chief Minister in reviewing the Family Welfare Programme.
- Placing Family Welfare high on agenda in the Janmabhoomi Programme, which is the vehicle for social development. Under this

programme, the health teams have visited every habitation 12 times in the past 3 years.

- Apart from general health camps, the health teams have undertaken the following activities as part of Janmabhoomi Programme.

Sl.No.	Particulars	Frequency per annum
1.	ORT / ARI Campaign	Once
2.	AIDS Campaign	Thrice
3.	Camps on Gynaecological problems	Four times
4.	RTI / STI camps	Twice
5.	ANC / PNC camps	Twice
6.	Immunisation	Twice

- Mobilising support from other departments to support Family Welfare Programme.
- Involving public representatives at various levels inculcating a sense of ownership & competition.

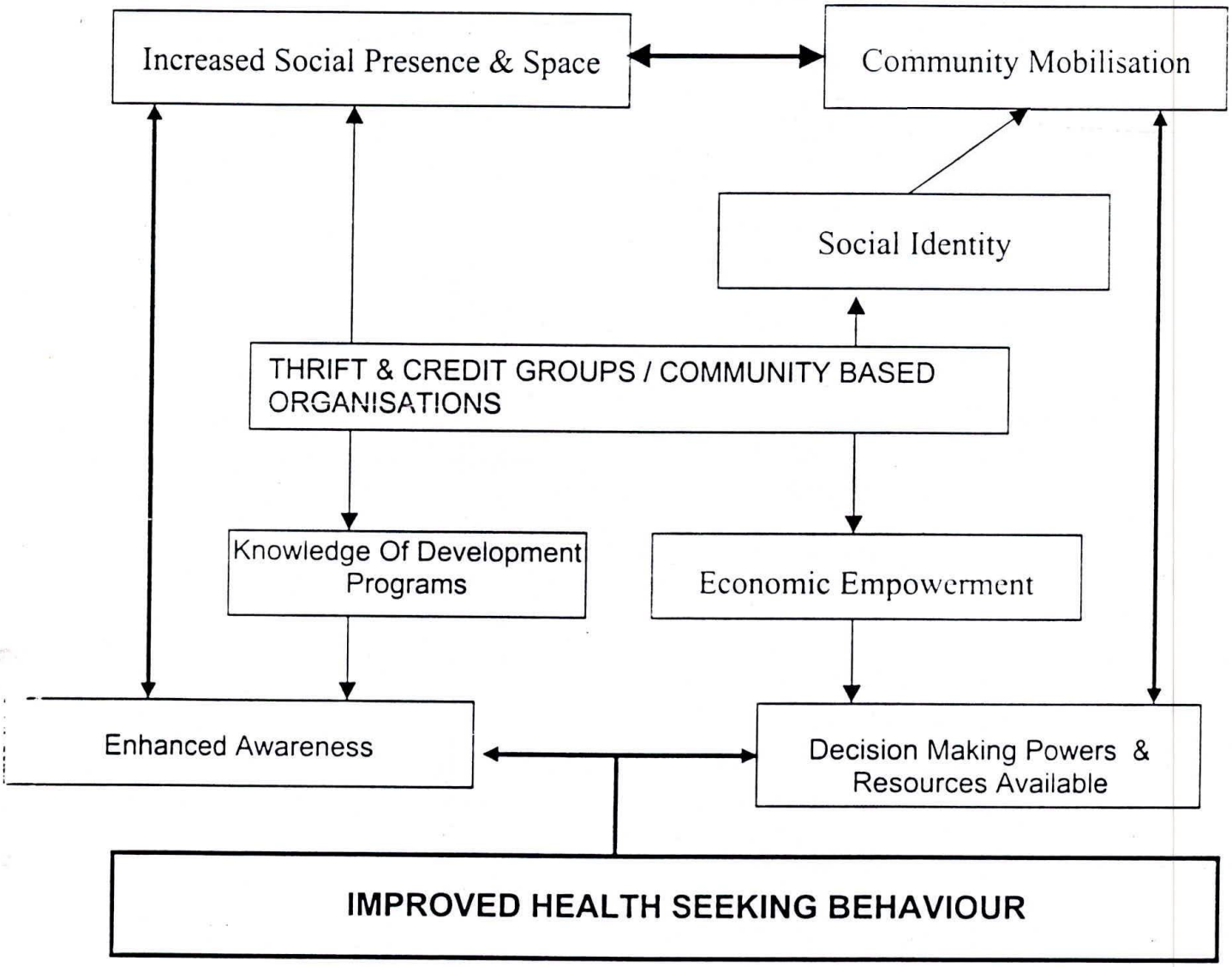
F. Total Literacy Campaign

- Initiated in all districts of Andhra Pradesh in 1991 with differing levels of success.
- Programme comprised :
  - 6 months environment build-up / ground work
  - 6 months learning
- The literacy primer carried health care messages
- Outcomes of TLC in terms of what it did to women learners:
  - Key health messages in primer received
  - Laid foundation for community mobilisation
  - Women gained a `social identity' , which made them more `powerful' and hence capable of executing their key health decisions
  - The TLC gains consolidated in the PLC Phase and the CEC Phase.

G. Women's Empowerment

1. Formation of thrift and credit groups: An incredible number of 3.95 lakh DWCRA groups with 50 lakh women currently exist in the state with a total private savings of Rs.600 Crores.

2. Improved health seeking behaviour through empowerment:



2. Formation of other community-based groups: leading to better health seeking behaviour. Other self-help groups that are involved for health programs are as follows:

- Watershed Groups
- Vana Samrakshana Samitis
- CMEY Groups
- Mother's Committees
- School Committees

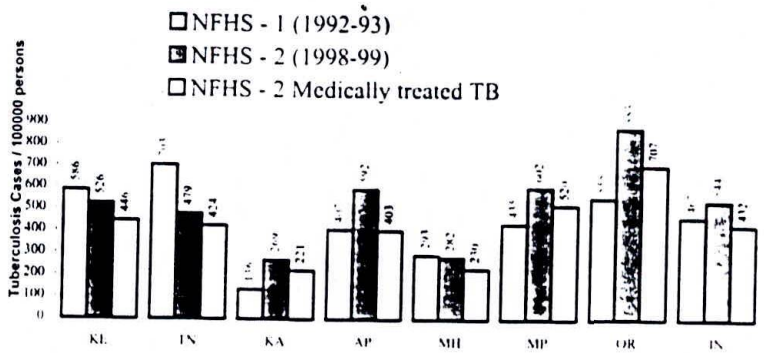
All these groups are given health messages regularly as part of their training program.

Appendix 2

1. Tuberculosis

The NFHS included questions for the head of household to find out existence of any of the identified major morbidity conditions. Tuberculosis was included in both the surveys. Prevalence of tuberculosis in Andhra Pradesh appears to have slightly increased between the two surveys. The question about medically treated tuberculosis would give a more accurate estimate. Since the NFHS-1 did not have such a question, we cannot compare between the two surveys using this parameter. However, the prevalence of medically treated tuberculosis at the time NFHS-2 was similar to the prevalence of perceived tuberculosis at the time of NFHS- 1. That would mean that the real prevalence of tuberculosis has definitely gone up slightly between 1992-93 and 1998-99 (Figure 1).

Figure 1



Source : NFHS-1 data from IIPS (1995)

2. Leprosy

Andhra Pradesh is a known endemic area of leprosy. Prevalence of leprosy has been brought down from 133 per 10,000 in 1961 to in 1983, 56/10,000 in 2000.

Figure 2

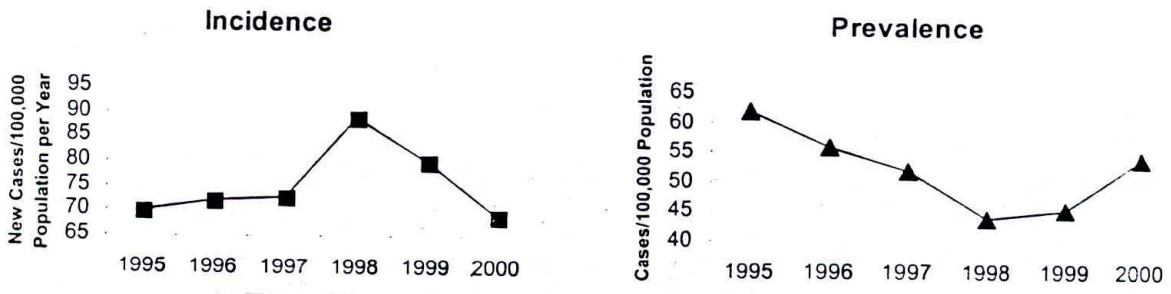
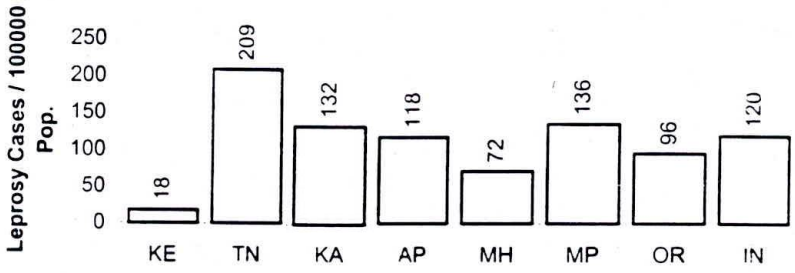


Figure 2 shows recent trends in incidence and prevalence of leprosy in the state. There has been a slight spurt in leprosy cases during the year 1998 and 1999 consequent to the house to house search conducted in a national

campaign. The incidence has reverted to its low position thereafter. The close similarity of prevalence and incidence figures suggest that the programme for treatment of leprosy is quite effective, resulting in a quick cure. As a result, the duration of suffering from leprosy by those who get the infection, appears to be low.

Figure 3



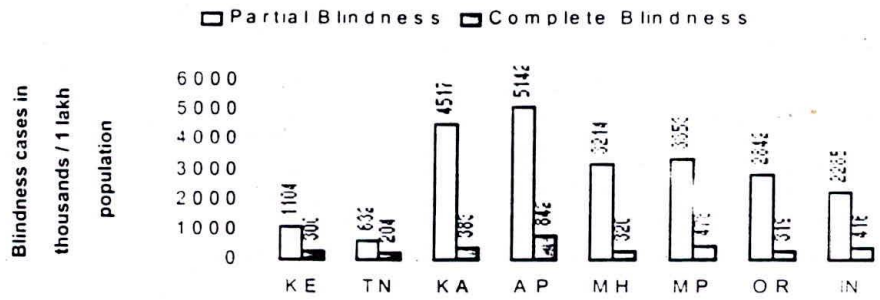
Source: NFHS – 1 data from IIPS (1995) Table – 8.2 p205

The NFHS.1 included a question on leprosy, which was dropped in NFHS-2 to accommodate questions on other conditions. Figure-3 shows prevalance in AP and its neighbouring states. Overall the performance of the Leprosy Control Programme in the state appears to have been very good.

3. Blindness

The NFHS- 1 asked a question about blindness. Figure 4 shows that prevalence of both partial and complete blindness is higher in AP and Karnataka compared to other neighbouring states. There is a need for greater focus on the National Blindness Control Programme to reduce the prevalence of blindness.

Figure 4
Blindness Cases in A.P. and other States, 1992-93

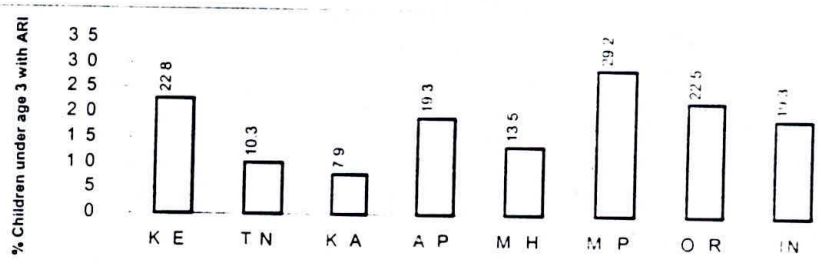


Source : NFHS – 1 data from IIPS (1995)

4. Acute Respiratory Infections (ARI)

ARI is a significant childhood morbidity. Figure 5 based on NFHS 2 reveals that point prevalence of ARI in AP was lower compared to Kerala, Madhya Pradesh and Orissa. Other neighbouring states like Tamil Nadu, Karnataka and Maharashtra had lower point prevalence of ARI.

Figure 5

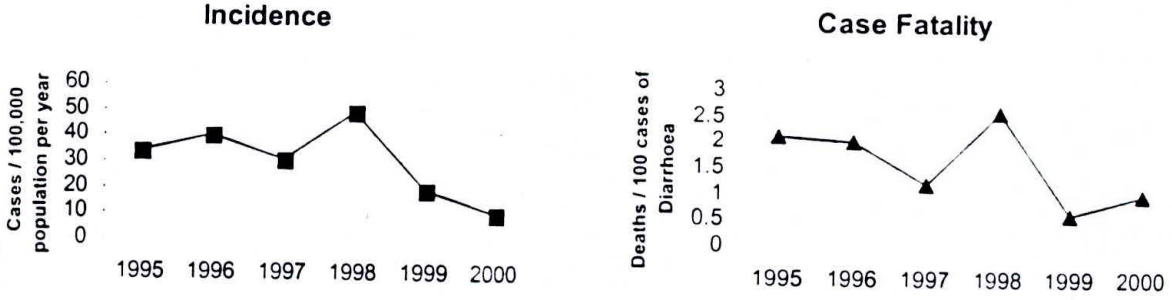


Source : NFHS – 2 data from IIPS (2000)

5. Diarhoea

Diarrhoea incidence and case fatality remained more or less constant between 1995-97. In 1998 there was a slight spurt of diarrhoea cases. There is a decline in diarrhoea incidence and related case fatality in the last two years.

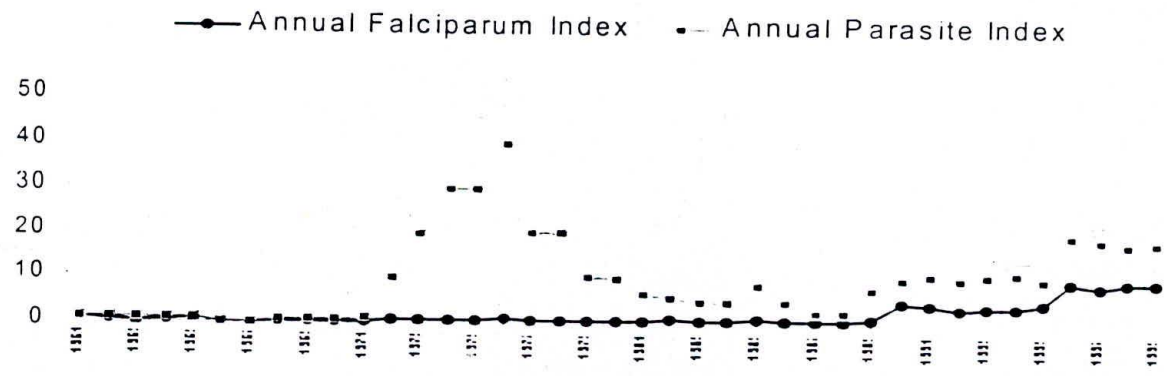
Figure 6



6. Malaria

Figure 7 shows the long-term trend of malaria cases in the state since 1961. During the 1970s malaria incidence in the state had significantly, was brought under control in the 80's and upto the mid 90's. Thereafter there has been a gradual increase in the incidence of malaria. Recent increase in incidence appears to have been contributed by the increase of both Vivax and Falciparum Malaria:

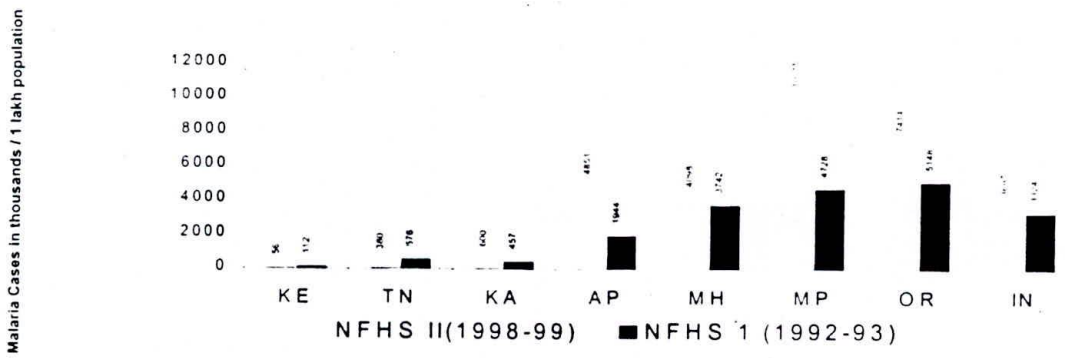
Figure 7



Source : Government of AP, Directorate of Health – Malaria Division

The two NFHS provide a comparative picture of malaria among AP and its neighbouring states and also give us an independent estimate of time trend during the 1990s. This also corroborates the rise of malaria in the 1990s. Incidence of malaria in the state of AP is similar to the incidence in Madhya Pradesh. Malaria incidence in Tamil Nadu, Karnataka and Kerala is considerably lower (Figure 8).

Figure 8
Recent Trends of Malaria in AP and Other Indian States

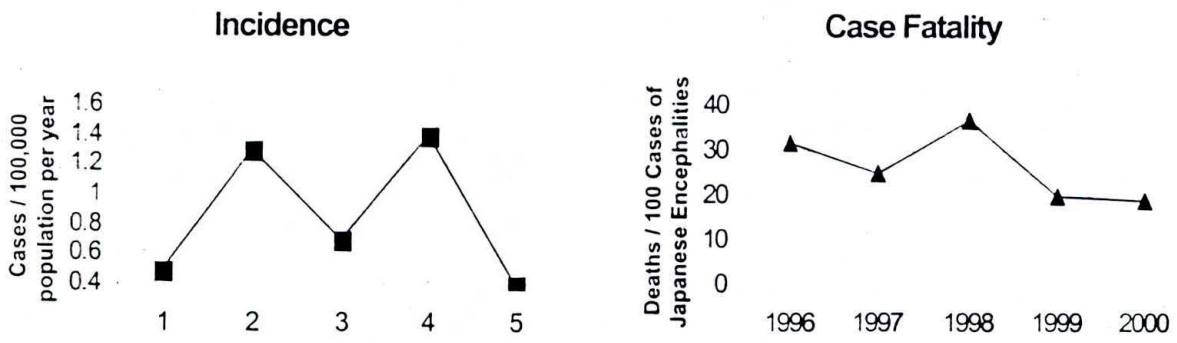


Source : NFHS data from IIPS (1995)

7. Japanese Encephalitis

Japanese encephalitis (JE) is caused by a virus. JE incidence in the state has been erratic, swinging up and down. The state has made significant efforts in building up professional capacity for management of JE cases. That appears to have contributed to the significant reduction in case fatality over the last two years.

Figure 9
Recent trend of Japanese Encephalitis incidence and case Fertility



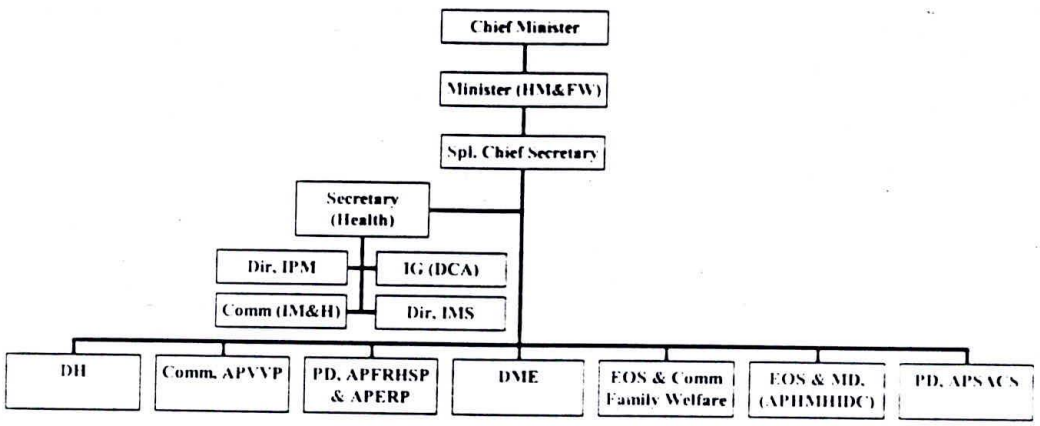
- *Extracted from the White Paper on Health and Family Welfare, Govt. of Andhra Pradesh, 2001.*

The organisation of the Department of Health and Family Welfare is summarised in the following Chart –

Organogram of the Department

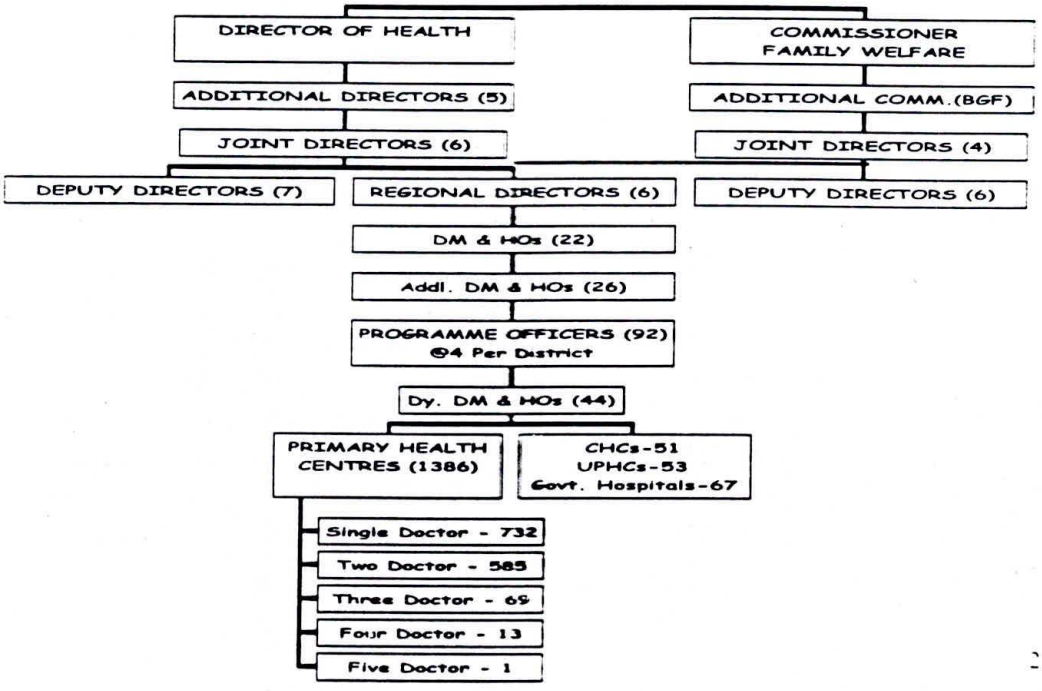
At the district level, the District Medical and Health Officers are in charge of primary health care and the District Coordinator of hospital services are in charge of secondary health care. At the sub-district level are the area hospitals, community health centres and the primary health centres. Each area/community hospital has a civil surgeon and deputy civil surgeon in charge respectively. Deputy District and Medical Health Officers look after primary health centres for a specified geographical area. The Directorate of Health is responsible for all primary health services including preventive and basic curative services, and the Department of Family Welfare is responsible for the family welfare services. The Andhra Pradesh Vaidya Vidhan Parishad, an autonomous body set up under state legislation, is responsible for secondary care. The Directorate of Medical Education is responsible for tertiary care.

