This monograph documents efforts in making pregnancy safer and improving maternal and neonatal health outcomes by the Department of Health and Family Welfare, State Government of Tamil Nadu, India. It is intended to serve as a useful resource for those who wish to learn from the lessons learnt and path taken to improve maternal health and pregnancy outcomes in a resource-poor setting in the South-East Asia Region.
Safer Pregnancy in Tamil Nadu: from Vision to Reality
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About six years remain before the target date of 2015 for achieving the UN Millennium Development Goals. While there has been steady and consistent progress towards most of the targets, progress in improving maternal health lags behind perceptibly. Due to an intricate correlation between maternal and neonatal health, maternal health has implications for the achievement of the MDG 4 target of reducing under-five child mortality, in which neonatal mortality is a critical component.

Due to sociocultural and economic differences, the situation of maternal and neonatal health varies considerably between countries of the South-East Asia Region, as well as within each country. India, the country with the largest population in the Region (over one billion inhabitants) has the highest number of maternal and newborn deaths in the world. It alone contributes over 68% of maternal and 76% of neonatal deaths in the Region. However, there are enormous variations within the country, with some states demonstrating tremendous progress in improving maternal and neonatal health.

The state of Tamil Nadu in South India is an example of such a success story, reflecting how the power of political will, the right blend of effective women-centred interventions tailored to the local sociocultural environment, and a well-established continuum of care based on the strong edifice of efficient health systems can bring about conspicuous improvement in maternal and neonatal health, as well as in the overall well-being of the population. In this monograph the officials of the Health and Family Welfare Department of the Government of Tamil Nadu generously share their experiences, achievements and lessons learnt from their efforts to ensure safer pregnancy and better newborn survival through the successful implementation of the Family Welfare Programme.

This monograph was prepared by the WHO Regional Office for South-East Asia, WHO Country Office, India and the Department of Making Pregnancy Safer of WHO Headquarters in collaboration with the Department of Health and Family Welfare, Government of Tamil Nadu and Government of India. It is intended for a wide range of health authorities and programme managers to learn and adapt successful programme strategies in their settings to accelerate action to improve maternal and neonatal health.
This monograph, *Safer Pregnancy in Tamil Nadu: From Vision to Reality*, is the result of a very interactive and participatory process involving a core team of public health specialists in Tamil Nadu. The inspiration for this monograph came from Dr P. Padmanaban, former Director of Public Health and Preventive Medicine, Tamil Nadu, and currently Advisor (Public Health Administration), National Health Systems Resource Centre, National Rural Health Mission, Ministry of Health and Family Welfare, Government of India, New Delhi. Not only his inspiration but also his sharing a rich collection of technical materials has made this monograph possible. His untiring motivation and inputs are graciously acknowledged. Dr B.R. Desikachari, a senior public health specialist with nearly thirty years of standing in reproductive and child health and health systems development in Tamil Nadu in his capacity as DANIDA Advisor and currently Consultant in HIV/AIDS control, took many initiatives in resource mapping to provide inputs in the documentation process. He, along with Dr K. Kasturi, a health economist and specialist in health systems development, did the actual documentation work to organize the monograph. Both of them deserve deep appreciation for providing their valuable time and effort, and they are profusely acknowledged. Dr Saradha Suresh, Director, Institute of Child Health and Hospital for Children, Chennai, undertook analysis of verbal autopsies of maternal deaths and provided inputs in understanding systemic issues contributing to maternal mortality. Her inputs and efforts in the documentation process are highly appreciated. Last but not the least, Mr V.K. Subburaj, IAS, the Principal Secretary, Department of Health and Family Welfare, Government of Tamil Nadu, is warm-heartedly acknowledged for giving permission for the documentation process and preparation of the monograph.
Executive Summary

The vision

Tamil Nadu's cherished vision is to significantly reduce, if not eliminate, the high toll of maternal death and pregnancy wastage. The state's chosen path is to realize this vision as a comprehensive public health initiative that responds to women's needs from a rights-based approach.

The achievement

In the last several decades Tamil Nadu has recorded impressive achievements in reducing maternal and infant mortality (see Figs. 1 and 2). Key indicators of progress are:

- by 2005 and again in 2006 the maternal mortality ratio (MMR) had fallen to 90 per 100,000 live births, compared with 450 in 1980;

An enabling environment

Social transformation, supported by a committed political system irrespective of the party in power,
along with a paradigm shift in public health policy to emphasize maternal and newborn health, are the key factors behind these advances. Overall, their impact is reflected in improved literacy; in the reduced incidence of early marriage, early pregnancy, and frequent pregnancies; and in a high level of public awareness of family planning and good nutrition. A dynamic public health system has made use of this environment to progress towards its goal of making pregnancy safer through effective women-centred initiatives.