ORGANOGRAM OF DEPARTMENT OF HEALTH, MEDICAL AND FAMILY WELFARE

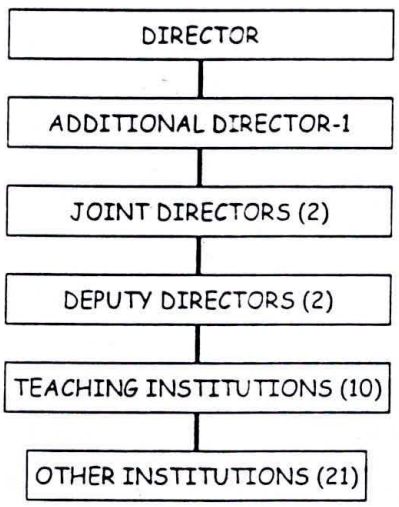


IPM	: Institute of Preventive Medicine
IG/DCA	: Inspector General, Drug Control Administration
Comm./ISM&H	: Commissioner, Indian System of Medicine and Homeopathy
Dir,IMS	: Director, Insurance Medical Services
DH	: Director of Health (Primary Health Care)
Comm,APVVP	: Commissioner Andhra Pradesh Vaidya Vidhan Parishad
PD,APFRHSP & APERP	: Project Director, AP First Referral Health Systems Project & AP Economic Re-structuring Project (Secondary Health Care)
DME	: Director, Medical Education (Tertiary Health Care)
EOS	: Ex – Officio – Secretary
MD,APHMHIDC	: Managing Director, Andhra Pradesh Health & Medical Infrastructure Development Corporation
PD,APSACS	: Project Director, Andhra Pradesh Statae AIDS Control Society

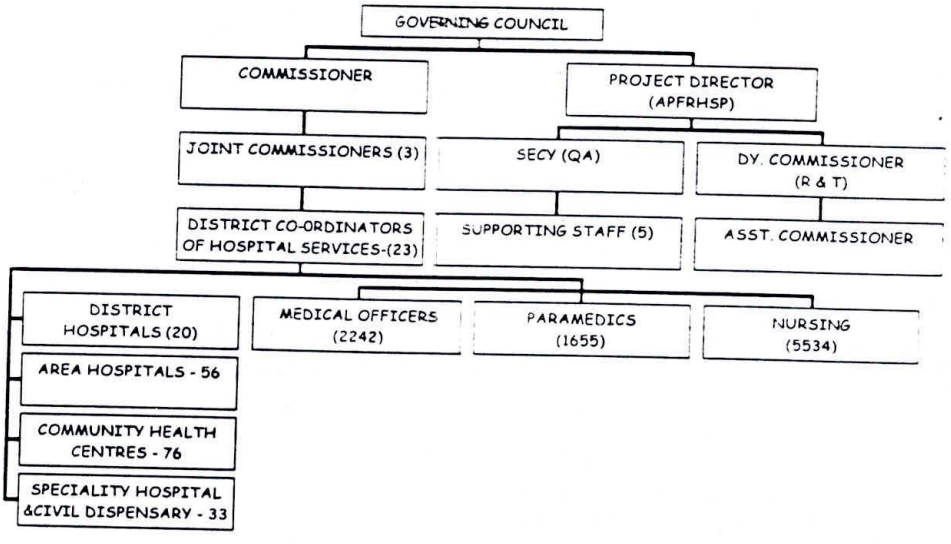
ORGANOGRAM OF DIRECTOR OF HEALTH AND COMMISSIONARATE OF FAMILY WELFARE



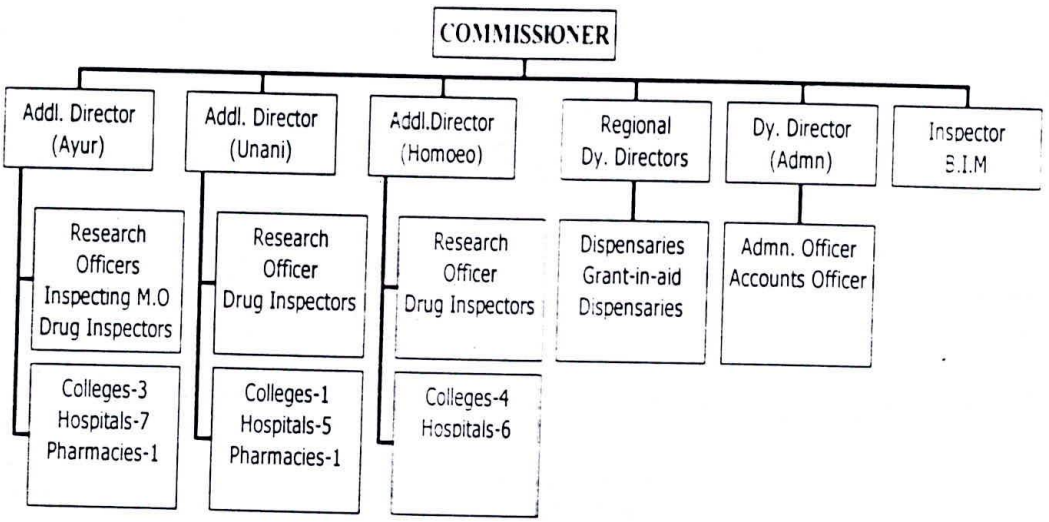
ORGANOGRAM OF DIRECTOR OF MEDICAL EDUCATION



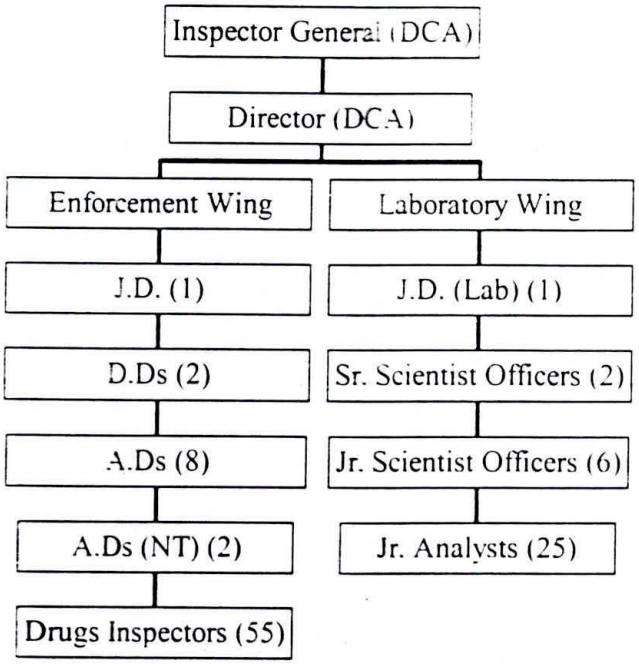
ORGANOGRAM APVVP & APFRHSP



ORGANOGRAM OF INDIAN MEDICINES &HOMOEOPATHY DEPT.

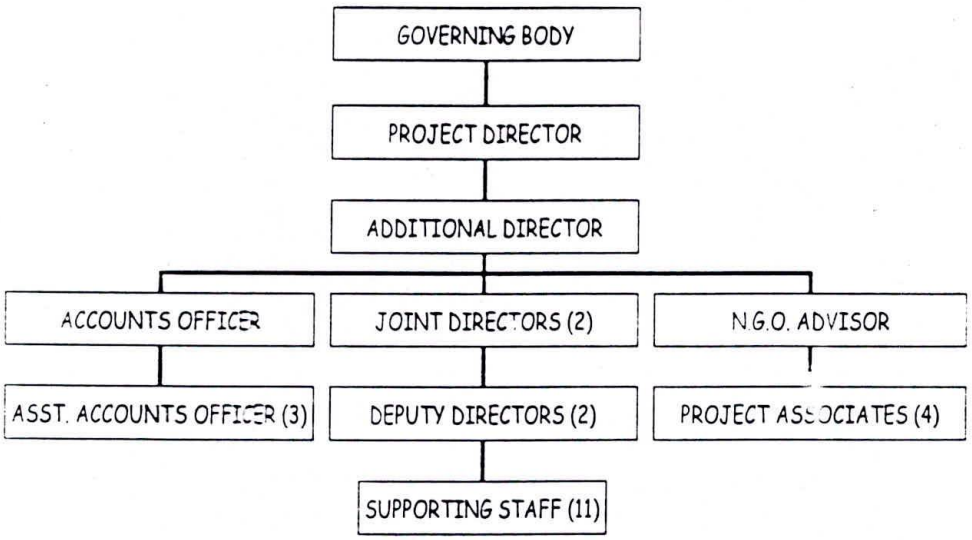


Organogram of Drug Control Administration



4

ORGANOGRAM OF STATE AIDS CONTROL SOCIET



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Appendix 4

Action Plan Approved By Cabinet Sub-Committee For Family Welfare

Demographic Goals for the Next 5 Years:

Sl. No.	*Indicator*	*2000-01*	*2002-03*	*2004-05*
1.	Natural Growth Rate (%)	1.2	1.05	0.98
2.	Crude Birth Rate / 1000 Pop.	20.0	18.0	17.0
3.	Crude Death Rate/1000 Pop.	8.0	7.5	7.2
4.	Infant Mortality Rate/1000 Lbs	55	50	45
5.	Maternal Mortality Rate	2.5	1.8	1.6
6.	Couple Protection Rate (%)	60	63	65
7.	Total Fertility Rate/Woman	2.1	1.9	1.8

Action Plan

Strategy	Activity	2000-01	2001-02	20002-03	2003-04	2004-05
1. Decentralised Organisational Structure	Establishment of Population Stabilization Societies at Dist. Mandal and Gram Panchayat Level.	All Dists.				
2. Quality Services	Strengthening Infrastructure	150 FRUs 600 PHCs	Balance buldings 100 Sub-centres	100 sub-centres	100 sub-centres	100 sub-centres
	Streamlining Drug supplies (changes in procedures)	All FURs	All PHCs	---	---	---
	RCH Training for Health Personnel	25% of doctors	25% of doctors	25% of doctors	25% of doctors	25% of doctors
3. Safe Motherhood	Ante-natal coverage	65%	80%	>95%	>95%	>95%
	Sukhibhava to increase Institutional Deliveries	5.2 lakhs	7 lakhs	9 lakhs	9 lakhs	9 lakhs
	Establishment of Round the Clock PHCs (Nos.)	300	494	494	494	494
	VNM Scheme (Villages to be covered)	2000	2000	2000	2000	2000
	Conduct of Antenatal camps at village level	All PHCs	All PHCs	All PHCs	All PHCs	All PHCs
	Provision for Maternity, RTI/ STI clinics on fixed days at PHCs	All PHCs	All PHCs	All PHCs	All PHCs	All PHCs
	Establishment of Referral & Emergency Services for Mother and Child	In 75 referral units	In 125 referral units	In 175 referral units	In 200 referral units	In 200 referral units
	Establishment of RTI/STI Clinics in Referral Units	In 75 referral units	In 125 referral units	In 175 referral units	In 200 referral units	In 200 referral units
	integration with ICDS to reduce malnutrition in pregnant women & lactating mothers	in 2 Dists.	in 5 Dists.	in all Dists.	in all Dists.	in all Dists.
	Campaigns for Adolescent Girl (Number)	2	2	2	2	2
	Specific Schemes for Age at Marriage	✓	✓	✓	✓	✓

Strategy	Activity	2000-01	2001-02	20002-03	2003-04	2004-05
4. Child Survival	Universal Immunisation	65%	80%	> 95%	> 95%	> 95%
	Pulse Polio Immunisation	100%	100%	100%	100%	100%
	Campaigns for ORT & ARI	1	1	1	1	1
	Provision for special neonatal care in referral hospitals	23 FRUs	50 FRUs	70 FRUs	70 FRUs	70 FRUs
	Integration with ICDS to improve nutrition practices to reduce low birth-weight babies	in 2 Dists.	in 5 Dists.	in all Dists.	in all Dists.	in all Dists.
5. Increasing contraceptive prevalence	No. Of Sterilisations	8 lakhs	8 lakhs	8 lakhs	8 lakhs	8 lakhs
	Percentage of Male Sterili sation (of total sterilisations)	10%	15%	20%	25%	30%
	Delay in First Pregnancy by 2-3 years (% of cases)	15%	20%	25%	40%	50%
	Increase in Birth Intervals of 1st & 2nd Child by 3-5 years (% of cases)	15%	20%	25%	40%	50%
	Research studies to test acceptability for alternative spacing methods	in Pilot Dists.	---	---	---	---
6. Strengthening Family Planning	Insurance coverage for FW acceptors	2 lakhs	4 lakhs	4 lakhs	4 lakhs	4 lakhs
	Skill Training for Medical Officers (DPL/NSV/Conventional)	25% of doctors	25% of doctors	25% of doctors	25% of doctors	25% of doctors
	Expand MTP services	in 75 Insts	in 125 Insts	in 175 Insts	in 200 Insts	in 200 Insts
	Social marketing of condoms & pills	in all Dists.	in all Dists.	in all Dists.	in all Dists.	in all Dists.
7. Incentives	Incentives for community individuals and service providers	✓	✓	✓	✓	✓
	Welfare benefits for acceptors and motivators of Family Planning	✓	✓	✓	✓	✓
8. Filling up gaps in the system	Pilot work for Optimum Utilisation of Manpower and Infrastructure	2 Dists.	5 Dists.	All Dists.	---	---
	Urban Health Centres	73 Muni-cipalities	addl. 44 Muni-cipalities	---	---	--
9. IEC Activities	Messages on Female Literacy, Age at marriage, Institutional deliveries Low birth-weight, Spacing & Male Sterilisation	All Dists.	All Dists.	All Dists.	All Dists.	All Dists.
10. Improve Monitoring and Evaluation System	Introduce Computerisation upto PHC level	All Pilot Dist. Hqs.	All 3 Dists.	All PHCs	All PHCs	All PHCs
	Introduce concurrent evaluation by independent agencies for validation of data	All Dists.	All Dists.	All Dists.	All Dists.	All Dists.
	Introduce Sample Registration System (SRS) for Districts	3 pilot Dists.	All Dists.	All Dists.	All Dists.	All Dists.
11. Active Participation of Community & N.G.Os	Public participation through Janmabhoomi	All Dists.	All Dists.	All Dists.	All Dists.	All Dists.
	Thrust on environmental sanitation in Janmabhoomi.	All Dists.	All Dists.	All Dists.	All Dists.	All Dists.
	Involvement of public representatives and Self-Help Groups	All Dists.	All Dists.	All Dists.	All Dists.	All Dists.

- Dept. of Family Welfare, Govt. of Andhra Pradesh

Action Plan Approved By Cabinet Sub-Committee For Health

Year	2000-2001	2001-2002	2002-2003	2003-2004	2004-2005
% share of health budget to total budget	6	7	8	9	10
% share of health budget to primary and secondary care	80	82.5	85	87.5	90
Increase community participation	Streamline functioning of hospital advisory committees	Increase role of mandal panchayats in functioning of PHC's Set up village health committees in villages with high risk of GE,JE and malaria.	Extend village health committees to rest of the state		
Strengthen surveillance system for vaccine preventable and communicable diseases	Institute systems for reporting from health institutions including private sector.	Prepare and implement localised plans based on disease incidence in 100 PHC's on a pilot basis.	Extend implementation of localised plan to additional 400 mandal PHC's	Extend implementation of localised plan to additional 500 PHC's	Localised plan based on disease incidence extended to all PHC's
Integration of Indian system of Medicine and Homeopathy	Initiate training of all non-allopathic doctors in preventive aspects of national programs. Allocate duties relating to immunisation to all ISM&H dispensaries	Extend duties to cover preventive aspects of malaria and GE . Set up mechanism for reviewing functioning of ISM&H units at district level.	Review and modify functioning of ISM&H dispensaries in relation to national programs.	Extend duties to cover preventive action for all national programs	
Strengthen secondary health care sector.	Complete implementation of all non-recurrent components of APFRHSP including civil works and procurement of equipment. Implement hospital monitoring system in 150 hospitals. Commence on-line hospital monitoring system for 20 district level hospitals	Upgrade additional 124 units as first referral units under APFRHSP. Expand on line hospital monitoring system to additional 50 Units. Integrate with mandal computer network for 20 units on pilot basis.	Expand on-line hospital monitoring system to additional 100 units. Integrate with mandal computer network for 50 additional units.	Expand on line hospital monitoring system to all first referral units. Integrate with mandal computer network for 100 additional units.	Set up fully integrated system computer network system for both mandal and first referral level.

Year	2000-2001	2001-2002	2002-2003	2003-2004	2004-2005
Strengthening of tertiary care in existing government hospitals	Identify source of funding and prepare self-financing upgradation scheme in 2 teaching hospitals	Implement plan for upgradation in 2 teaching hospitals	Study impact of scheme and plan for 2 additional units based on experience.	Review implementation of scheme and modify.	Extend plan to cover 4 additional units
Encourage private sector investment in the health sector	Establish 5 medical and 5 dental colleges in the private sector. Institute transparent mecahnism for establishment of institutions for paramedical courses in the private sector. Introduce bill for setting up regulatory authority for monitoring the quality of treatment in the private sector.	Establish additional 5 medical and5 dental colleges in the private sector. Frame rules for functioning of regulatory authority and establish authority	Establish additional 5 medical and5 dental colleges in the private sector.	Establish additional 5 medical and5 dental colleges in the private sector.	Establish additional medical and dental colleges to ensure at least one medical and one dental college in the private sector in all districts.
Developing health information systems	Utilise APSWAN for processing district level data on-line for 22 districts Systematise data collection on mandal level disease patterns including private sector institutions also.	Strengthen district level data processing and initiate direct mandal level data processing on pilot basis in 100 mandals. Set up interactive web-site.	Link mandal level centres to districts and undertake on-line processing of mandal level in additional 500 mandals.	Strengthen mandal level on line data processing and cover remaining 500 mandals.	Integrate systems with private institutions network. Introduce telemedicine.
Streamlining of drug procurement processes and quality control	Strengthening of warehousing facilities in 23 districts. Computerisation and on line transaction of drug procurement. Set up drug data base.	Establishment of additional go-downs in 9 ITDA areas. Extend activities to cover surgical consumables also. Set up interactive web-site.	Improve quality control at go-down level and obtain quality certification. Extend computer network to cover mandal level.	Extend activities to cover all consumables.	Fully integrate computer network with private sector network.

Year	2000-2001	2001-2002	2002-2003	2003-2004	2004-2005
Strengthening referral system	Integrate national programs including RCH into the secondary referral system. Introduce systematic referral protocols and treatment schedules. Introduction of pilot scheme in 3 districts for adopting the base hospital approach with a stronger component of mobile healthcare.	Strengthening of referral system through base hospital approach based on lessons learnt from the pilot study, in 5 additional districts. Introduce system of incentives for encouraging referrals.	Introduce base hospital approach in additional 5 districts. Upgrade all taluk level hospitals into first referral units.	Introduce base hospital approach in additional 5 districts.	Introduce base hospital approach in additional 4 districts.
Human resource development	Continue training of all medical personnel with special reference to nursing staff and lab technicians. Introduce quality circles at different levels on pilot basis in all health institutions in 3 districts. Institute performance based system of transfers.	Extend quality circles in additional 5 districts. Set up computerised hospital management systems. Introduce system of hospital management staff.	Strengthen hospital management capability. Continue training Extend quality circles to additional 5 districts.	Continue training Extend quality circles to additional 5 districts.	Continue training Extend quality circles to additional 5 districts.
Strengthening IEC activity and health education	Strengthen traditional forms of public health education with focus on providing area specific information. Set up systems to review impact of IEC activity. Introduce strong element of health education in school curriculum including personal hygiene public hygiene and healthy habits. Introduce AIDS awareness programs at high school and college level	Set up interactive web-site for public information. Review impact of IEC activity and make necessary modifications	Expand use of multimedia for public health education through satellite communicati on. Review impact of IEC activity and make necessary modifications	Review impact of IEC activity and make necessary modificati-ons	Review impact of IEC activity and make necessary modificatio-ns

- Medical, Health and Family Welfare Dept., Govt of Andhra Pradesh

References

1. Bhatia, Dr.J.C., (1988), *A Study on Maternal Mortality in Anantpur district. Andhra Pradesh,* Indian Institute of Management, Bangalore.

2. James, K.S. and.Subramaniam, S.V, (2001), *Towards a Demographic Transition.* Centre for Economic and Social Studies (CESS), Hyderabad.

3. Mahal, A, et al, (December 2000), *Who Benefits from Public Health Spending in India*, NCAER, New Delhi

4. Pearson, Mark; Gupta, DB; Gumber, Anil; Purohit Brijesh; Rao Venkat; George Alex. (March 2001), *Impact and Expenditure Review, Health Sector*, DFID Health Systems Resource Centre, Presented to the Government of Andhra Pradesh, Hyderabad.

5. Department of Medical, Health and Family Welfare, Government of Andhra Pradesh, (1998), *Report of the Expert Committee on Reform of the Health Sector in Andhra Pradesh,* Secretariat, Hyderabad.

6. Department of Medical, Health and Family Welfare, Government of Andhra Pradesh, (1997), *Report of the Expert Committee on Administrative Reforms in the Health, Medical and Family Welfare Department,* Secretariat, Hyderabad.

7. Department of Medical, Health and Family Welfare, Government of Andhra Pradesh, (2000), *Draft Report of the Cabinet Sub-Committee on Health and Family Welfare.* Secretariat, Hyderabad.

8. Department of Medical, Health and Family Welfare, Government of Andhra Pradesh, (2001), *Strategy Paper on Health and Family Welfare in Andhra Pradesh.* Secretariat, Hyderabad.

9. Government of Andhra Pradesh, (2000),*Vision 2020: Swarna Andhra Pradesh,* Secretariat, Hyderabad.

10. Sample Registration Survey (SRS), (various years, Registrar General, Census of India, Government of India, New Delhi.

APPENDIX 6

Health Empowerment of the People: the Kerala experience

V. Vijaychandran

Introduction

Kerala is a small state in the southwestern corner of India occupying 1.1 per cent of the country's geographical area and supporting about 3 per cent of its population. It is known for its high social development like high levels of education and life expectancy and low rates of infant mortality, birth, fertility etc. A curious thing about the state is that this level of social development has been achieved without any high levels of income. The coexistence of relative poverty and better health has drawn the attention of various academics to Kerala. This paper will draw a picture of the health status of its people in comparison with the other states of India and some other countries. It will also attempt to explain the process of achieving that status and try to draw lessons from it. Section 2 will introduce the state with some characteristics that make it stand out from the rest of the country and compare it with some other countries of Asia. Section 3 will put forward some explanation of the process that has led to this development, emphasising, among other things, the role of education. Section 4 will trace the history of health care development in the state and describe the health systems and its strengths and weaknesses. The next section will speak of the role of the private sector. Section 6 will touch upon the recent phenomenon of migration from the state in search of employment and how it brings in extra income. Section 7 will describe the epidemiological transition from communicable to non-communicable diseases while still carrying the burden of the former. Section 8 will list the main problems in health care, the initiatives taken and the lessons that can be drawn from the Kerala experience. The concluding session will summarise the arguments.

The Characteristics of the State

The state was formed in 1956, when the states of India were reorganised along linguistic lines. Three regions speaking the common language of Malayalam were unified into one state, reviving the old name of Kerala. These regions were Travancore and Cochin in the southern part under the princely rulers before independence and Malabar in the northern part ruled by the British Government directly as part of Madras Presidency. They had a common cultural, social and historical past at the time the British established their supremacy over the territory in 1793, but were destined to traverse different socio-political routes during the next century and a half. This diverse development of the three regions led to different levels of development in them. But we shall go into this later.

The state has a coastal line of about 600 kilometres stretching from South to North. The eastern boundary of the state is the Western Ghats. The average distance from this to the Arabian Sea on the West is about 65 Kilometres. This stretch of land has four major physiogeographic zones. The area of the Western Ghats is the highlands where plantation crops like tea, coffee and cardamom are grown. The midland region, which varies from an altitude of 300 to 600 meters, has rich laterite soil and the major crops are rubber, and coconut. Coconut is the major crop of the state, stretching to the low lands where rice is also grown. In the sands of the coastal plain coconut is virtually the only crop. Fishing is the main activity in that region. The state has relatively heavy monsoon rain and not much difference in temperature at any time of the year. There are more than 40 rivers that originate from the Western Ghats and flow into the Arabian Sea forming backwaters and rivulets in some of the low lands.

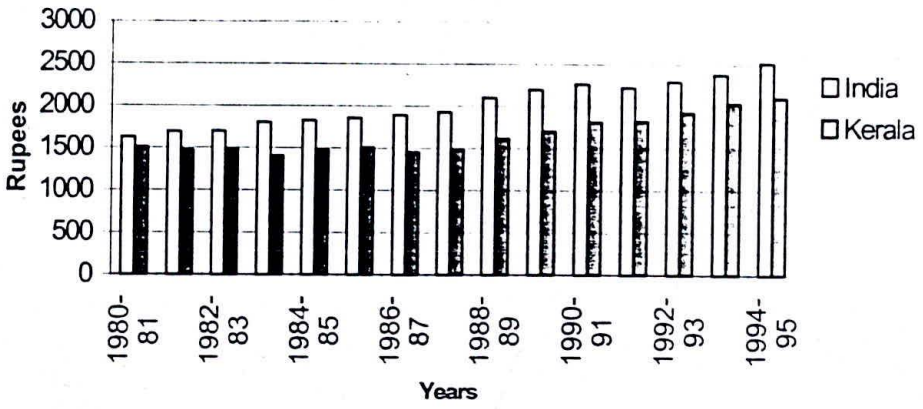
The first thing that strikes a casual visitor to the state is the settlement pattern of its people. Unlike in the rest of the country, where people live in clusters, leaving vast areas for cultivation, the people of Kerala live in small homesteads surrounded by coconut palms, sharing the neighbourhood with members of other religions. The mixture of religions in the state is the highest among the major states of the country. Only 57 per cent of the population are Hindus against 82 per cent in the country. Muslims are 21 per cent (all India 12) and Christians 20 (all India 2), the others constituting 2 per cent (Census 1991). The provisional figures of the 2001 Census show that 819 persons live in a square kilometre, which is one of the highest densities in India.

This settlement pattern, no doubt, necessitated by the high density of population and facilitated by the cropping pattern, has led to the obliteration of the rural-urban differences in the state. The state looks like one huge settlement, with names of the administrative divisions changing from village to town and to city with the increase in the number of houses. In fact these divisions are only in the maps and have only rarely any demarcation visible on the ground. The whole state has been described as a rural-urban continuum. The huge development-gap between rural and urban areas that we find in the rest of the country is virtually non-existent in Kerala. 85.3 per cent of Kerala villages are well connected by good roads. In the rest of the country only 36.85 are so connected. 94.7 per cent have a bus stop within 5 kilometres and a post office within 2. The percentage of villages with a telephone within 2 kilometres is 80. Only 26.7 per cent of the villages of Kerala have to depend on unprotected water, while more than half the villages in India have to do so. (See Table 1- Percentage of Villages and Availability of Different Facilities by States). According to the first Economic Census conducted in 1977, 99.7 per cent of villages in Kerala had a primary or junior basic school within 2 kilometres, 98.6 per cent had a middle school within 2 kms and 96.7 per cent, a high or higher secondary school within 5 kms as against an all India average of 90.1 per cent, 43.8 per cent and 20.9 per cent, respectively. (Kannan 1988).

Another feature of the state is a well-developed public distribution system of food grains. A large part of the cultivable area of the State is under commercial crop. The State does not produce enough food grains to feed its people and this has been declining as more and more areas get converted from food grain production to commercial cropping and for construction of houses as the population expanded. The State produced 63 kilograms of food grains per annum per capita in 1970-73, which declined to 37 kgs in 1990-93, when at the all India level the Green Revolution was making it steadily rise. But from the 1960s the state has been distributing through its fair price shops a reasonable quantity of food grains for its people. Against 22.2 kg at all India level in 1992, Kerala distributed 70.4 kg of food grains per capita. (Srinivasan and Shariff 1997) It had 92 per cent of its people covered under the PDS system in 1991. The 42nd round of National Sample Survey (NSS) (1986-7) showed that 37 per cent of the people in the rural areas in the State depended solely on public distribution system and 30 per cent on PDS and other sources. In the urban areas 83 per cent dependent on PDS and other sources. (Nair 2000) The beneficial impact of PDS on nutrition has been well documented. (For example, George 1979)

Though the infrastructure is well developed, the economy of the state does not perform as well as an average state in the country. The per capita net state domestic product of the state has always lagged behind the average of the country. At 1980-81 prices it is Rs.2349 in 1996-97, the 8th lowest among the states. (See Table 2 - Per Capita Net Domestic Product). Figure 1 below illustrates this point.

Figure 1
Per Capita Net Domestic Product - India and Kerala 80-81 prices



Source: see table 2.

The state government estimates that the Per Capita Income at current prices in 1999-2000 was Rs. 19,461/- which works out to about US$ 423 at the current exchange rate (Government of Kerala 2000). This poor

economy has also been growing much slower than the rest of the country. While the NDP of India grew at 1.39 per cent in the seventies, that of Kerala grew at 0.06 per cent only. The situation was not much different in the eighties when the growth rate was 3.25 for the country and 1.45 for the state. Only in the nineties it has overstepped the average. (See Table 3 - Compound Annual Rates of Growth of Per-capita Net Domestic Product in Kerala and India, 1970-1 to 1991-2). The poverty of the state becomes more apparent when we look at the head count ratio of poverty. According to official estimates Kerala had 48.4 per cent of its people below the poverty line in 1977-78[1]. (Table 4 - Percentage of Population Below Poverty Line-India and States.) Though the situation has improved over the years, 32 per cent of the people were still below the poverty line in 1987-88 according to the estimates of the expert Group.

Along with poverty unemployment is also high in the state. According to the 43rd round of the National Sample Survey (1987-8) 14.1 per cent of males in the urban areas and 12.5 per cent in the rural areas were "usually unemployed" (unemployed for more than 183days). The percentages of females were 33.8 and 25 in the urban and rural areas. This was the highest in the country The picture is more striking when you come to the unemployment level among the educated. According to the NSS, the level of unemployment among the educated males in Kerala was 18 per cent and among females 42 per cent in 1986-7, while the figures for all India were 6 and 22 peer cent. The average waiting period for the first job for a job-seeker with a school leaving certificate was 48 months for a permanent job and 35 months for a temporary job (Oommen 1992).

But in this state ridden with relative poverty, unemployment and poor economic growth, the people are highly literate. The provisional results of Census 2001 show that 90.92 per cent of the people are literate against an all India percentage of 65.38. This is not a recent phenomenon. Nearly all the census showed that Kerala had a much higher level of literacy than the rest of the country. The literacy level among females has also been the highest. In 2001 it is 87.86 per cent against the all India figure of 54.16. (See Table 5 Crude Literacy Rate – India and States). The female to male ratio was 93.1 per cent in 1991. Even the Schedule Caste[2] women of the state are more literate (74 per cent) than the adult general population of many states (see Table 6 Kerala: Educational Record). Though there is no law making primary education compulsory, sending children to school is the norm even in poor households. Only 0.4 per cent of the male children between 12 and 14 years and 1.8 per cent of the female children had never been enrolled in school in 1986-87. It is not only that they enrol in Class I, but all of them go to Class V. In fact, the drop out rate from Class I for IV is negative for both the sexes in 1993-94.

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[1] This is defined as enough income for consuming 2250 calories in rural areas and meeting the other basic needs. There are different estimates of the Head Count Ratio of Poverty.

[2] Scheduled Castes and Scheduled Tribes are very backward communities recognized in the Constitution of India for whom many measures of positive discrimination like reservation in Government jobs and in educational institutions are in place.

What is more interesting is that less number of females drop out from Class I to X, their percentage being 24.51 against 33.43 for males. But in the country as a whole 74.74 per cent of females and 68.41 of males drop out of school before reaching class X. No wonder, the reading habit is wide spread in the state. More than half the adult male population read a newspaper and about 46 per cent of the agricultural labourers also read some publication. Compare this with 23.6 per cent and 3.1 per cent respectively for India. This makes the people politically quite aware and demanding. We shall see later how literacy spread in the state and how it influenced the demographic and health situation. But before that, we have to have a peep into the health status of the people.

Kerala has often been compared with the developed countries for its health indicators. Kannan (1999) has made some comparison of various indicators like Human Poverty Index, Life Expectancy and GDP Per Capita in Purchase Parity Dollars with some Asian countries. (Table 7 Selected Indicators of Development – Kerala and some Asian Countries) has been extracted from his various tables. It can be seen from this table that with less than a fifth of the income of Malaysia, Kerala has achieved about the same levels of life expectancy (71.7) and infant mortality (13). In fact, in total fertility rate (1.8) and female literacy rate (86.3), Kerala is much ahead. The Human Poverty Index constructed by UNDP taking survival deprivation beyond 40 and other deprivations of education and economic provisioning shows that only 15 per cent of the people of Kerala suffer from poverty. Only Thailand has a better figure among the countries for which data is available. Although most Asian countries in this table have made a remarkable progress in reducing the rate of population growth, the policy regimes under which such population programmes have been enforced showed wide variations. The strict policy of mandatory limitation of family size in China is well known. Indonesia's programmes were enforced with a heavy hand by the government until recently. It is without any of this that the fertility rate has been brought down below the replacement level in Kerala, Sri Lanka and Thailand. But Kerala has only about half the income of Sri Lanka and less than a fourth of the income of Thailand. In fact, Kerala achieved tremendous fall in birth rate, fertility rate and population growth rate in the 1970's and 80's when its economy was growing only at 2.5 per cent and per capita income at less than 1 per cent. Curiously enough, this was the time when the economy of the country was for the first time growing at 5 per cent. (Kannan 1999). The provisional figures of Census 2001 shows that The annual compound growth rate of population has been brought down to 0.89 per cent in 1991-2001. The rise and fall in population growth rate is summarised in Box 1.

Box 1

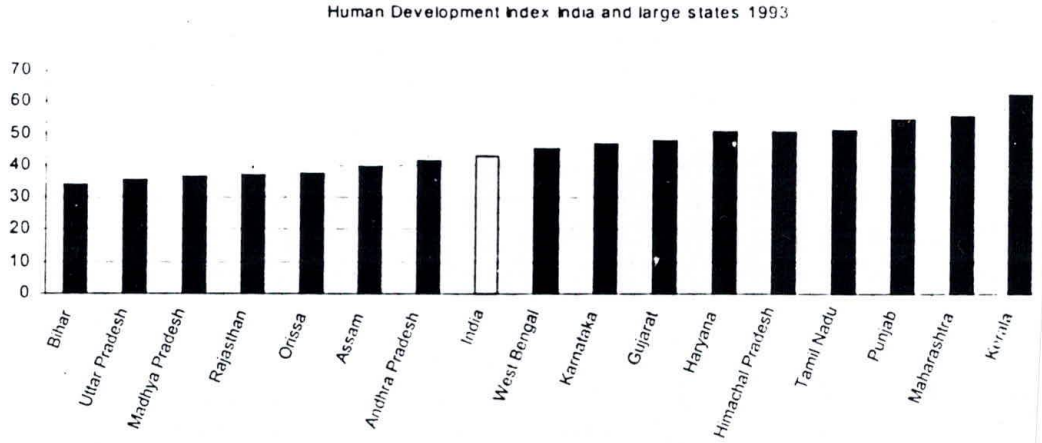
Annual Population Growth Rate 1901-2001 Kerala And India (Per Cent)

Period	Kerala	India
1901-11	1.11	0.56
1911-31	1.44	0.51
1931-51	1.79	1.30
1951-71	2.33	2.12
1971-91	1.55	2.17
1991-2001(provisional)	0.89	1.96

Source:Census reports

A high life expectancy and literacy has made the state known for it high physical quality of life, in spite of its low income. A comparison of the Human Development Index of the state with other states brings out the picture very strikingly. Srinivasan and Shariff (1997) have constructed an HDI slightly different from that of UNDP. They put the HDI for Kerala at 62.79, which is 20 notches above that for India. (See Table 8 - Human Development Index – India and Major States). Even for China and Egypt, two countries known for their high physical quality of life, the figures are only 60.9 and 61.1 respectively, according to them. A rich state like Punjab, which has nearly double the income of Kerala, has an HDI of only 54.86 as they do not do as well as Kerala in life expectancy, literacy and middle school enrolment, the other indices for which weightages have been given.

Figure 2



Source : See Table 8

The Process

How did Kerala achieve a high status of health and other social development without a strong economic base? This is a question that has plagued many academics and planners. Many explanations have been attempted for the 'Kerala phenomenon' which sometimes has been called the 'Kerala model of development'. People like Amartya Sen have cited

Kerala as an example of what can be achieved without much income. The following can be identified as the main causes for the high health status of Kerala's people:

- Spread of literacy and education
- Mass movement for uplifting the backward classes
- Political awakening
- Agrarian reforms
- Prevalence of indigenous systems of medicine
- A well developed health infrastructure in public and private sectors
- Migration.

The scope of this paper does not permit a detailed examination of all these factors. We will touch upon the first five and dwell at some length on the last two.[3]

The spread of literacy, education and reading habit is the result of decades of action by the people. The importance of literacy appears to have been felt by the upper castes even in the sixteenth century. Tharakan (1984) describes sixteenth to eighteenth centuries as a period of growth of literacy in Travancore, when it spread beyond the reach of Brahmins and came within the reach of almost all the socially and economically privileged sections of society. A Royal Rescript by the Queen of Travancore in 1817.

Box 2

Royal Rescript by the Maharani of Travancore, 1817

"The State shall defray the entire cost of the education of its people in order that there may be no backwardness in the spread of enlightenment among them, that, by diffusion of education, they become better subjects and public servants."

Source: Nair (1974)

This was a remarkable declaration in 1817 when no other Government in British India thought of universal education. It was 55 years before Japan's Meiji Educational Law of 1872 was enacted making education universal. It not only declared education to be universal, but also proclaimed the intention of the state to bear the expenses. However, starting primary schools did not follow this immediately. Travancore had to wait till the second half of the 19th century for expansion of education. The Christian missionaries established modern schools in Travancore and later in the other two parts of the state. In this they got liberal support from the colonial power. Christianity in Kerala is much older than the advent of colonialism. The traditional Christian population of Travancore

[3] For a detailed analysis of these factors except the fifth and the seventh, see Ramachandran (1996).

and Cochin (Syrian Christians) were also a supportive factor for the missionaries. Cochin soon followed the example of Travancore in starting schools. Malabar was slow in this, as in many other aspects, and had to wait till the 20th century for the spread of education.

Initially, schooling was for the upper castes. But social reform movements that started as a protest against the institutionalisation of social exclusion practised by the upper caste Hindus, began demanding education for the backward communities. Kerala had several forms of oppression of the lower castes like untouchability and distance pollution. This was the main hurdle in the spread of literacy among the masses. A movement started by Sree Narayana Guru in the early part of the twentieth century was mainly responsible for a series of social changes that facilitated the removal of caste pollutions and made literacy spread to the oppressed castes. The change in the political message spread to all castes and religions more significantly to the Scheduled Castes. Later, in Malabar the emerging proletarian nature of the labour force provided a good breeding ground for the growth of the secular forces. This led to a radical political movement, which first emerged as a leftist group within the Indian National Congress. This group quickly turned itself into communists and was quite successful in mobilising the labour power. Working underground and fired by an ideology of liberation, they influenced the poor in the nook and corner of Kerala. Their method of organisation was critically dependent on education. Political study classes, publication of radical literature and work among the intelligentsia to influence art and literature were some of the means by which they sought to effectively communicate with the masses. Even after the formation of the State of Kerala and the ushering in of the first elected communist Government, the relevance of these various forms of social movements did not fade away. From the point of basic education capabilities, one of the institutional legacies of this half a century of mobilisation was the establishment of what are called village libraries throughout the length and breadth of Kerala. These libraries established in the mid 1930s became a popular rallying ground and meeting place for the local youth. After the formation of the State, the Government recognised them for their contribution to non-formal education and initiated a system of grant-in-aid for their maintenance. (Kannan 1999)

The demand for education is reflected in the government's spending on education. In 1980-81 when all the states together were spending Rs. 47/- per capita from their budget on education Kerala was spending Rs. 85/-. The trend continues to today, as can be seen from Table 9 (Per Capita Expenditure on Education – All States). In the budget estimate for 2000-01 the state was to spend Rs. 870/- against the average of Rs. 579/- for all states. If we ignore the small states with populations less than 5 million, Kerala spent the highest among the states on education in the eighties. Only in the nineties did the other states catch up. About half of what Kerala spends is on primary education. There is one lower primary school for 236 children and one upper primary for 329 children of the

relevant age group in the state. (Government of Kerala 2000). All this has spread education to virtually all the people of the state. The importance given by government to education is also evidenced in the fact that the government pays the salaries and maintenance grants to the schools run by the private sector. About 40 percent of the state's budget goes for education. (Government of Kerala, Budget in Brief 2001-02)

The change in the structure of agrarian relations can be put forward as the next contributory factor. This emancipated the tenants and agricultural labourers and made them conscious of their rights, generating among other things, a demand for education. Though there were varying nature of agrarian relationships in the three regions of the State, by and large, the relationship in Malabar was much more feudal than in the other two regions. In Travancore, and to a large extent in Cochin, significant changes had taken place in the second half of the 19th century in agrarian structure and economic relations leading to a wider distribution of the ownership of cultivable land, growth of a large body of peasant cultivators, expansion of the area and diversification of cultivation, commercialisation of agriculture and growth of employment and wage incomes. Malabar remained, on the other hand, for the most part of 19th and first half of 20th century, a region in which feudal land relations of an intensively exploitative kind existed. It resulted in the majority of the agrarian population particularly the simple tenants and the landless agricultural labourers getting progressively impoverished. (Varghese 1970). This turned Malabar into a breeding ground for the radical political movement, the spreading of which we have already seen. The decades of effort in improving the lot of the landless agricultural labourers culminated in the historic step of passing the Kerala Land Reforms Act in the mid sixties which gave absolute ownership to the occupant of the land and liberated him from the clutches of the land lord. This is one of the important steps that led to the empowerment of the people and put them in charge of their destiny.

Health Care

Before the advent of modern medicine the people were dependent on the Indian system of medicine called ayurveda. Not much literature is available on the role this system played in the health care of the people. But as a centuries old system of medicine that describes in detail many of the physiological and anatomical systems of the body and the pathology of many ailments accurately long before it was discovered in modern medicine, and as the only system available, it was the one resorted to by people for their health care needs. It has not only what today is called internal medicine, but various surgical and other therapeutic procedures and specialities. It uses many techniques, the efficacy of which is only slowly being understood by modern medicine. By emphasising the preventive aspect of health care and by providing home remedies and traditional practitioners in the villages, this system took care of the health of the people long before modern medicine came to the scene. Its role in

making people take care of their own health, or the 'health empowerment' of the people has to be studied in detail. Though it cannot deal with epidemics and many of the acute ailments, it is cost effective, accessible and has no side effects. Gradually many of the procedures fell to disuse with the advent of the quick-fixing modern medicine; but they are being revived slowly as people realise their value as a safe system. This is a system prevalent throughout the country and used by the rural people as the first resort. But the practice by quacks, who prescribe modern medicine under the guise of ayurveda without a licence to do so has made it rather unsafe system. However, in Kerala it has been better preserved with less of a 'mixture'. The people of the state still resort to Ayurveda for certain chronic diseases, degenerative disorders and for general health. It is attracting patients from outside the state and country as a safe system of alternate medicine. Here the practitioners have developed a procedure known as 'Panchakarma', which uses the application of various medicated oils to the body. The popularity of ayurveda can be judged from the fact that there are nearly 5000 institutions and 2600 beds in the private sector in the state (Table 10 - Kerala: Institutions and Beds in Different Systems in Public and Private). The number of institutions in the public sector is about 800 and the number of beds about the same as in the private sector. There is demand for starting more and more dispensaries and hospitals in the public sector. The State Government has a programme of covering all the villages with such institutions and has already covered more than 700 of the 996 villages. There are 5714 institutions and 5199 beds and five medical colleges in the public and private sector put together in ayurveda. Another system called 'Sidha', which branched off Ayurveda and flourished as a full-fledged system in the neighbouring state of Tamil Nadu is also popular in the southern part of Kerala. The state government promotes both Ayurveda and Homeopathy as two alternate systems of medicine and maintains two departments for them with separate Directors as for modern medicine. Medical education in these two systems is also promoted with government themselves running medical colleges and paying the salaries of teachers and other staff of the colleges run by the private sector. The government runs Homeopathy dispensaries in more than half the villages, gradually increasing the coverage and runs hospitals in the districts and 2 medial colleges. Adding the private sector, there are 3673 institutions, 1364 beds and 4 medical colleges in Homeopathy.

The history of modern medicine starts with it's introduction by the colonial power, for treating their military. The princely rulers who were quite receptive to modern ideas started adopting this. The King of Travancore issued a royal proclamation in 1879 making vaccination against smallpox compulsory for public servants (Ramankutty 1999) He subjected himself and members of his family to vaccination publicly as an example for his subjects to follow. His 1907 proclamation (see Box 3) shows the importance given by a monarch to the health of his subjects.

Box 3

Proclamation by the King of Travancore 1907

"One of the main objects of my government is to see that good medical aid is placed within the reach of all classes of my subjects. It is a blessing, which is not at present in the power of individuals generally to secure however much so ever they may desire it. It is hence the obvious duty of the state to render its assistance in this direction."

Source: Nair (1974)

Parasite surveys were conducted in the State of Travancore in 1928 with the help of experts from the Rockefeller Foundation (Ramankutty 1999). The Public Health Department started by the Travancore government had the preventive control of contagious diseases as their main activity. They were successful in checking the spread of malaria, cholera and plague. They also collected vital statistics and did propaganda work among the people (Krishna Pillai 1941). Like education, health too began to be demanded by people as they became more politically conscious. With the introduction of modern medicine the people started realising the advantage they will get by having health facilities within reach. The rulers responded to these demands. The most convenient indicator of the importance given by the rulers of Travancore and Cochin to health and education is the share of these in their Government expenditure. The data available from 1867 show that starting with less than 1 percent they increased the share over time to about 6 percent on health and about 17 per cent on education. (Table 11 - Share of Education and Health Expenditure in total Government Expenditure: Travancore and Cochin). By the time popular governments came on the scene the demand for education and health had reached such heights that no government could ignore it. After the formation of the state the share of health shot up to 12. 65 per cent and fluctuated between 11.41 and 16.49 percent (Table 12 - Trends in Government expenditure in medical and public health and related variables, Kerala). The provision in the budget for 2001-2 is 11.97 per cent (Government of Kerala: Budget in Brief 2001-2). As a percentage of State Domestic Product the public spending on health is more than one per cent when the state was formed, exceeding 2 per cent in some years. In 1999-2000 it came to 1.4 per cent. One has to remember that the current level of expenditure of Government of India is about 0.8 per cent of GDP. On a per capita basis the state's spending on health worked out to Rs. 32 in 1980-1, increasing to Rs.198 in 2000-1 (Table 13 - Per Capita Public Expenditure on Medical and Public Health Care – All States). This is more than the average for all the states and one of the highest among the large states.

This kind of importance given to health by successive governments has helped build up a good infrastructure for health care delivery in the public sector. The all India pattern of one Sub Centre with an Auxiliary Nurse Midwife for 5,000 population, one Primary Health Centre for 25,000 and one Community Health Centre for 100,000 for the rural areas has virtually dotted the landscape of Kerala with these institutions. A woman of Kerala has to travel typically 1.5 Kms. to reach a sub centre for antenatal care and for immunising her child whereas in the rest of the country the radial distance is 2.7 Kms. There is one sub centre for 4205 people in the state. A typical PHC in the country covers an area of 143.08 sq. km. with a radial distance of 6.8 kms, and in Kerala 37 sq. kms with a radial distance of 3.4 kms. Similar difference is there for CHCs also. In spite of the fact that the state has only 105 CHCs against the required 300, the radial distance to them is only 14.5 kms against 20.6 for the country (Government of India 1998). The shortfall of CHCs is made up by a net work of 184 sub district hospital with better facilities. These take care of the primary and secondary care in the rural and urban areas. For tertiary care there are 16 District/General hospitals, 11 speciality hospitals and six medical college hospitals which are geographically well distributed. All put together the government runs 1317 institutions manned by 4367 doctors in the modern system with 45684 beds (Government of Kerala 2000). If the institutions and beds in the other systems are added it comes to 2672 institutions and 48258 beds. That is about one bed for 650 persons in the public sector alone (see table 10). While for India as a whole there are 7 hospital beds per 10,000 population practically remaining unchanged during 1981-91, for Kerala it has gone up from 10.5 to 20.6 (See Table 14 - Beds per 10,000 Population in Public Hospitals – India and States). But if you take the private medical institutions also there is one hospital for every 14264 persons in 1991 against an all India average of one for 61810 (See Table 15 - State-wise Distribution of Population and Medical Care Institutions-1991). Even this does not narrate the whole story as only allopathic medical institutions are covered. If you include the beds in ayurveda, homeopathy and other systems of medicine, there are altogether 15290 institutions and 120182 beds for a population of 31.84 million as we have seen in Table 10. This means that there is one bed for every 265 persons in the State. Thus the picture that emerges is quite different from the one that comes out of various studies, which do not put together the beds in different systems of medicine. One bed for 265 persons is something that not many developed countries can dream of.

While a well serving network of facilities is the main strength of the Kerala public health system, it has many weaknesses. A summary of these is available in an article wriiten by a doctor after conducting a study of the public health infrastructure in an average district (the district of Trissur). The main weaknesses he found are that the doctors do not stay in the residential accommodation provided by the government, expectant mothers do not visit the sub centres for antenatal check up, the inpatient facilities are not utilised by the public, the field staff do not work as a

team, buildings are in poor maintenance and that many posts of doctors are vacant. (Jagadesan 1997). These weaknesses are real and are the refrains in the complaints about the public health system. We will see how bad they are and how they are tackled when we come to the problems and initiatives. Suffice it to say here that the proof of the pudding is in the eating. And on that score we have seen that the state is doing well. The utilisation of public facilities appears to be better than many other states. Analysing the 52nd round of NSS data Mahal et al (2000) found that about half the patients use the public facilities. The distribution of inpatient days between public and private facilities is 122.8 and 124 respectively out of a total of246.8. Only Karnataka has a similar pattern of utilisation. While 61.3 per cent of the people of Kerala below the poverty line and 73.5 per cent of the Scheduled Castes and Tribes used public facilities, even 41.5 per cent of the fifth income quintile used these facilities. (See Table 16 Distribution of Inpatient Days between Public and Private Facilities Kerala) This is in spite of a wide network of private hospitals in the state. People, especially of the higher income brackets, will not use public hospitals unless they expect a reasonable quality of service.

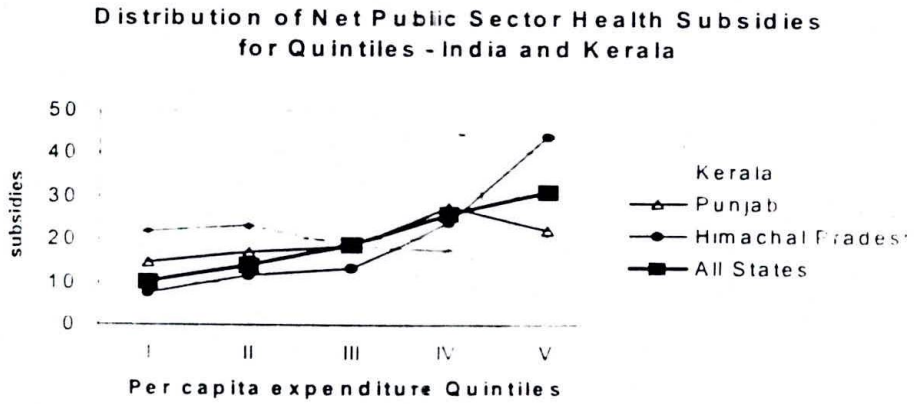
Similarly, if we judge the performance of the field staff by the results of their work, with the current indicators in demography and health no one can say they have not been working. The field staff is to implement various disease control programmes, meet the need for contraception, give maternal and childcare, deal with epidemics etc. We have seen how fast the fertility and the growth of population has been brought down. All reports by the state and central Governments and by studies conducted by independent agencies show that immunisation in Kerala is more than 90 per cent. (Table 17 - Performance in Immunisation - Kerala) Similar is the story in disease control. The state has successfully interrupted the spread of filaria through community action, nearly eradicated the polio virus (the surveillance system has detected only one case in the last three years), and brought down the prevalence of leprosy to the elimination status. In the programmes like TB Control the state achieves a cure rate above the target of 85 per cent. In blindness control the target is achieved usually. These programmes are implemented by the field staff like Male Worker, ANM, their supervisors and the doctors in charge. All this would not be possible without the field staff working in in a co-ordinated manner.

One of the nagging worries of the health planners is whether the money spent by the government is reaching the poor. The common charge against the government is that the quality of the services is kept so low that only those who cannot afford better quality services go to government facilities. The moment there is improvement of quality, the better off rush to the public facilities edging out the poor. This can be called the public health conundrum. Solving this is a major challenge of the health planners in all the states of India. We have seen that the utilisation of public in patient facilities is more equitably distributed in Kerala than in the other states. Taking the outpatient and other services into account Mahal et al

(2000) has done yeoman work in analysing the 52nd round of NSS data and arrived at the incidence of public health subsidies among various income groups, people below the poverty line and Scheduled Castes and Tribes. It will be interesting to look at the incidence of subsidy in the states that spent the highest amount per capita on health in 1995-6 when the NSS 52nd round was done. We know from Table 13 that those who have spent more than Rs 100 per capita among major states are Himachal Pradesh, Jammu and Kashmir and Kerala. For J&K the benefit incidence is not available. A comparison of Kerala with the other two high-spenders and with all the states is made in the figure below.

Figure 3

Distribution of Net Public Sector Health Subsidies for Quintiles - India and Kerala



Source: Mahal et al (2000)

In Punjab and Himachal Pradesh and in all states the subsidy is distributed regressively. 31 percent of the subsidies is cornered by the richest quintile in all states, nearly 44 per cent in HP and 22 per cent in Punjab. But the lowest quintile in Kerala gets 21.9 per cent of the subsidies whereas at all India level the group gets only 10.2 per cent. Though the second quintile in Kerala gets 23 per cent, it comes down to 18.2 per cent for the third and 17.2 per cent for the fourth, slightly increasing to 19.7 per cent for the last quintile. The all-states picture is one of steady regression from 10.2 to 31 per cent. The people below the poverty line in Kerala get 31 per cent of the subsidies, a higher proportion than their population. Their share is only 27 per cent in all states, 7 in HP and 3 in Punjab. (See Table 18 (Distribution of Net Public Sector Health Subsidies for Quintiles - India and Kerala). Thus, in spite of the weaknesses, the Kerala health system appears to be functioning reasonably well in efficiency and equity.

The question we are grappling with is how the state could achieve a better health status without being rich. Our discussion shows the foundation was laid by literacy, social reforms, public action and political commitment. But to give the entire credit to these will not be right. On the foundation laid by these the superstructure of a well serving public infrastructure has been built assiduously. It is doubtful whether the current levels would have been achieved without that network manned by

a motivated beaurocracy. Some writers like Panikar and Soman (1981) and Zachariah et al (1994) who have studied the issue in depth are of the view that the public health system has contributed significantly to the present health status. No doubt, the building of this edifice itself is dependent on public action. It is a demanding public that points their fingers at the drawbacks of the system in such a way that no government can ignore them and helps maintain efficiency and equity at a level higher than the richer states. It will not be wrong to call the development of health in Kerala as health empowerment of the people. Some academics gathered in Ballagio, Italy in 1985 and considered the social development of 4 low-income regions that have achieved significant health and social status. Their summary of factors is in Box 4.

Box 4
Characterisation of the Four Examples in Reference to Specific Indicators of the Major Social and Political Factors Contributing to Good Health

	Four Examples			
Social and Political Factors	***China***	***Costa Rica***	***Kerala***	***Sri Lanka***
Historical Commitment				
Early legislation	Yes	Yes	Yes	Yes
Early government welfare policy (grea than 30 years)	Yes	Yes	Yes	Yes
Early medical system (centuries)	Yes	No	Yes	Yes
Christian missionary influences	Yes	Yes	Yes	Yes
Social Welfare				
Preventive health	Yes	Yes	Yes	Yes
Food subsidies	Yes	Yes	Yes	Yes
Education	Yes	Yes	Yes	Yes
Land reform	Yes	Partial	Yes	Yes
Participatory Orientation				
Universal franchise (historical)	Since 1949	Yes	Yes	Yes
Extent of decentralisatioin (program management authority)	Medium	Medium	Medium	Medium
NGO involvement	Low	Low	Low	Low
Community involvement in health prog	High	High	Low	Low
Equality of Coverage (Equity)				
Health, education, nutrition status :				
Women	High	High	High	High
Minority groups	Medium	Medium	High	Medium
Urban / rural coverage	Medium	Medium	High	High
Intersectoral Linkages				
Mechanisms (e.g., inter-agency	Yes	Yes	Yes	Yes

committees)				
Incentives for linkage (e.g., laws, regulations)	Yes	Yes	Yes	Yes
Training programs (e.g . intersectoral Interdisciplinary)	Yes	Yes	No	No

Source: Rockefeller Foundation (1985) Good Health at Low Cost: Proccedings of a conference held at Bellagio, Italy April-May 1985.

As can be seen, most of the factors that are common to the regions are available in Kerala. Those factors, which are medium, low or negative for the State, are in the process of improvement, as we shall see later.

The Private Sector.

We will now look at the role played by the private sector in the health transition of the state. We have seen that there were 67,517 beds in the private sector in 1995 which is about one and a half times the beds in the public sector. This was only 49,000 in 1986. Thus the growth of the private sector in recent years has outstripped the public sector which grew only from 36,000 to 38,000 in the same period (Ekbal 2000). The growth of the public sector is certainly limited and will continue to be so as it has already fulfilled the norms fixed by Government of India for rural health infrastructure. All the panchayats (villages) are served by a facility in modern medicine. In a few years time all will have facilities in ayurveda and Homeopathy. Therefore, further growth in modern medicine is likely to be only in the private sector.

However, this has put concern in the mind of activists and made them express the fear that Kerala has changed from a demand driven provisioning of health care which is responsible for the present health status to a supply-driven health care seeking. The burgeoning private sector with no restriction on the charges levied and the establishment of expensive investigative equipment like MRI (there are three within one sq. km. In the states' capital) have led to many undesirable consequences. An example of the overuse of medical facilities is the number of caesarean section deliveries. As a percentage of normal deliveries they have gone up from 11.9 per cent in 1987 in rural Kerala to 21.4 per cent in 1996 in urban Kerala (Table 19 - Caesarean Section Rates – A Comparison). This table gives a comparison of caesarean section rates with some less developed and some developed countries, though for different years. Urban Kerala in 1996 is nearly as high as North America in 1993. One study in Trivandrum district found that the caesarean rates in some of the hospitals was as high as 60 per cent. (Kunhikannan and Aravindan 2000) According to WHO, no region in the world is justified in having a caesarean rate higher than 10-15 per cent. Some writers call it the 'Healthflation' of the State. Narayana (2000) analysed the utilisation of health care facilities during the last year in Kerala and found the probability of using private facilities to be 0.75 and public hospitals 0.38 with utilisation of public facilities coming down with education.

Two questions come up in this context. First, how does this affect the health care burden of the poor people? Second, how are the people of Kerala be able to support such a rapidly expanding healthflation? Will entrepreneurs invest in new hospitals and super speciality centres without a market for it either apparent or dormant? Our first concern is how this 'healthflation' is affecting the poor. The burden of health care on the poor has certainly gone up in the last few years. Kerala Sastra Sahitya Parishad (KSSP), a prominent NGO of Kerala who conducted a health survey in 1987 and visited the same families in 1996, found that there has been an increase of more than five fold in medical expenditure for all categories of people from 1987 to 1996 and as a percentage of per capita income it went up from 3.57 to 6.79, an increase of 90 per cent. For the lowest socio-economic group the increase in expenditure is more than a seven fold and as a percentage of income the increase of medical expenditure is more than four and a half times. (See Table 20 (Annual per capita medical expenditure by socio-economic status 1987 and 1996). Thus it is clear that the burden of health care on the poorer segments has increased. The role by the profiteering attitude of some private sector in this cannot be denied. However, there are two points about the private sector in the state that are on the positive side. The first is that a large number of them are run by church based organisations. Their origin is similar to the origin of missionary activities in education. They charge low rates from people who cannot afford and generally give good service. Thus they are midway between the not-for-profit NGOs and the for-profit private sector. The second is that many private sector facilities are established in the rural areas. Many of the entrepreneur-doctors find it more lucrative to set up small hospitals in the rural areas rather than compete with the well served urban areas. Not all of them charge exorbitant rates. A study of two sample private hospital in the rural areas in the northern part of the state found them taking care of indigent patients free of charges and setting the prices in such a way that some of the basic services cost not more than what they cost in a government hospital (Narayana 2000). But the private, purely for profit hospitals in the tertiary sector tell a different story. On the whole, the private hospitals have filled the gap of the health infrastructure in the public sector. But in this process, it has contributed to increase in health care costs.

Migration

We shall seek an answer to the second question about the market sustenance of the private sector by looking into a 30 year old phenomenon in the state which would also throw some sidelight into the inadequacy of income calculations. This is the huge migration of Keralites to the countries of the Persian Gulf in West Asia. With a stagnant economy and 4.18 million job seekers registered in the employment exchanges (Government of Kerala 2000) the educated Keralite has to seek employment outside. Already government is providing 52 per cent of the organised employment in the state and the private sector in primary and secondary sector is stagnant. Migration became the only solution.

Fortunately the oil crisis caused a boom in the Middle East throwing up employment opportunities. The Keralite grabbed the opportunity. Educated people going for employment outside is not a new phenomenon in the State. Migration has been there with Kerala for quite sometime as petty traders going to Myanmar and Sri Lanka and ministerial job seekers going to the rest of the country was quite common. But the boom in the 1970s has no parallel. This gave the opportunity of a job abroad not only for the educated but also for carpenters, masons mechanics who constitute the bulk of this migration. Zacharia et al (2000) estimates that 1.5 million Keralites now live outside India. Together with the migrants to other States in India and those who have returned they estimate that 3.75 million people are involved in migration. This is about 1/8th of the population of the State. No reliable estimates are available of the inflow of money in cash and kind through legal and illegal channels from the emigrants. World Bank (2000) estimates from the national accounts of the Central Statistical Organisation that if you take into account the net factor income from abroad and the other current transfers disposable income is about 2.1 per cent more than the GDP in 1997-98 at the country level. Prakash (2000) took the total figure of workers remittance to India from all countries provided by the World Bank in `Global Development Finance 1999` and reduced it by two assumptions. Firstly, by 75 per cent assuming that that is the share of the remittances from West Asia and secondly by 50 per cent assuming that that is the share of Kerala. His table is reproduced as Table 21 (Workers Remittances to Kerala). According to this the remittance to Kerala has varied between 10.74 per cent of the Net Domestic Product in 1990 to 30.42 per cent in 1996. Though these figures are based on the two assumptions, thus reducing their usefulness as exact numbers, these assumptions are not wide off the mark and the contribution to the economy is sizeable. Thus any study of the states economy without taking into account this factor and coming to the conclusion that the state is poor is misleading. Zacharia et al (2000) estimated that in 1998, a migrant on an average sent home Rs.25,000 in a year. If we spread it on all the population it works out to Rs.1105 per capita. But the authors would add the value of the goods that are brought in by the migrants and estimate the total remittance to be Rs.407171 million in 1998 which is 10.7 per cent of the State domestic product. They also estimate that 86 per cent of the households involved in migration use their remittances for living expenses. Thus the disposable income of the people is much higher than what estimates of state domestic product would show.

It is a curious fact that the population growth rate and total fertility rate started falling when migration started going up. Is the improvement in demographic indicators influenced by the quick rise in standard of living of the poor who constitute the majority of migrants? Do we finally prove the dictum that 'development is the best contraceptive', which India preached in the World Population Conference in Bucharest in 1974 notwithstanding the fact that shortly afterwards was written the black, though fortunately short, chapter of compulsory sterilization? These are tempting questions. But demographers who have looked into this would

not agree that the remittances from the migrants and the consequent increase in disposable income is the sole determinant of the demographic transition. Some writers who have gone into this question finds that the demographic transition of the state started long before the migration boom took place in the seventies (Example, Nair 1997). Demographers generally put the sixties as the turning point when the population growth rate started declining. However, the influence of the improved standard of living brought about by the remittances from abroad on accelerating demographic changes is likely to be substantial. Zacharia et al (1994) attribute four determinants to the fall in fertility. Universal Immunisation Programme, Universal Literacy Drive, the World Bank Project in the Backward Districts of Kerala (India Population Project III) and accelerated Gulf migration. More such in depth studies have to be undertaken to find the impact of migration on general health care and the explosion of health care provision in the private sector. It goes without saying the latter is a direct consequence of higher disposable income with the people.

Epidemiological Transition.

We have already seen the quick transition of demography in the state. The second transition is in its epidemiology. The picture of epidemiological transition is a little more complex. We have the various rounds of NSS, the studies carried out by the National Council of Applied Economic Research (NCAER) and two studies carried by KSSP. All these studies show the prevalence of morbidity in the State to be quite high. NSS round of 1974 found the morbidity rate in rural Kerala to be 71.21 against an all India rural figure of 22.46. According to the survey carried out by NCAER in May-June 1993, there are 168 sick persons for every thousand people in rural areas in Kerala against an all India average of 97. Based on the survey conducted by NCAER in 1994, Shariff (1999) has found that among the States in India, Andhra Pradesh and Kerala have the highest prevalence rate of major morbidity at 7684 and 7319 respectively per 100,000 population (See Table 22 - Prevalence Rates of Major Morbidity by States). Mahal et al (2000) also found that Kerala has the largest number of illness episodes treated at 90.3 per thousand persons. KSSP found the morbidity in the State in 1987 to be 206.39 per thousand. They visited the same families in 1996 and found that the morbidity has come down. Box 5 gives the comparative figures of NSS 1994, KSSP 1987, 1996 for acute and chronic diseases :

Box 5

MORBIDITY RATE PER THOUSAND POPULATION IN KERALA

Disease	NSS1974	KSSP 1987	KSSP 1996
Acute	71.21	206.39	121.86
Chronic	83.68	138.02	114.6

Source: Kunhikannan & Aravindan (2000)

The size of these morbidity figures has often made planners and others doubt their authenticity. How could a people with such good health indicators and low mortality figures have such a high degree of sickness? But some say that high morbidity co-existing with low mortality is not a strange phenomenon. This appears to be common in developed countries. Panikar (1999) quotes from Johansen S Ryan. "In general, it is not high mortality developing countries that have high levels of morbidity and low mortality (generally developed) countries that have low levels of morbidity, but quite contrary". He also refers to Riley who reviewed the morbidity trends in four countries, Japan, United States, Britain and Hungary and found that sickness prevalence has moved in a direction opposite to the death rate for most of the age and sex groups. Thus the State appears to follow the pattern of development followed by the developed countries. But not all agree with this. Others argue that a higher reportage in Kerala reflects a better health care system and higher levels of health consciousness, as well as a greater awareness of personal rights and of the demands that a citizen can legitimately and successfully make of the health care system (Ramachandran 1996). The author cites Christopher Murray and Lincoln Chen who showed that self perceived morbidity in Kerala is substantially lower than in United States and shows with the data on Cote d'Ivore Ghana and Peru that self perceived morbidity rises with income. This appears to be nearer to the truth in Kerala. It is difficult to believe that the average person of Kerala suffers more sickness than, say, the rural poor of Bihar.

But the pattern of sickness shows that Keralites suffer from life style diseases more then the people of the other states. 1433 persons out of 100,000 suffer from hypertension, 980 from diabetes and 914 from heart diseases which are the highest or the next highest in the country, (table 22). Cardiovascular diseases and neurological disorders constitute about 29 per cent of the cause of death in Kerala. They caused only 12.8 per cent of the deaths in 1987 (Table 23 Some common causes of mortality in Kerala). But the state does not appear to have got out of the burden of communicable diseases during the transition to non-communicable diseases. The large part of the disease burden still continues to be communicable diseases. The official reports of the state Director of Health services show that diarrhoeal diseases, respiratory infections and tuberculosis continue to be major killers in the state. (See Table 24- Affliction and death due to principal communicable diseases - Kerala). Even as late as 1996 there was an outbreak of cholera killing 114 people. New diseases like Japanese Encephalitis, Dengue fever and Leptospirosis are emerging. It is this persistence of diseases of poverty and deprivation side by side with the emergence of the diseases of the affluent that will be the challenge for health planners in the State.

Problems, Initiatives and Lessons

The question that interests health planners is what lessons can be learned from the performance of Kerala. We have seen that it is a

combination of public action and a well serving network that helped Kerala attain a high level of health and quality of life. Obviously the history of Kerala has been unique and cannot be repeated in other states. The Kerala example shows that the route for better health is health empowerment of the people. In this literacy, especially of the female, has played a pre-eminent role proving the dictum that literacy is the corner stone of development. Development thinkers of the country cannot miss this. But the history of 50 years of development planning of the country shows that not enough importance has been given to literacy and primary education. The teacher-population ratio, which was growing at 3.6 per cent between 1950-51 and 1960-61, grew only at 2.3 per cent in the next decade. The growth declined further to 0.5 per cent in the decade after and stagnated between 1980-81 and1984-85.In the next five years the growth rate actually declined by 0.5 per cent (Dreze and Sen 1995). In 1971, 21 years after planned development came on the scene, the literacy level in the country was 29.5 per cent (Census Reports). In another 20 years it reached only 42.9 per cent. In the early 90's Government of India started a campaign for literacy which got a great fillip by the trail blazing experiment by a district administrator in one of the districts of Kerala. His untiring work made the Prime Minister declare Ernakulam the first fully literate district of the country in 1990, the world literacy year (Rajan1991)[4]. Government of India adopted this model for the literacy mission. The mission has had its impact. The provisional Census figures of 2001 show that the level has improved to 65.4. But the female literacy is still only 54.2 per cent. The country has still a long way to go and the momentum does not seem to be acequate.

Is literacy the only lesson that Kerala can give to the others? To find an answer to this we now look into some of the problems faced by the health sector and how they have been dealt with, if at all, and what initiatives have been taken to improve the performance of the sector. The first problem that faces the planner comes from statistics. It comes out of the fact the averages conceal huge differences. There are sections of the population of the state who have not been benefited by the so-called Kerala Model. Three such groups can be identified. The first is the traditional fishing communities in the coastal areas. They live in very crowded surroundings with poor sanitation and water supply. The infant mortality rate among them was estimated to be 85 in 1981 and sex ratio 972 women per 1000 men (Kurien 1993). This is the year when the state had an infant mortality rate of 37 and a sex ratio of 1032. The recently completed Coastal Health Project with the help of the World Bank has not made any dent on the situation. The second such deprived social group is the Scheduled Tribes of Kerala's hills. They suffer from peculiar genetic disorders like sickle cell anaemia and are poor in literacy, nutrition and other indicators. The district of Waynad, in the north of Kerala which has

[4] Some media reports showed Kottayam, another district of the state as the first fully literate district. This is wrong. The Kottayam campaign was for making the town of Kottayam fully literate and not the entire district. For the correct picture see New York Times International, March 16.1990: *Ernakulam Journal: A success story that all can read*

a tribal population of 17 per cent (1991), the highest among the districts, has registered a decadal population growth of 17.04 per cent from 1991 to 2001 against the state's growth of 9.42, (Census 2001). In the district of Idukki, the next highest in the number of tribals (percentage 4.77) the sex ratio of 2001 is 993 making it the only district in the state with a sex ratio unfavourable to women. To know that this is a district of a state, which has not only a sex ratio of 1058 (Census 2001), but also equality with men in literacy is quite revealing. There is one village (name Vattavada) which has a mortality rate of 59 and literacy level of 32 per cent Report in the *'Hindu'* of April 15, 2001). Such pockets of deprivation should be the immediate concern of planners. Though the government has launched many programmes for tribals including setting up health facilities beyond the norms for the plains, the problem continues to persist. A new programme launched with the help of UNICEF is currently the hope for these people. The third group is the new class of Tamil migrant workers in Kerala, who come in search of unskilled manual jobs. Many such workers are homeless and live in deprived and unhygienic conditions. There is very little information about their health status and little recognition that they are part of the community of Kerala. But it is known that they are a very deprived group (Ramachandran 1996). The existence of these deprived groups is sometimes not even recognised in the euphoria generated by the averages. Special efforts are required to improve their lot.

The second problem is one of sustainability of the public health system. The people expect the state to provide health care of all types to all categories of people. It is the 'Dharma' (duty) of the ruler to look after the health of the people and public hospitals are 'Dharma' (free) hospitals. But the state of public finances is such that no state can ever do it. Shortages in the system are huge. The drugs are in short supply, the buildings are in poor maintenance, and essential manpower is lacking. The claim from other sectors of governmental activity is so strong that the share of health in the state budget has been coming down steadily. (Table 25 Trend in Development Expenditure 1990-91 and 1994-95 to 2001-02, Kerala). It has declined from 15.45 per cent in 1991 to 11.97 per cent in 2001 - 02. The increase in nominal terms is only 2.9 per cent in the last two years. The rate of inflation being much higher than this, the growth is negative in real terms. Similar is the fate of education, which has come down from 43.02 to 39.02 per cent. With the continued pressure on resources, it is very unlikely that this trend will be reversed. Therefore, if the system has to be sustained, other resources have to be mobilised outside the budget.

The state has taken some initiative in resource mobilisation. In the early 80's the Government formed Hospital Development Committees for all the major public hospitals. The committees consisted of representatives of political parties and other groups in the locality with a senior administrator of the district as the chairman and the medical superintendent of the hospital as the convenor. The idea was that they would voice the local

needs and find solutions. They were also permitted to collect parking fees, visitors fees etc. and to collect certain charges for some procedures. The Government collected some charges for procedures like X-rays and laboratory investigations from those who could afford, but that went into the general revenues of the Government. The HDCs were permitted to retain the collection and spend it on the development of the hospital as decided by them. Gradually they were permitted to collect charges for some other hospital services also. The revenues from the charges collected by Government for the treasury were meagre as there was no way of means testing and all would declare a low income. But the HDCs employed better means testing techniques like questioning the patient and the accompanying persons. In the 90's HDCs developed into a regular system and some of them were registered as separate charitable societies. In the major hospitals, the HDCs collected reasonably good amounts. For example, the HDC of Medical College Hospital Trivandrum collected an amount of Rs 30 million in 1997-98, which is nearly 10 per cent of the total running cost of the hospital including salaries[5]. This HDC runs a fair price medical shop and has established expensive equipment with borrowed funds and is able to repay the loan with the charges levied. Care is taken to see that the poor are exempted from the charges. Not all HDCs are able to perform as well as this. But slowly realisation is dawning on the public that without mobilising resources like this, the system cannot be sustained. The collection of hospital charges by the Government for the treasury is also not insignificant. The information about that is available in the Government accounts, which has been collected by the National Institute of Public Finance and Policy. The NSS 52nd round has also collected data about this. Mahal et al (2000) has looked in to both these and found that Kerala has collected the highest amount among the states according to both the data. The NIPFP figure shows Kerala collected 2.22 per cent of the total expenditure of Government on health, and Maharashtra 2.68 per cent, while the other states ranged between 0.10 per cent (Karnataka) and 1.31 per cent (Punjab). The NSS data reveals a completely different picture. While Kerala collected 15.86 per cent, the other states collected between 0.92 per cent (Rajasthan) and 10.67 per cent (Punjab). (See Table 26 Collection of User Fees and Cost Recovery Ratio - Major States). The collection of user charges formally by the Government and informally by the HDCs for which no data is available together would constitute not an insignificant proportion of the budgeted expenditure on health. This is one way out of the resource crunch, provided care is taken to see that the poor are not affected.

Another experiment that has contributed to the mobilisation of resources is autonomisation of hospitals. Registering a hospital as a separate society helps it to collect user fees in a more systematic manner. This is because the society will have to manage its own resources. Though the Government will have to continue to support it with grants, the society

[5] source: Internal reports of the Superintendent of the hospital .

knows that the grant is a finite amount and anything extra will have to be mobilised by it for its development. This will, of course, depend on the degree of autonomy given to the society. Kerala has made only one hospital an autonomous body. This is the Regional Cancer Centre Trivandrum. Though the degree of autonomy is limited and the major source of finance continues to be the Government, the resources it has mobilised from other sources are considerable. From 1989-90 it has generated between 11 and 53 per cent of its total receipts by internal mobilisation which consisted of user fees and sale of drugs. This was enough to meet between 19 and 65 per cent of its running cost and the cost of drugs. (See Table 27 Receipt and Expenditure of Regional Cancer Centre Trivandrum). This is all the while giving free treatment to the poor. Only because it was an autonomous hospital it started thinking of deficits and surpluses, which made it tap outside sources for its development. It has also made it improve on customer satisfaction and research. In its sixteen years of existence it has published more than five hundred research papers in peer reviewed journals. The autonomy facilitated it to stop private practice among its doctors in 1999 and start a pay clinic that generated enough income to pay non-practising allowance to the doctors. It is possible to introduce such autonomisation in teaching hospitals and other big hospitals. Once the institution is made autonomous, each department can also be given the freedom to generate its own resource and use it for the development of the department, which will give enough motivation for the staff to collect more. The Government can always stipulate that the poor should be exempted from user charges. Already Hospital Development Committee has shown the way. Autonomisation has of course, other advantages like decentralised decision making. This is another path of reform for Kerala and other states. But the important condition is that autonomy should be real and not in paper. But such an initiative requires advocacy and bold decision making at the political level.

Let us now turn our attention to the weaknesses pointed out by Jagadeesan. The first one is that doctors do not stay in the residential accommodation provided by the government. This is a kind of paradox. While lack of residential accommodation is usually given as the reason for the doctors being not available in the rural areas, it is also true that in some places where accommodation is available, doctors do not use them. This points to one of the major problems in public service of doctors. The doctors are allowed to use their spare time to treat patients at home and collect fees from them. Staying in the government accommodation, which is often in the campus of the hospital, is a disincentive for the doctors to get private practice. When the patients come to the hospital campus it is expected that they will be treated in the public facility. The lure of private practice not only makes the doctor live outside the hospital campus but also makes him neglect his hospital and fieldwork. Very often, complaints are made of doctors refusing to treat a patient in the hospital who does not meet him as a private patient and pays the fees. Such corrupt practices also leads to other services in the hospital being dependent on bribe. Private practice is usually supported on the argument that doctor's

services should be available to the public after office hours. While this argument may hold good in very remote areas where other doctors are not available, this becomes a pervading evil in the urban and semi-urban areas, which constitute the major part of the state. It becomes quite pernicious in medical college hospitals and district/general hospitals. The Government tried to stop this in the past, but had to withdraw immediately on account of the political pressure put in by lobbies of doctors. Only Regional Cancer Centre could stop it.

The second weakness pointed out by Jagadeesan is the under utilisation of the sub centres. There are 5094 sub centres in the state. These are to be housed in a separate building constructed according to a type design which houses the office of the ANM in one half and the other, her residence. But only 2986 sub centres have such buildings and the others function in private buildings where the ANMs do not stay (Government of India 1998). There is a qualitative difference in the service at the sub centres functioning in government buildings where the ANM is available day and night and those functioning in rented premises. Complaints of ANM not being available there even during office hours are common. Only a program for constructing buildings for sub centres can rectify this. Only in one district such a program has been launched with the assistance of the World Bank where a special area project is being implemented under the Reproductive and Child Health Programme. Similar programmes are required in the other 13 districts.

The third weakness is a similar under utilisation of the inpatient facilities in the Primary Health Centres. There are two types of PH in the state. The small ones are called Mini PHCs, which are run as inics by one doctor and usually there are no inpatient facilities. The next are Block PHCs which have two or three doctors, and CHCs with a minimum of four doctors but very often more than 4. It is true that there is under utilisation of inpatient facilities in the PHCs. We have seen in Table 16 that a total of 122.8 inpatient days are spent in public facilities. But the data also reveals that only 1.6 days were spent in PHCs and others, the balance being spent in hospitals (Mahal et al 2000). This calls for some rethinking on the need for inpatient facilities in PHCs. In Kerala where facilities are available at short distances the need for maintaining beds in the PHCs without being able to provide the necessary staff and consumables, has to be reassessed. It is better to run some facilities well than to run all badly. But closing down the existing facilities will generate protests from the locality and a proper campaign has to be launched for making the people understand the price of keeping bad facilities open. This, again, requires bold political initiative.

The next problem is the shortage of manpower. There is always a considerable number of vacancies of doctors and other staff. It is small comfort that these are much less than in the rest of the country. Though most of the rural areas have essential infrastructure as we have seen, the choice of the doctor to work in a place is very often dependent on his

perception of the scope for private practice. Two recent initiatives have helped in improving this. The first is the reservation of a small number of seats for postgraduate medical courses for doctors serving in difficult rural areas that have been carefully selected for the purpose. Many young doctors now opt for these areas as they get a much-treasured seat in a PG course without going through the tough entrance test. The second has came as a part of devolving powers on the locally elected governments in the villages which is discussed separately. The elected Presidents of the Village Panchayats are now permitted to fill up vacancies on contract basis. As the institution itself is under them they can no longer tell the people that they have petitioned the Minister. It is now their responsibility to get some doctor to work there. The State Government has even given in some difficult areas, a remuneration higher than that paid to the permanent doctors. Though the officially reported vacancies of doctors continue to be 419 out of 2,500, the contract appointment has reduced it effectively to about 80 (Government of Kerala 2001). The large number of vacancies of Staff Nurses (187), Auxiliary Nurse Midwives (84), Male Workers (443), Lady Health Inspectors (88), Lab technicians (76), Hospital Attendants (522), Nursing Assistants (247) continue to be a matter of serious concern. Permitting the Panchayats to fill up these vacancies also on contract will solve the problem.

Yet another problem in health manpower is a perennial one of clinicians getting into health administration without any formal training and attitude. There is also the problem of the specialists getting posted to the institutions that do not need them. This is because there is no speciality cadre and when a doctor gets promoted he gets posted to a post vacated by a different specialist. As a solution to both these problems an attempt is being made to break-up the cadre of doctors into a few categories. The first will be the doctors who get into administration. Generally these will be doctors without any specialist training. But they will be trained in public administration and hospital management. The second will be a cadre of public health specialists who will have the requisite qualification and training. The third will be different cadres of specialists. Thus there will be six or seven specialities to which the doctors will opt after a few years of service and get their promotions in those cadres. The senior administrative positions like Deputy Director, Additional Director and Director of Health Services will be only from the administrative cadre. This is a long drawn process and will take at least two years to be in place. But a beginning was made in 2000.

The third major reform attempted in the state is in decentralisation. After the 73rd and 74th amendment to the Constitution of India of 1993, the state passed the necessary laws and went in a very serious way in devolving powers, responsibility and funds to the elected local governments in the villages (panchayats). Many sectors of the State Government have handed over their work to these panchayats. The state government has handed over to them all but 18 of the 1300 dispensaries, Health Centres, sub district and district hospitals under the control of the Director of

Health Services. The state government now runs only general hospitals, speciality hospitals and the medical college hospitals. Similarly the majority of the institutions under ayurveda and homeopathy have also been handed over to them. 37 per cent of the development budget of the State has been given to the panchayats with the only stipulation that they should use at least 40 per cent in the productive sector of the economy. This has been in place for the last 5 years and though the impact on the performance of the health systems is not assessed in a systematic manner, the general impression one gets is that things are working much better. The hospitals are getting maintained faster and the shortages of drugs are replenished by local purchases quickly. We have already seen how the presidents of the panchayats were able to find doctors to work on contract in remote places where regular service doctors refused to go. The feeling that it is the responsibility of the people to manage and run the hospital has gained ground. The panchayats prepare detailed development plans for their area and it is heartening to see that many of the plans in the health sector are for improvement of sanitation. mosquito control, garbage disposal and such other preventive measures. It is the responsibility of the Panchayats to prepare project, raise resources, implement them and be answerable to the public. Administration has become a lot more transparent and though there are complaints about corruption, the accountability to the public has improved. In the year 1999-2000, the Local Self Governments have implemented 159850 projects raising 12.20 per cent as loan from financial institutions and co-operative societies, 2.87 per cent as voluntary contribution and 9.17 as contribution by the beneficiaries. They found 9.27 per cent from their own funds and had to depend on government grants only to the extent of 66.49 per cent. (See Table 28 Financing Pattern of Projects implemented by Local Self Governments Kerala 1999-2000.) 14.32 per cent of the projects are exclusively for Scheduled Caste, 3.27 per cent for Scheduled Tribes and 7.37 per cent for women. If we look into the nature of the project, it is seen that 27.8 per cent are for productive purposes.

When decentralisation is discussed as a solution to many of the problems in health and general administration, it is common to dismiss it as a solution suitable only to states like Kerala with high levels of literacy and awareness. It is pointed out that the previous experiments at decentralisation conducted with a lot of fanfare in many states have failed to yield results. Therefore, it is concluded that it will only end up in dispensation of favours by privileged groups in the states ridden with illiteracy, cast politics and serious deprivations for several groups of people. However, it has to be remembered that the previous experiments have not been done with sufficient preparation. Kerala this time. launched a six-phase campaign. The first was one of intensive advocacy among the people to make them realise that for the first time they had an opportunity to decide what they want and what they can do in their Panchayat. The Gram Sabhas, which are mandatory meetings of all the voters in the Panchayat, were poorly attended before. The experience of the neighboring State of Karnataka, which made a serious attempt at

devolution in the early eighties, had shown that only 29 per cent of the villages had even convened their Gram Sabhas. A study made in a sample district of that state revealed that the attendance was only 5.25 per cent in 1987. In another panchayat the average number of persons attended was just 29. With the kind of advocacy launched in Kerala the meetings of Gram Sabhas proved to be a resounding success. The attendance ranged from 8.38 to 15.32 per cent of the total electorate in most of the 996 Gram Panchayats (Isaac and Franke 2000). The second phase consisted of training to the elected representatives and building their capacity and holding development seminars in the Panchayats. These seminars were attended by local resource persons who themselves were trained in a three tier structure. 373 Key Resource Persons were selected and trained for seven days at the state level, who trained 11628 District Resource Persons in 81 camps for three days. They, in turn, trained the Local Resource Persons who numbered nearly 100,000. As a result of their involvement, the quality of the deliberations in the Gram Sabhas improved dramatically. The third phase was in forming task forces for preparing projects, the fourth phase in formulating grass root level plans at the Panchayats, the fifth phase for preparing higher tier plans for Blocks[6] and Districts and the sixth phase for appraisal of the plans by Voluntary Technical Corps. This campaign lasted for about a year and a half and it is only this that has made decentralisation a successful experiment this time. Such advocacy and campaign are a necessary pre requisite for giving powers to the local representatives of the people and there is no reason why it will not succeed even in backward areas. The success of some women's self help groups in many states point in this direction.

The next experiment in the state is in the women's self help group. A small programme of women from 25-45 families coming together and organising their own schemes like thrift, tiny manufacturing, attending to local problems etc. has grown into a movement. There is a health volunteer in these neighbourhood groups. About 12 of them form themselves into an Area Development Society and the ADSs in municipality or panchayat form themselves into a registered charity called Community Development Society. Banks are lending to them for various productive activities and the recovery is very often 100 per cent. There is no outside involvement in this. The State Government has spread this to one entire district (Malappuram) and 241 Panchayats out of 996. 7537 Neighbourhood groups have been formed so far who have formed 607 ADSs and 58 CDSs. 400 of these neighbourhood groups are by tribal women (Government of Kerala 2000). If properly nurtured, this is a scheme like Gramin Bank of Bangladesh, which can bring in community participation, reduce gender disparities, alleviate poverty and improve health.

[6] Blocks are a group of about 10 Panchayats formed for community development programs in the 50's. Now the Block Panchayats are the second tier of Local Self Government, the third being District (Jilla) Panchayats.

We have seen already seen that one of the problems the state has is the prevalence of communicable diseases. Though the rate of prevalence is much less than in the other states, diseases like Cholera. Malaria, Japanese Encephalitis, Leptospirosis and Typhoid still break out sporadically though in minor proportions. The entire machinery of the district administration comes together as a war team and contains these outbreaks. However, there is no system of knowing the outbreak in time. A scheme has been put in place to detect the early warning signals and take preventive as well as curative measures before they come to epidemic proportions. Based on the Nadhi scheme (John 1998), Kerala started a programme of disease surveillance in the District of Kottayam. The scheme consists of training and sensitising the doctors and clinicians in the private as well as public sector to report diseases. Fourteen diseases have been carefully selected for this based on the past experience of outbreaks. Pre-paid post-cards are given to the doctors and when they suspect a patient to have any of the 14 diseases, they write the details of the patient and tick the relevant disease and post the card to the District Medical Office. They do not wait for laboratory confirmation. A software is installed in the DMO where all these postcards are entered and at a glance the Officer in charge of Public Health knows whether there is any clustering of any particular disease in any location. Threshold levels are fixed for each disease and the rapid action team moves in once the threshold is crossed. A monthly bulletin is published reviewing the reporting and the action taken. This bulletin is an important feedback to the doctors and motivates them to continue the reporting. The scheme was put to test in the district in 2000 when there was an outbreak of cholera, which was nipped in the bud and many lives were saved. The scheme is to be spread to three more districts in the next phase and to all the 14 districts in the last phase.

While communicable diseases are hoped to be tackled with a good disease surveillance mechanism and with good preventive measures in environmental sanitation taken by the panchayats under the decentralised set up, there is no program for screening people at risk of contracting non communicable diseases. Only some sporadic initiatives have been taken in this regard. Worth mentioning here is the program of screening all women in the reproductive age group for cervical and breast cancer in the backward four districts in the north of Kerala. Another such initiative is for screening the entire population of a block near the capital of the state for hypertension and cardiovascular problems. Such sporadic initiatives are not enough for a state that has an ageing population who are at greater risk of non-communicable diseases. According to 1991 Census 8.81 per cent of Kerala's population are above 60 and above 74 are 1.96 per cent. Both are the highest in the country. These figures are expected to go up substantially as the population growth in shrinks further. Many of them are going to suffer from terminal diseases like cancer. Taking care of the terminally ill is going to be another problem. Usually these terminally ill patients are either taken to the hospital or hospice or allowed to die at home. But the degree of care they get at either place leave many things to

be desired. The people would normally like to spend their last days at home with their family. But the members of the family have to be trained to take care of them and administer pain-relieving drugs. One such program has been launched in the state. The program consists of enlisting volunteers, giving them intensive training and sending them to the homes of the terminally ill where they administer the pain relievers, console the patients and train the family members to care for them. Rules have been liberalised to make oral morphine, which is a narcotic drug but which is the best pain reliever, easily available to these patients. The Scheme was started with the medical college hospital, Calicut as the hub and has been spread to other districts. There are now 26 satellite centres and more than 4000 patients on their roles. Hospitals are also encouraged to take the patients when they need it. This has been found to be better than a hospice approach.

Conclusion

The experience of Kerala is one of health empowerment of the people. That is the route for health for all. This paper has attempted to describe the characteristics of the state which make it a unique case of good health at low cost. In trying to find the reasons for such a development we saw that literacy has played a major role. But the spreading of literacy was a result of not only political decision by the rulers but also of public action for upliftment of the backward classes, the demand for agrarian reforms and political awakening. These and other characteristics like Christian missionary influences, indigenous medical system with its emphasis on preventive care and food subsidies are shared by Kerala with other regions of the world that have achieved good health at low cost like Sri Lanka, China and mostly with Costa Rica. Public action has facilitated and was complemented by a good network of health infrastructure in the public sector. The state is one of the best in the country on utilisation of the public sector and the best on the incidence of public subsidies on the poor. Recently there has been a burgeoning of the private sector. Public and private sectors in all the systems of medicine put together have given the state a very high bed to population ratio. With their dual characteristic of NGO like behaviour by some and profit motive by many, the private sector has contributed to curative care, though it has added to the cost of health care. Migration to the Middle East in the last 30 years has brought in extra income to the people, which supports the private sector. It has also helped accelerate demographic changes among the population.

Though the public sector is quite equitable and, judged by its utilisation, fairly efficient, it is plagued by shortages and inadequacies. But the sector that requires the most immediate attention is the pockets of deprivation people like scheduled tribes, coastal fishermen and Tamil migrant labour. Resource crunch is the major problem faced by the public sector. The initiatives taken by the state in resource mobilisation and cost recovery are not insignificant. Nurtured properly, these initiatives will show the way for sustaining the system against declining resources. On the manpower

side, the greatest problem is the private practice by government doctors. It has affected the quality of service, contributing to absenteeism and neglect of duties. There is heavy under utilisation of inpatient facilities of PHCs. The question of continuing the inpatient facilities in Mini PHCs has to be examined. Permitting local administration to recruit doctors on contract basis, giving the incentive of post graduate seats to doctors serving in difficult rural areas and breaking up the cadre of doctors into specialists and administrators have helped in mitigating the problems of manpower. But there is a large number of vacancies of paramedics, which needs to be addressed.

In the last five years, the state has devolved powers on locally elected governments and handed over, among other things, the health facilities to them. This has been preceded by a massive campaign of advocacy and training. Funds have also been given to them for managing the work in each sector. This is a successful experiment and most of the problems of the public health facility get solved at the local level. It has been a great step forward not only in democracy but also in efficiency. The health plans formulated by the Local Self-Governments very often emphasise preventive care, sanitation, mosquito control, water supply etc. Though devolution is mandated by the Constitution, many states have not taken it seriously. It is time they did. Similar community participation has been brought in by the Neighbourhood Groups. These women's groups have proved to be a good experiment in self-help.

Some other recent initiatives worth noting are a simple and cost effective mechanism for disease surveillance and the scheme for taking care of the terminally ill. The lesson that is thrown up by the Kerala case is that literacy, especially of the female is the prime prerequisite for health empowerment of the people. Unfortunately, this lesson does not appear to have been learned and put in practice as the female literacy figures of Census 2001 show. Literacy will result in public action and will create demand for health care and the elected governments will have to rise up to this demand by providing better health care.

References

1. Census 1991 - Government of India.

2. Census of India 2001 - Provisional Population Totals for Kerala, Director of Census Operations Kerala.

3. Dreze, Jean and Sen, Amartya (1995), *India: Economic Development and Social Opportunity.* Oxford University Press, Oxford and Delhi.

4. Ekbal, B (2000), *Kerala Model of Health: From Success to Crisis?* An occasional paper not published. For copies contact Dr. B. Ekbal, Vice Chancellor, Kerala university, Trivandrum – 695001, India.

5. George, P.S. (1979), *Public Distribution of Food Grains in Kerala* – International Food Policy Research Institute.

6. Government of India (1998) *Bulletin on Rural health Statistics in India.* Ministry of Health and Family Welfare. June

7. Government of Kerala (2001-2), *Budget in Brief 2001-2.*

8. (2001), *Monthly Statement of Achievement and Progress, for the month of January 2001* , Health Information Cell of the Directorate of Health Services.

9. (2000), *Economic Review* . The State Planning Board.

10. Isaac, T.M. Thomas and Richard W Franke (2000), *Local Democracy and development: People's Campaign for Decentralised Planning in Kerala.* LeftWord, New Delhi

11. Jagadeesan, C.K. (1997) 'Exploding an Enduring Myth: the Kerala Phenomenon' in *Health for the Millions* March-April. Delhi.

12. John, T. Jacob (1998) '*The Lancet*'. London, *July 1998.*

13. Kannan, K.P. (1999) *Poverty Alleviation as Advancing Basic Human Capabilities: Kerala's Achievement Compared.* Working Paper No.294 Centre for Development Studies, Trivandrum, May 1999.

14. Kannan, K.P, K.R.Thankappan, V.Ramankutty and K.P. Aravindan (1991) *Health and Development in Rural Kerala.* Kerala Sastra Sahitya Parishad, Trivandrum.

15. Kannan, K.P. (1988) 'Political Economy of Labour and Development in Kerala' *Economic and Political Weekly* Vol.XXXIII No.52 December 2.

16. Krishna Pillai, Kondoor (1941) '*Travancore and its Rulers*' Sudharma Publics, Changanachery.

17. Kunhikannan, T.P. and K.P. Aravindan (2000) : *Changes in the Health Status of Kerala 1987-1997.* Discussion paper no. 20 Kerala Research Programme on Local Level Development. Centre for Development Studies, Trivandrum.

18. Kurien, John (1993) ' *Kerala's Marine Fisheries: The Socio-economic Profile.* Centre for Development Studies, Trivandrum.

19. Mahal, Ajay, Janmajeya Singh, Farzana Afridi, Vikram Lamba, Anil Gumber and V. Selvarju (2000): *WHO Benefits from Public Health Spending in India?* National Council of Applied Economic Research, Delhi.

20. Nair, K.N. (2000) *'Food Security and Public Distribution system in Kerala'* in *'Public Support for Food Security – The Public Distribution System in India'* ed. N. Kishnanji and TN Krishnan. Sage Publications, New Delhi.

21. Nair, P.R. Gopinathan (1974) *Decline of Birth Rate in Kerala: A Hypothesis About the Interrelationship Between Demographic Variables, Health Services and Education*, Economic and Political Weekly, 9.

22. Nair, PR Gopinathan, (1997) *'Dynamics of Demographic Transition in Kerala: A Critical Analysis'*. Centre for Development Studies, Trivandrum.

23. Narayana, D. (2000) *Macro Economic Adjustment Policies, Health Sector Reform and Access to Health Care in India (Kerala)*. Centre for Development Studies, Trivandrum.

24. Oommen, M.A. (1992) *The Kerala Economy*. Oxford University Press. New Delhi

25. Panikar, P.G.K. (1999) *'Health Transition in Kerala'*, Discussion Paper no. 10, Centre for Development Studies, Trivandrum.

26. Panikar, P.G.K. and C.R. Soman (1981) *Health Status of Kerala: Paradox of Economic Backwardness and Health Development*, Centre for Development Studies, Trivandrum.

27. Prakash, B.A. (2000) 'Gulf Immigration in Kerala: A Study of Returned Immigrant' *Economic and Political Weekly*, December 16-22.

28. Rajan, K.R. (1991) *Mass Literacy, the Ernakulam Experience*. Ernakulam District Literacy Society, Cochin.

29. Ramachandran, V.K. (1996) 'On Kerala's Development Achievements' in Dreze, Jean and Amartya Sen, *Indian Development: Selected Regional Perspectives*. UNU/WIDER.

30. Ramankutty, V. (1999) 'Development of Kerala's Health Services: Need for Burdening the Base of Policy Making' in *Kerala's Development Experience* Vol.II e.d. by M.A. Oommen, Institute of Social Sciences Delhi.

31. Rockefeller Foundation (1985) *Good Health at Low Cost; Proceedings of a conference held at Bellagio*, Italy April-May 1985

32. Shariff, Abdusaleh (1999) *India Human Development Report - A Profile of the Indian States in the 1990s*. National Council of Applied Economic Research, Delhi.

33. Srinivasan. K and Abdusaleh Shariff (1997) *India Towards Population and Development Goals*. UNFPA.

34. Tharakan, P.K. Michael (1984) *Socio-Economic* Factors in Educational Development: Case of Nineteenth Century Travancore. *Economic and Political Weekly*, 10-17 November.

35. Varghese, T. C. (1970). *Agrarian Change and Economic Consequences : Land Tenures in Kerala 1850-1960*,Allied Publishers, Bombay.

36. World Bank (2000) *India: Reducing Poverty and Accelerating Development*. OUP.

37. Zacharia, K.C, S.Irudaya Rajan, P.S.Sarma, K.Navaneethm, P.S. Gopinathan Nair and U.S. Misra (1994) *Demographic Transition in Kerala in the 1980s.* Centre for Development Studies, Trivandrum.

38. Zacharia, K.C., E.T. Mathew and S. Irudaya Rajan (2000) *'Socio-economic and Demographic Consequences of Migration in Kerala.* Working Paper No.303. Centre for Development Studies, Trivandrum.

APPENDIX - List of Tables

Table 1

Percentage of Villages and Availability of Different Facilities by States

Region/States	Transportation			Communication		Major Sources of Drinking Water			
	Connected with Pucca Road	Bus Stop Within 5 km	Railway Station Within 5 km	Post Office Within 2 km	Tele-phone within 2 km	Piped Water	Hand Pump	Other Protected Water	Unpro-tected Sources of Water
North									
Haryana	61.1	76.7	25.6	77.8	55.6	32.2	12.2	13.3	42.2
Himachal Pradesh	23.8	61.9	4.8	68.3	54.0	61.9	0.0	1.6	36.5
Punjab	81.4	68.6	21.4	78.6	65.7	34.3	48.6	0.0	17.1
Upper Central									
Bihar	19.0	42.2	32.8	74.1	37.9	0.0	32.8	3.5	63.8
Uttar Pradesh	34.3	44.4	23.6	65.3	35.2	6.0	20.4	13.0	60.7
Lower Central									
Madhya Pradesh	21.2	40.1	11.5	41.9	37.8	2.8	3.2	6.9	87.1
Orissa	15.7	44.1	62.8	53.9	36.3	0.0	5.9	0.0	94.1
Rajasthan	40.6	53.8	13.2	68.9	42.5	9.4	13.2	2.8	74.5
East									
North-eastern Rg.	21.2	63.6	15.2	63.6	28.8	3.0	3.0	3.0	90.9
West Bengal	14.1	56.4	35.9	79.5	47.4	2.6	59.0	0.0	38.5
West									
Gujarat	54.6	85.2	27.3	79.6	68.2	47.7	5.7	33.0	13.6
Maharashtra	45.0	81.5	15.2	64.2	60.9	24.5	6.6	35.8	33.1
South									
Andhra Pradesh	44.3	92.0	15.0	94.7	58.4	8.9	15.0	17.7	58.4
Karnataka	25.9	85.9	11.9	76.3	62.2	22.2	51.9	3.7	22.2
Kerala	**85.3**	**94.7**	**26.7**	**94.7**	**80.0**	**10.7**	**0.0**	**62.7**	**26.7**
Tamil Nadu	40.8	93.4	30.3	92.1	85.5	52.6	26.3	11.8	9.2
All India	36.8	64.5	22.4	70.2	50.9	16.6	18.4	13.0	52.0

Source : Shariff.A (1999)

Table 2		
Per Capita Net Domestic Product - India and Kerala at 1980 - 81 Rupees		
Year	India	Kerala
1980-81	1625	1508
1981-82	1692	1469
1982-83	1699	1485
1983-84	1804	1406
1984-85	1827	1473
1985-86	1857	1507
1986-87	1893	1453
1987-88	1929	1482
1988-89	2099	1614
1989-90	2198	1705
1990-91	2267	1815
1991-92	2226	1826
1992-93	2298	1932
1993-94	2386	2043
1994-95	2522	2113
1995-96 (P)	2644	NA
1996-97 (Q)	2793	NA

Sourse: Reserve Bank of India (1999) Hand book of statistics on Indian Economy (for India)
Government of Kerala Department of Economics and statistics -Bullettin for various years (for Kerala)
The figures are in two series, 80-81 and 93-94. The latter has been reduced to 80-81 for the purpose of comparrision.
P - Provisional, Q- Quick estimates

Table 3

Compound Annual Rates of Growth of Per-capita Net Domestic Product in Kerala and India, 1970-1 to 1991-2 (percentages)

Time Period	Kerala	India
1970-1 to 1980-1	0.06	1.39
1980-1 to 1990-1	1.4	3.25
1986-7 to 1991-2	6.16	3.79

Note: The figure represents two separate series; one for percapita domestic product at constant 1970-1 prices for the period 1970-1 to 1986-7, and one for percapita domestic product at constant 1980-1 prices for the period 1980-1 to 1991-2

Source: Ramachandran (1996)

Table 4

Percentage of Population below Poverty Line - India and States

India / States	Official Estimates			Average Annual Change (%)		Expert Group Estimates			Average Annual Change (%)	
	1977-8	1983-4	1987-8	1977-83	1983-7	1977-8	1983-4	1987-8	1977-83	1983-7
India	48.0	37.0	30.0	3.8	4.7	51.8	44.8	39.3	2.3	3.1
States										
Andhra Pradesh	43.6	36.4	31.7	2.8	3.2	40.0	29.9	27.2	4.2	2.3
Assam	47.3	23.5	22.8	8.4	0.7	57.6	40.9	36.8	4.8	2.5
Bihar	56.3	49.5	40.8	2.0	4.4	62.0	62.5	53.4	-0.1	3.6
Delhi	N.A.	N.A.	N.A.	N.A.	N.A.	33.1	26.8	16.0	3.2	10.1
Gujarat	38.9	24.3	18.4	6.3	6.1	42.2	33.3	32.3	3.5	0.8
Harayana	25.2	15.6	11.7	6.3	6.3	29.5	21.2	16.6	4.7	5.4
Himachal Pradesh	27.0	13.5	9.2	8.3	8.0	32.5	16.4	15.5	8.3	1.4
Karnataka	50.8	35.0	32.1	5.2	2.1	49.5	38.5	38.1	3.7	0.3
Kerala	**48.4**	**26.8**	**17.0**	**7.4**	**9.1**	**52.9**	**40.9**	**32.1**	**3.8**	**5.4**
Madhya Pradesh	58.9	46.2	36.7	3.6	5.1	62.4	50.1	43.4	3.3	3.3
Maharashtra	506.0	34.9	29.2	5.2	4.1	56.1	43.6	40.1	3.7	2.0
Orissa	65.1	42.8	44.7	5.7	-1.1	70.4	65.3	55.6	1.2	3.7
Punjab	16.4	13.8	7.2	2.6	12.0	19.4	16.3	12.7	2.7	5.5
Rajasthan	33.6	34.3	24.4	-0.3	7.2	38.0	35.0	34.6	1.3	0.3
Tamil Nadu	52.8	39.6	32.8	4.2	4.3	56.3	52.4	45.1	1.2	3.5
Uttar Pradesh	49.7	45.3	35.1	1.5	5.6	49.2	47.2	42.0	0.7	2.8
West Bengal	52.2	39.2	27.6	4.2	7.4	60.7	54.7	44.0	1.6	4.9
Union Territories										
Andaman & Nicobar	N.A.	N.A.	N.A.	N.A.	N.A.	56.6	52.7	45.2	1.1	3.6
Chandigarh	N.A.	N.A.	N.A.	N.A.	N.A.	27.6	23.9	12.9	2.2	11.5
Dadra & Nagar Haveli	N.A.	N.A.	N.A.	N.A.	N.A.	37.3	15.7	18.7	9.7	-4.8
Lakshadweep	N.A.	N.A.	N.A.	N.A.	N.A.	54.1	43.5	37.3	3.3	3.6
Pondecherry	N.A.	N.A.	N.A.	N.A.	N.A.	55.5	51.4	44.7	1.2	3.3

Note: The official estimate is based on the aggregate private household consumption expenditure as estimated by the National Accounts Statistic of the Central Statistical Organisation. The expert group estimates is based on NSS Consumer Expenditure Distributions.

Source : Srinivasan and Shariff (1997)

N.A. = Not available

Table 5

Crude Literacy Rate- India and States

India/States/Uts	Persons		F/M Ratio	Scheduled Castes		Scheduled Tribes	
				Persons	F/M Ratio	Persons	F/M Ratio
	1991	2001	1991	1991	1991	1991	1991
India	42.9	65.38	60.8	30.1	47.3	23.6	44
States							
Andhra Pradesh	36.8	61.11	59.3	25.9	49.8	13.6	34.2
Arunachal Pradesh	32.8	54.74	55.7	46.2	56.6	28.9	57
Assam		64.28					
Bihar	30.6	47.53	43	15.1	22.7	21.4	38.2
Delhi	62.4	81.82	71.6	45.7	62	N.A.	N.A.
Goa	66.6	82.32	80.2	49.8	68.2	33	49.7
Gujarat	51.2	69.97	66.6	50.5	60.5	29.7	49.9
Haryana	45.2	68.59	58.4	30.8	45.9	N.A.	N.A.
Himachal Pradesh	53.5	77.13	69.5	43.7	63.2	38.7	49.9
Karnataka	46.7	67.04	65.9	30.7	52.2	29.2	49.1
Kerala	**78**	**90.92**	**93.1**	**69.4**	**88**	**48.6**	**81.1**
Madhya Pradesh	35.5	64.11	49.1	27.7	35.6	16.9	33.3
Maharashtra	53.8	77.27	67.7	45.9	58.9	29.4	48.8
Manipur	49.9	68.87	66.2	46.8	73.1	44.8	71.1
Meghalaya	38.2	63.31	83.7	35.5	54.7	36	87.8
Mizoram	67	88.49	90.8	71.5	74.7	66.9	91.1
Nagaland	51.1	67.11	79.1	N.A.	N.A.	50	81.2
Orissa	40.8	63.61	54.9	30.2	39.6	18.1	29.7
Punjab	49	69.95	77	33.4	61.9	N.A.	N.A.
Rajasthan	33.1	61.03	37.1	20.6	19.5	15.3	13.2
Sikkim	46.5	69.68	67	41.2	72	48.4	74.4
Tamil Nadu	54.3	73.47	69.9	39.5	59.9	23.4	57.4
Tripura	49.5	73.66	70	45.5	67.2	32.3	51.4
Uttar Pradesh	33.2	57.36	44.8	21.1	25.8	28.4	39.1
West Bengal	47.9	69.22	67.9	34.3	52.5	22.4	37.2
Jharkhand*		54.13					
Uttaranchal*		72.28					
Chhatisgarh*		65.18					
Jammu & Kashmir**		54.46					
Union Territories							
Andaman & Nicobar	61	81.18	53.6	N.A.	N.A.	47	76.8
Chandigarh	66.2	81.76	76.2	44.6	64.9	N.A.	N.A.
Lakshadeep	66.8	87.52	71.8	N.A.	N.A.	65.2	81.3
Pondicherry	64.5	81.49	75.4	47.1	70.3	N.A.	N.A.

Note: * Jharkhand, Chhatisgarh & Uttaranchal are new states formed in 2000.
** The other figures of Jammu & Kashmir are not available.

Source: Sreenivasan & Shariff (1997) for all columns except for 2001
The figures for 2001 are from Census of India 2001 - Provisional Population Totals released by Director of Census Operations, Kerala.

Table 6

Kerala: Educational Record.

				KERALA	INDIA
Literacy (% of population above & years of age)		1961	M	55	34.3
			F	38.9	12.9
		1991	M	94.5	63.9
			F	86	39.4
Literacy among Scheduled Castes (ex-untouchable communities)		1961	M	31.6	17
			F	17.4	3.3
		1991	M	85.2	49.9
			F	74.3	23.8
Literacy among children	Age group 6-11	1986-87	M	97.4	64.7
			F	97.4	48.9
	Age group 12-14	1986-87	M	99.5	75.3
			F	99.1	54.5
Dropout Rates (%)	Class I to IV	1993-94	M	-5.35	35.05
			F	-3.05	38.57
	Class I to X	1993-94	M	33.43	68.41
			F	24.51	74.74
Percentage of rural childrn aged 12-14 who have never been enrolled in a school		1986-87	M	0.4	26
			F	1.8	51
Proportion of persons aged 6 and above who have completed primary education		1992-93	M	65.8	48.6
			F	60.5	28.1
Proportion of rural children attending school	5-9 years	1987-88	M	86.9	52.5
			F	82.8	40.4
	10-14 year	1987-88	M	93.3	66.1
			F	91.2	41.9
Proportion of readers in the estimated adult population (Any Daily)		1989	M	53.4	23.6
			F	35.8	11.5
Proportion of readers in the estimated adult population (Any publication)		1989	M	63.3	26.6
			F	54.2	15.4
Proportion of readers among agricultural labourers (Any publication)		1989	M	45.9	3.1
			F	11.9	0.7

Source : Kannan (1999)

Table 7

Selected Indicators of Development for Kerala and Some Asian Countries.

Country / State	Population (million) 1994	GDP Per Capita PPS $ 1994	HPI value (%) 1996	Population below International Poverty line 1985 (one PPS $ /day)	Female Literacy Rate (%) 1994	Gross enrolment ratio (1995) in Secondary Schools	Life Expectancy Year 1994	Total Fertility Rate	IMR 1994
1	2	3	4	5	6	7	8	9	10
Kerala	30.5	1618	15.0	NA	86.3	103	71.7	1.8	13 *
India	918.6	1348	36.7	52.0	39.0	49	61.3	3.0	74
Sri Lanka	18.1	3277	20.7	4.0	86.9	75	72.2	1.7	16
Thailand	58.2	7104	11.7	0.1	90.7	55	69.5	1.8	29
Malaysia	19.7	8865	NA	5.6	77.5	57	71.2	3.4	12
Indonesia	194.6	3740	20.8	14.5	77.1	48	63.5	2.5	53
China	1208.8	2604	17.5	29.4	70.9	67	68.9	1.8	43

* According to National Family Health Survey for 1998-99, the IMR for Kerala is 16.3

Notes: HPI: Human Poverty Index. This takes into account (I)the survival deprivation in terms of people not expected to to survive to age 40,(ii) a composite index of deprivation in economic provisioning indicated by (a)population without access to safe water, (b)population without access to health services, and (c) underweight children under the age of five.

Source : Kannan,1999.

Table 8
Human Development Index-India and Large States,1993

India/States	Life Expectency 1989-93	Index of Life Expectency (I_1)	Adult Literacy Rate,1991	Middle School Enrolment Ratio,1993	Index of Literacy (I_2)	Per Capita SDP,1993	Index of SDP (I_3)	Human Development Index
India	59.3	57.23	48.7	59.1	52.16	6255	19	42.79
Andhra Pradesh	60.5	59.14	40.1	56	45.38	5718	19.33	41.28
Assam	54.9	49.89	49.4	53.4	50.72	5310	17.81	39.48
Bihar	58.5	55.85	38.7	32.9	36.76	3084	9.56	34.05
Gujarat	60	58.36	56.7	67.7	60.38	7175	24.73	47.82
Haryana	63.1	63.43	49.9	68.6	56.12	9171	32.13	50.56
Himachal Pradesh	63.6	64.33	50.9	100	67.27	5979	20.29	50.63
Karnataka	61.8	61.36	52.2	67	57.12	6443	22.01	46.83
Kerala	71.8	78.01	86	100	90.85	5768	19.51	62.79
Madhya Pradesh	54	48.26	41.8	55	46.19	4733	15.67	36.71
Maharashtra	64.2	65.27	60.3	81	67.39	9628	33.82	55.49
Orissa	55.5	50.84	46.4	50	47.6	4097	13.32	37.25
Punjab	66.3	68.88	51.8	65.6	56.41	11106	39.3	54.86
Rajasthan	57.9	54.87	36.1	46.2	39.48	5086	16.98	37.11
Tamil Nadu	62.4	62.31	50.6	103.4	68.19	6663	22.83	51.11
Uttar Pradesh	55.8	51.41	38.4	46.6	41.14	4273	13.97	35.51
West Bengal	61.5	60.83	57.1	53.1	55.75	5775	19.54	45.37

Source: Srinivasan and Shariff (1997)

Notes of Authors: Index of $e_{(\ )}(I_1)$=(((Percent males*$e_{(\ )}$ (males)+Percent females*$e_{(\ )}$ (females))-25)/60*100

Index of education(I_2)= (2* Adult literacy rate(%)+ Middle school enrolment ratio)/3*100

Index of per capita income(I_3) =

(((State net domestic product / net domestic product of country)*1240)-100)/5348*100

HDI=(I_1+I_2+I_3)/3.

Table 9

Per Capita Expenditure on Education - All States

S. No.	State	1980-81 Edu.	1990-91 Edu.	1994-95 Edu.	1995-96 Edu.	1996-97 Edu.	1997-98 Edu.	1998-99 Edu.	1999-00 R.E Edu.	2000-01 B.E Edu.
1	2	3	4	5	6	7	8	9	10	11
1	Andhra Pradesh	43	171	240	239	275	307	384	460	541
2	Arunachal Pradesh	..	592	718	792	1047	1083	1069	1167	1175
3	Assam	54	221	361	396	419	462	535	825	927
4	Bihar	34	142	181	212	238	265	266	427	435
5	Delhi	..	..	385	-	536	695	819	896	1067
6	Goa	..	653	793	940	1038	1277	1397	1599	1413
7	Gujarat	53	226	356	419	450	496	667	707	714
8	Haryana	57	202	303	360	406	456	643	640	660
9	Himachal Pradesh	105	385	521	630	697	859	1092	1058	1187
10	Jammu & Kashmir	73	293	442	509	591	663	669	883	962
11	Karnataka	47	187	306	354	391	439	524	557	692
12	**Kerala**	**85**	**269**	**443**	**464**	**528**	**569**	**625**	**796**	**870**
13	Madhya Pradesh	33	141	193	229	262	267	337	325	320
14	Maharashtra	61	222	361	427	489	556	599	1042	759
15	Manipur	143	438	668	739	960	1062	865	1801	1178
16	Meghalaya	77	379	464	594	587	645	739	914	1012
17	Mizaram	..	704	929	1065	1317	1243	1288	1794	1370
18	Nagaland	163	461	763	928	811	860	895	973	1048
19	orissa	41	171	242	275	312	346	420	496	484
20	Punjab	83	281	359	415	467	574	748	888	919
21	Rajasthan	43	196	307	352	398	423	538	583	617
22	Sikkim	133	717	890	1012	1246	1288	2235	2250	2614
23	Tamil Nadu	50	201	333	374	425	485	645	693	749
24	Tripura	81	418	509	566	633	677	737	1036	1160
25	Uttar Pradesh	32	154	194	225	248	265	351	356	333
26	West Bengal	45	218	247	267	325	334	395	635	469
	All States	**47**	**190**	**278**	**316**	**357**	**395**	**477**	**595**	**579**

RE: Revised budget Estimates, BE: Budget Estimates
Source: Government of Kerala, *Budget in Brief 2001-2002.*

Table10

Kerala: Institutions and Beds in Different Systems in Private and Public

	Government (2000)	Private (1995)*	Total
Allopathy			
Institutions	1317	4288	5605
Beds	45684	67517	113201
Ayurveda			
Institutions	792	4922	5714
Beds	2604	2595	5199
Colleges	3	2	5
Homeopathy			
Institutions	555	3118	3673
Beds	970	394	1364
Colleges	2	3	5
Other Systems			
Institutions	8	290	298
Beds	--	418	418
Total			
Institutions	2672	12618	15290
Beds	49258	70924	120182
Population(2001)			31,838,619
Beds/Population			1:265
Beds per 100,000			377

Source: Government of Kerala: *Economic Review2000*

* Data for 1995. (Survey undertaken by Economics & Statistics Department of Govt. of Kerala.)

Table 11

Share of Education and Health Expenditure in Total Government Expenditure: Travancore and Cochin

Period	Share of Education		Share of health	
	Travancore	Cochin	Travancore	Cochin
1867-78 to 1869-70	1.90	0.90	N/A	N/A
1870-79	2.70	1.50	1.80	N/A
1880-89	3.40	2.80	1.50	1.7
1890-99	4.60	4.20	3.20	2.6
1900-09	6.30	4.20	4.10	3.4
1910-19	11.10	10.90	4.00	7.9
1920-29	18.30	16.50	4.50	5.4
1930-39	19.80	18.10	5.30	6.3
1940-01 to 1942-43	16.10	17.30	4.60	6.9

Source : Ramachandran (1996)

Table 12

Trends in Government expenditure in medical and public health and related variables,Kerala

Year	Govt. exp. on Medicine and Public Health	Index No.1957-58 - 100	Total State Government expenditure	Index No. 1957-58 - 100	Net State domestic product at current prices	Index No. 1957-58 - 100	Percent of Govt. expenditure on Medical & Public Health	
							Total State Govt. exp.	State Domestic Product
1957-58	386	100	3051	100	36691	100	12.65	1.05
1958-59	445	115	3572	117	39367	107	12.45	1.13
1959-60	501	130	4010	131	43136	118	12.49	1.16
1960-61	541	140	4474	147	46215	126	12.09	1.17
1961-62	627	162	5491	180	49420	135	11.41	1.27
1962-63	755	196	6076	199	52000	142	12.43	1.45
1963-64	769	199	6447	211	55693	152	11.92	1.38
1964-65	843	218	6749	221	67626	184	12.49	1.25
1965-66	981	254	7281	239	16601	209	13.47	1.28
1966-67	1137	295	7951	261	88667	242	14.30	1.28
1967-68	1427	370	9981	327	100210	273	14.29	1.42
1968-69	1581	410	11116	364	103000	281	14.22	1.53
1969-70	1684	436	12354	405	114178	311	13.63	1.47
1970-71	1943	503	13700	449	118336	323	14.18	1.55
1971-72	2635	683	16197	531	121047	330	16.27	2.10
1972-73	2813	729	17688	580	139726	381	15.90	1.94
1973-74	2995	776	20726	679	174621	476	14.45	1.66
1974-75	3970	1029	24070	789	202944	553	16.49	1.96
1975-76	4627	1199	30575	1002	213131	581	15.13	2.13
1976-77	5240	1358	34121	1118	227065	619	15.35	2.22
1977-78	5051	1309	37224	1220	240576	656	13.57	2.09
1978-79	3630	940	42725	1400	261832	714	8.49	1.39
1979-80	6865	1779	50020	1639			13.72	
1980-81	7879	2041	54272	1779			14.52	
Growth rate %	13.04		12.45		9.81			

Source :Panikar and Soman (1984)

Table 13

Per Capita Public Expenditure on Medical and Public Health Care – All States

State	1980-81 Health	1990-91 Health	1994-95 Health	1995-96 Health	1996-97 Health	1997-98 Health	1998-99 Health	1999-00 R.E. Health	2000-01 B E Health
2	3	4	5	6	7	8	9	10	11
Andhra Pradesh	23	52	79	66	83	93	110	144	155
Arunachal Pradesh	..	225	299	288	384	420	441	582	574
Assam	22	51	80	73	80	88	76	107	116
Bihar	14	39	53	36	42	43	49	77	77
Delhi	..	..	149	..	204	240	273	349	443
Goa	..	254	290	318	374	399	472	514	518
Gujarat	26	61	94	88	98	117	160	185	164
Haryana	31	60	81	72	85	103	134	131	151
Himachal Pradesh	84	145	211	195	236	268	354	356	372
Jammu & Kashmir	84	137	196	207	245	262	285	404	460
Karnataka	19	62	97	84	91	115	138	156	168
Kerala	**32**	**90**	**113**	**109**	**124**	**139**	**156**	**204**	**198**
Madhya Pradesh	23	49	63	53	65	68	96	89	87
Maharashtra	27	68	90	88	103	113	122	156	154
Manipur	98	111	143	151	160	165	177	319	214
Meghalaya	120	165	158	154	206	223	264	280	339
Mizaram	..	171	335	324	464	436	434	715	518
Nagaland	197	255	263	314	385	407	425	414	418
orissa	22	59	64	56	65	70	92	94	115
Punjab	32	91	106	121	121	153	206	278	301
Rajasthan	33	62	98	85	104	111	134	140	147
Sikkim	81	250	320	332	466	414	739	678	679
Tamil Nadu	23	66	106	99	116	130	160	166	176
Tripura	31	108	120	104	144	136	141	166	182
Uttar Pradesh	14	40	61	52	59	74	65	76	77
West Bengal	26	73	73	72	85	89	129	152	178
All States	**24**	**59**	**83**	**75**	**88**	**99**	**117**	**139**	**146**

overnment of Kerala: *Budget in Brief 2001-2002.*

Table 14

Beds per 10,000 Population in Public Hospitals - India and States

India/States/Uts	Rural			Urban			Total		
	1981	1986	1991	1981	1986	1991	1981	1986	1991
India	1.2	1.3	1.9	25.6	24.9	21.8	7.0	7.3	7.0
States									
Andhra Pradesh	0.8	0.8	2.0	23.7	21.8	9.7	6.1	6.2	4.0
Arunachal Pradesh	5.7	4.6	21.9	107.7	84.7	74.3	12.3	11.0	28.6
Assam	NA	1.4	2.0	NA	36.4	35.0	NA	5.3	5.6
Bihar	0.1	0.4	0.4	25.2	23.8	23.0	3.2	3.6	3.4
Delhi	1.4	1.7	2.7	22.2	21.8	21.9	20.7	20.6	19.9
Goa	0.0	11.0	19.5	0.0	49.4	47.9	0.0	24.5	31.2
Gujarat	0.6	1.1	2.5	28.9	30.2	36.6	9.4	10.6	14.3
Haryana	0.4	0.4	0.4	24.0	18.8	16.0	5.5	4.9	4.3
Himachal Pradesh	1.0	1.2	1.1	74.1	91.7	74.7	6.5	8.4	7.4
Jammu & Kashmir	0.1	0.6	13.7	30.8	48.1	0.8	6.6	11.3	10.6
Karnataka	1.0	1.0	1.0	25.2	22.7	25.1	8.0	7.8	8.4
Kerala	10.5	12.0	20.6	44.9	45.2	43.1	16.9	18.6	26.5
Madhya Pradesh	0.3	0.3	1.2	14.2	14.4	7.8	3.1	3.4	2.7
Maharashtra	1.2	1.6	2.1	28.6	32.5	22.5	10.8	13.1	10.0
Manipur	3.7	3.2	6.9	21.5	20.6	12.6	8.4	8.1	8.5
Meghalaya	0.3	0.2	0.0	58.9	65.2	56.6	10.9	13.5	10.5
Mizoram	8.6	0.0	5.3	27.7	56.9	34.8	13.3	16.7	18.9
Nagaland	9.7	5.1	2.6	36.8	38.2	38.1	13.9	11.4	8.7
Orissa	0.8	1.0	1.2	28.3	24.6	26.1	4.1	4.3	4.6
Punjab	2.4	2.7	1.6	24.2	21.1	20.6	8.5	8.2	7.2
Rajasthan	0.3	0.4	0.3	22.0	20.7	19.3	4.8	5.1	4.7
Sikkim	8.6	0.0	0.0	39.2	69.6	155.4	13.5	13.8	14.1
Tamil Nadu	1.1	1.4	1.2	22.9	21.9	23.3	8.3	8.5	8.7
Tripura	0.8	0.8	1.4	45.1	44.8	33.1	5.7	5.7	6.3
Uttar Pradesh	0.3	0.3	0.2	21.1	17.8	16.2	4.0	3.8	3.4
West Bengal	2.2	1.8	1.5	26.0	27.5	25.3	8.5	11.8	8.0
Union Territories									
Andaman & Nicobar	21.1	18.6	8.0	58.8	61.9	55.0	31.0	30.9	20.5
Chandigarh	0.0	9.7	0.0	26.5	22.9	8.7	24.8	22.2	7.8
Dadra & Nagar Havel	4.0	4.5	0.0	0.0	0.0	59.7	3.8	4.2	5.1
Lakshadeep	23.1	30.0	0.0	0.0	0.0	24.0	12.4	16.1	13.5
Pondicherry	0.4	0.0	0.0	71.4	61.3	50.4	37.5	35.0	32.3

Source : No. of beds has been taken from Health Information of India,1993,Directorate of Health Services,Ministry of Health & Family Welfare ;

Population of 1981 & 1991 has been taken from Census of India 1981 & 1991.

Population of 1986 is projected population by Expert Committee.

NA = Not Available

Table 15

State-wise Distribution of Population and Medical Care Institutions : 1991

States	Population	Govt. Hospitals	No. of Hospital Beds	Medical Care Institutions (1992) Pvt.		Total Hospitals	Population Coverage of Health Care Facility Rates of Population to Hospitals(Col. 2 to 7)
				Hospitals	Beds		
1	2	3	4	5	6	7	8
Andhra Pradesh	665.08	141	2554	1722	24237	1863	35,099
Assam	224.14	141	9687	80	1992	268	83,635
Bihar	863.74	237	20522	90	8519	328	2,63,337
Gujarat	413.1	263	20708	2031	33497	2370	17,430
Haryana	164.04	58	4796	20	2232	78	2,11,070
Jammu & Kashmir	77.19	65	3062	2	187	67	1,15,204
Karnataka	449.77	209	2716	56	9999	293	1,53,507
Kerala	290.99	141	28030	1899	49169	2040	14,264
Madhya Pradesh	661.81	363	18141	-	-	363	1,82,317
Maharashtra	789.37	495	34261	2583	37758	3115	2,53,41
Orissa	316.6	250	13077	29	1306	248	1,11,478
Punjab	202.82	174	10786	39	3782	217	93,465
Rajasthan	440.06	218	20465	-	-	218	2,01,862
Tamil Nadu	558.59	282	37935	119	10366	408	1,36,909
Uttar Pradesh	1391.12	534	34267	159	12026	735	1,89,268
West Bengal	680.78	242	47252	129	6912	592	1,73,668
All India	8463.03	4235	365696	9113	210987	13692	61,810

Source : Panikar (1999)

Table 16

Distribution of Inpatient Days between Public and Private Facilities
Kerala

	Public Share	Private Share	Total ('00,000s)
	Percentages		
Poverty Status			
BPL	61.30	38.70	56.20
APL	46.40	53.60	190.40
Social Status			
Non SC/ST	45.50	54.50	209.20
SC/ST	73.50	26.50	37.40
Expenditure Quintiles			
I	58.50	41.50	39.20
II	64.40	35.60	41.30
III	50.70	49.30	39.70
IV	42.60	57.20	50.10
V	41.50	58.50	76.60
Total ('00,000s)	122.80	124.00	246.80

BPL: Below Poverty Line
APL: Above Poverty Line

Source: Mahal et al. (2000)

Table - 17
Performance in Immunisation - Kerala

Year	BCG	DPT	Polio	Measles	TT(Preg.W)
1993-94	108.7	99.5	99.3	88.3	91.4
1994-95	114.7	106.6	108.4	96.5	94.2
1995-96	109.5	101.5	104.5	90.3	87.8
1996-97	107.9	101.8	103.2	91.5	87.1
1997-98	116.9	108.6	109.7	95.7	89.5
1998-99	116.5	108.8	110.5	102.6	90.8
1999-00	111.9	105.8	106.9	100.3	94.5

Source : Government of Kerala, various tables.

Table 18

Distribution of Net Public Sector Health Subsidies for Quintiles - India and Kerala

States	Per capita expendure on health 95-96	Per capita expenditure Quintiles					Social Status	
		I	II	III	IV	V	BPL	SC/ST
Kerala	109	21.9	23	18.2	17.2	19.7	30.9	21.1
Punjab	121	14.7	17.1	18.5	27.6	22.2	2.9	44.1
Himachal Pradesh	195	7.5	11.4	13.4	23.9	43.8	7.2	31.5
All States	75	10.2	14.1	18.7	26	31	26.9	28.7

Source : Per Capita Expenditure on health from Government of Kerala *Budget in Brief 2001-2002*
All the others from Mahal et al (2000)
Note: BPL : people below the poverty line

Table 19

Caesarean Secction Rates - A Comparison

Country	Sample Size	% Caesarean	% Institutional delivery	% Skilled attendent at delivery	Year
Africa					
Burkina Faso	6302	1.3	43	41	1988-93
Cote d'Ivoire	3989	1.8	45	45	1992-94
Central African Republic	2836	1.9	50	46	1990-95
Egypt	11454	6.6	33	46	1991-95
Kenya	6062	5.2	44	45	1988-93
Madagascar	5604	1	45	57	1987-92
Malawi	4512	3.4	57	57	1988-92
Morocco	2235	3.5	37	40	1990-94
Namibia	3814	7	67	68	1987-92
Niger	7094	0.9	16	15	1987-92
Rwanda	5612	1.8	25	26	1987-92
Senegal	5581	2.3	47	47	1988-93
Uganda	6027	2.6	35	38	1992-95
Zimbabwe	2328	6	69	69	1991-94
Latin America					
Belize	1490	8.4	76	77	1986-91
Nordeste Brazil	3392	17.9	76	96	1986-91
Brazil	2864	31.6	81	95	1981-86
Brazil	4782	36.4	92	97	1991-96
Colombia	5050	16.9	77	85	1991-95
Dominican Republic	3820	22	92	92	1986-91
Ecuador	8837	17.1	64	64	1989-94
Guatemala	9150	8.2	34	35	1991-95
Asia					
Indonesia	16983	2.5	18	34	1989-94
Phillipines	8803	5.9	28	53	1988-93
Kerala (rural)	1314	11.9	78	90	1987
Kerala (urban)	103	21.4	97	99	1996
Europe					
United Kingdom		9			1985-90
Finland		11.9			1990-95
Canada		18.3			1989-90
North America					
United States		22.8			1993

Source : Kunhikkannan and Arvindan (2000)

Table 20

Annual per capita medical expenditure by socioeconomic status 1987 and 1996 - Kerala

Socioeconomic status	Annual per capita expenditure in Rupees			Annual Expenditure as % of per capita income		
	1987	1996	% of increase	1987	1996	% of increase
I	54.99	477.26	768	7.18	39.63	452
II	42.11	467.26	1010	2.93	16.11	450
III	126.33	538.27	326	3.38	5.08	50
IV	160.8	569.49	254	2.18	2.44	12
All	88.92	548.86	517	3.57	6.79	90

Source: Kunhikannan and Aravindan (2000)

Note: For classifying people into socioeconomic groups, income, size of the land owned, educational attainment and housing condition, were taken into account

Table 21

Workers Remittances to Kerala

Year	Remittances in US $ Million	Exchange Rate	Total Remittance (Rs. Million)	Remittances as % of NDP of Kerala
1990	728.63	17.94	13072	10.74
1991	1281.75	24.47	31364	20.77
1992	939.75	30.64	28794	16.76
1993	1155	31.36	36221	15.48
1994	1866	31.39	58574	20.41
1995	2401.5	33.45	80330	22.9
1996	3497.25	33.5	124152	30.42
1997	3339.75	37.16	124105	25.9
Total	15209.63		496612	

Source: Prakash (2000)

Table 22

Prevalence Rates of Major Morbidity by States

Regions / States	Major Morbidity (per lakh pop.)								Major Morbidity
	Epilepsy	Hyper-tension	Diabetes	Heart Disease	Mental Disease	TB	Leprosy	Cancer	
North									
Haryana	103	372	100	230	143	322	–	34	6,697
Punjab	103	1,475	196	166	286	230	–	28	6,692
Upper Central									
Bihar	78	481	143	443	169	496	29	19	3,817
Uttar Pradesh	120	221	158	231	120	370	27	34	3,523
Lower Central									
Madhya Pradesh	74	366	138	160	136	686	313	57	4,801
Orissa	369	863	116	245	99	206	31	74	5,011
Rajasthan	60	64	55	84	79	303	–	37	3,150
East									
North-eastern Rg.	50	732	226	502	105	189	74	127	3,076
West Bengal	133	1,049	207	795	151	636	22	32	6,168
West									
Gujarat	103	381	215	188	160	276	30	7	2,551
Maharashtra	147	241	130	151	84	282	65	62	3,487
South									
Andhra Pradesh	129	1,295	545	676	163	580	63	66	7,684
Kerala	81	1,433	980	914	283	504	–	39	7,319
Tamil Nadu	205	1,191	377	949	80	583	83	15	6,775
All India									
Person	**120**	**589**	**221**	**385**	**132**	**423**	**57**	**43**	**4,578**
Gender disparity	**0.71**	**1.31**	**0.65**	**0.86**	**0.75**	**0.59**	**1.64**	**0.95**	**1.00**

Source : Shariff (1999)

Table 23

Some CommonCauses of Mortality in Kerala, from the KSSP Surveys in 1987 & 1996.

Cause of death	1987		1996	
	rank	%	rank	%
Heart attack	1	10.4	1	14.28
Cerebral Thrombos	7	2.4	1	14.28
Cancer	2	7.4	2	8.57
Accidents	4	3.6	3	5.7
Suicides	5	3	4	2.8

Source : Kunhikannan and Arv-dan (2000)

Table 24
Affliction and death due to Principal Communicable Diseases - Kerala

Name of Disease	1995-96		1996-97		1997-98		1998-99		1999-2000	
	A	D	A	D	A	D	A	D	A	D
Diseases inlcuding Cholera	707246	21	656635	114	554695	34	580441	36	609936	25
Diptheria	33	4	4	0	7	0	18	1	4	0
Measles	6107	1	7931	1	4930	0	6043	0	6433	2
Acute Respiratory Infection	3032563	139	3769791	164	4056142	183	7512989	507	5594351	1024
Pneumonia	21753	26	21299	26	21873	38	24590	47	23550	79
Enteric fever (typhoid)	7749	6	5516	1	598	1	10739	1	15494	5
Leptospirosis									912	66
Japanese Encephalitis	105	31	61	8	66	13	133	0	29	1
Menengococal Menengitis	98	7	65	10	39	4	69	4	244	10
Pulminary tubercolosis	42091	272	36922	243	38269	131	10419	123	36549	226

A: Affliction, D: Death
Source: Government of Kerala: various tables of Directorate of Health Services

Table 25

Trend in Development Expenditure 1990-1 and 1994-5 to 2001-2 , Kerala

Item	Share of Government Expenditure								
	1990-91	94-95	95-96	96-97	97-98	98-99	99-2000	2000-01	01- 02
Education	43.02	44.81	42.06	39.93	35.00	34.70	40.08	38.65	39.02
Health	15.45	14.31	14.61	13.22	12.60	12.32	13.37	12.29	11.97
Deviation points		-1.14	0.30	-1.39	-0.62	-0.28	1.05	-1.08	-0.32
Rs. Million	2785	4316	4986	5353	6341	6949	8704	8953	9212
Agriculture	8.75	11.49	11.40	11.73	11.44	10.91	9.89	9.78	9.84
Community Development	16.95	13.55	13.43	17.36	24.48	25.90	20.97	23.39	21.90
Industry and labour	4.02	4.39	4.63	4.98	4.27	3.40	3.33	3.44	3.02
Irrigation	3.57	3.44	3.57	2.86	2.21	2.61	2.34	2.10	2.34
Public Works	3.45	3.04	4.11	3.75	3.37	3.52	3.77	3.60	4.85
Forests	1.72	2.24	2.10	2.15	1.58	1.85	1.94	2.42	2.20
Transport & Communication (other than roads)	0.39	0.35	0.33	0.32	0.30	0.29	0.31	0.34	0.34
Housing and Urban Development	0.91	1.25	1.24	2.92	3.27	3.36	2.96	3.03	3.57
Others	1.77	1.14	2.52	0.77	1.47	1.16	1.05	0.96	0.96
Total in Rs. Million	18026	30154	34122	40480	50313	56420	65102	72852	76987
Index	100	167	189	225	279	313	361	404	427

Source : Government of Kerala:*Budget in Brief 2001 -02*

Note: The figures for 1990-91 and 94-95 to 99-00 are the accounts of expenditure.
The figures for 2000-01 is the revised budget estimate for that year.
The figures for 2001-02 are the budget estimates proposed for the year.

Table 26
Collection of User Fees and Cost Recovery Ratio - Major States

State	Total exp	Total User Fees		Cost Recovery Ratio	
		NIPFP	NSS	NIPFP	NSS
		Rs. Lakhs			
Andhra Prade	47897.97	210.62	734.92	0.44	1.53
Bihar	22304.44	252.15	229.75	1.13	1.03
Gujarat	33564.11	203.70	438.14	0.61	1.31
Haryana	11957.45	26.11	1136.67	0.22	9.51
Himachal Pra	11621.46	76.24	78.40	0.66	0.67
Karnataka	42614.04	44.71	1180.41	0.10	2.77
Kerala	31226.29	693.06	4952.00	2.22	15.86
Madhya Prade	36218.31	212.88	577.91	0.59	1.60
Maharashtra	45892.85	1229.22	2126.99	2.68	4.63
North East	22695.49	214.85	386.37	0.95	1.70
Orissa	19093.04	32.46	183.21	0.17	0.96
Punjab	17693.15	232.66	1888.04	1.31	10.67
Rajasthan	43161.48	154.24	397.92	0.36	0.92
Tamil Nadu	55983.65	204.39	1238.33	0.37	2.21
Uttar Pradesh	84308.17	243.82	2726.22	0.29	3.23
West Bengal	50801.52	232.30	1063.42	0.46	2.09

Source: Mahal et al (2000)

Note: The author has taken the figures for the North East by scaling the corresponding figures for Assam in accordance with the proportion of population

Table 27
Receipt and Expenditure of Regional Cancer Centre Trivandrum
(Rupees Millions)

Year	Receipts					Expenditure				Surplus (+)	Internal Revenue as %	
	State Govt.	Federal Govt	Internal Rev.	Research Grant	Total	Running Cost	Drug Purchase	Bldg. & Eqpt.	Total	Deficit (-)	Of Total Receipts	Of Running Cost & drug purchase
89-90	10.45	2.00	1.77	0.85	15.06	8.12	1.12	6.41	15.66	-0.60	11.75	19.16
90-91	20.67	14.00	4.13	1.08	39.88	10.11	2.97	24.38	37.46	2.42	10.36	31.57
91-92	22.35	3.00	7.35	1.97	34.68	14.04	5.06	11.31	30.41	4.27	21.19	38.48
92-93	31.05	6.50	15.11	2.22	54.89	18.38	6.20	33.15	57.74	-2.85	27.53	61.47
93-94	34.22	7.00	21.99	5.38	68.60	23.70	9.87	33.10	66.67	1.93	32.06	65.50
94-95	37.50	7.00	26.82	4.05	75.37	33.99	17.13	26.27	76.40	-1.03	35.58	52.46
95-96	58.61	7.50	33.63	8.17	107.92	34.71	21.45	34.65	90.82	17.10	31.16	59.88
96-97	41.32	9.00	36.97	7.26	94.55	52.76	21.90	41.40	116.26	-21.71	39.10	49.52
97-98	44.89	7.50	45.19	9.13	106.70	52.48	24.58	23.80	101.78	4.92	42.35	58.64
98-99	41.04	8.16	46.50	11.00	106.70	54.62	25.50	31.50	111.62	-4.92	43.58	58.04
99-00	34.60	7.50	49.00	12.00	92.10	96.25	27.00	31.43	154.71	-62.61	53.20	39.76

Source: Regional Cancer Centre, Trivandrum. Annual reports for various years and internal documents

Note: The huge deficit in 1999-2000 is due to the introduction of pay revision and of non practising allowance to the doctors necessitated by the stopping of private practice. The latter was made up from the income from pay clinics .

Table 28

Financing Pattern of Projects implemented by Local Self Governments Kerala 1999-2000 (per centages).

Item	No of Projects	Grant-in-aid carried over	Grant-in aid	Own Fund	State Sponsered	Centrally Sponsered	Loan from Co-operative Inst.	Loan from Fin. Inst.	Voluntary Contribution	Beneficiary Contribution	Beneficiary Contribution (directly spent)	Others	Total
Gram Panchayats	118931	14.45	36.59	12.79	5.23	3.65	1.19	3.63	3.05	2.84	10.95	5.62	100
Block Panchayats	22665	10.65	22.91	0.00	8.55	37.43	0.48	11.98	1.68	0.20	1.49	4.63	100
District Panchayats	6521	14.18	25.26	0.00	6.13	3.31	0.56	30.91	5.00	0.17	1.32	13.17	100
Municipalities	9949	10.02	27.00	24.59	6.15	8.36	0.28	12.81	2.22	0.84	5.71	2.02	100
Corporations	1784	10.96	32.24	19.73	1.58	8.11	0.60	17.12	1.62	0.95	5.46	1.63	100
Total	159850	13.07	30.85	9.27	6.31	10.83	0.83	11.37	2.97	1.60	6.72	6.18	100
Categories of Projects													
General	131724 (82.40%)	11.39	29.12	11.34	5.57	11.48	0.85	12.07	2.87	1.82	7.35	6.14	100
For Scheduled Castes	22892 (14.32%)	19.13	37.54	2.08	7.71	8.24	0.72	9.16	3.54	0.62	4.22	7.04	100
For Scheduled Tribes	5234 (3.27%)	29.99	45.68	2.62	5.51	5.80	0.75	2.74	2.79	0.26	1.47	2.38	100
For Women	11783 (7.37%)	12.83	40.00	1.90	2.68	3.14	1.74	14.71	3.64	3.14	9.65	6.56	100
Nature of Projects													
Productive Sector	44435 (27.80%)	20.40	32.75	1.99	4.26	11.71	1.09	5.42	2.81	3.70	14.07	1.80	100
Service Sector	55813 (34.92%)	9.63	30.08	4.74	6.68	10.33	0.64	17.59	3.63	1.02	5.53	9.95	100
Infrastructure Sector	59602 (37.29%)	12.01	30.33	29.65	5.73	10.87	0.95	5.08	1.78	0.43	0.94	3.23	100

Source : Govt. Of Kerala (2000)

Note: Gram Panchayats are the lowest elected unit with a population of about 29,000. Block Panhayats are the next tier and consists oof a group of about 10 gram Panchayats. District (Jilla) Panchayats are the third tier of elected self governments.