**A 3-fold path**

Tamil Nadu’s effort to ensure safer pregnancy and newborn survival pursues a three-pronged strategy:

- prevention and termination of unwanted pregnancies;
- accessible, high-quality antenatal care and institutional delivery, with routine essential obstetric care and emergency obstetric first aid at the primary level;
- accessible, high-quality emergency obstetric care at the first referral level.

Successful implementation of the family welfare programme has brought down the fertility level (total fertility rate) to 1.7 in 2005 and the crude birth rate to 16.2 in 2006. Sustained efforts have reduced the unmet demand for family planning. This, coupled with provision of safe abortion services in public health facilities, has helped address the issue of unwanted pregnancies. A fertility transition has occurred, evidenced by a sizeable decrease in fertility among adolescents.

High-quality antenatal care is on the upswing, with higher rates of early registration of pregnancies and sustained follow-up. Over 96% of mothers had at least three antenatal visits during their last pregnancies, according to the National Family Health Survey 3 in 2005–06. The state policy promoting institutional deliveries, coupled with appropriate incentives, has led to 96% of deliveries taking place in institutions by 2006 (see Fig. 3). Even among the 4% that were domiciliary deliveries in 2005–06, untrained persons attended only a negligible proportion.

The innovative 24×7 model, providing around-the-clock access to essential obstetric and newborn care
and emergency obstetric first aid services at the primary level, is paying rich dividends. Under this model three staff nurses, working on 8-hour shifts, provide skilled attendance throughout the day and night at primary health facilities, conducting deliveries, attending to sick newborns, and arranging timely referrals. Delivery performance at the primary health facilities has improved significantly, while pregnancy complications have been identified early and referred in time to first referral units for management. This initiative was piloted successfully under the Reproductive and Child Health Programme (RCH) in Phase I and now has been scaled up to cover the entire state.

**Shortening the three delays**

Steps taken to address the three delays, which play a critical role in maternal deaths, have had a positive impact. The first delay, in seeking appropriate care in time, accounted for 40% of maternal deaths in 2004. This delay has been shortened substantially by ensuring the availability of a skilled birth attendant at the primary level, through the 24×7 model.

Delay in reaching a first-level referral facility in case of complications, the second delay, accounted for 37% of maternal deaths. This delay has been tackled through provision of emergency transport. An initiative piloted in one district provided ambulance service through partnership with a non-governmental organization (NGO). The NGO manages and operates the service, with a vehicle provided by the government, free of cost to poor pregnant women and at a nominal fee for others. The success of this pilot initiative has paved the way for phased replication in 385 Blocks across the entire state. Selected NGOs receive new vehicles under the World Bank-supported Tamil Nadu Health Systems Project.

Provision of timely and comprehensive emergency obstetric and newborn care has effectively tackled the third delay, which had accounted for 23% of maternal deaths. This care is organized through a network of Comprehensive Emergency Obstetric and Newborn Care centres (CEmOC and newborn care centres). These facilities are accessible within an hour and provide all the crucial emergency obstetric and newborn care services around the clock. Currently, 62 CEmOC and newborn care centres are in operation, strategically located throughout the state, and more are being established.

The CEmOC and newborn care centres are equipped with the requisite equipment and human resources. All the personnel have been trained to provide the emergency obstetric services that these facilities offer. An obstetrician and a paediatrician are on stay-in duty at these centres around the clock, while an anaesthetist is on call duty. The centres also have the flexibility to hire in private anaesthetists if needed. To address the shortage of anaesthetists in government health facilities, a new initiative provides short-term training in anaesthesia for MBBS (Bachelor of Medicine and Bachelor of Surgery) degree doctors in the public health system.

A baseline survey on the operations of the CEmOC and newborn care centres was conducted in 2004–05, the teething phase of this programme. Results were positive:

- one third of the beneficiaries belonged to underprivileged sections of society;
- 78% of mothers came to the centres directly, an indication of widespread community awareness;
- 86% of the mothers could reach the CEmOC and newborn care centres within half an hour;
- 83% of the women admitted received services within half an hour, and another 12%, in half an hour to an hour;
- wrong referrals, resulting in delays in reaching the centres, had declined to 18% of cases;
- 19% of the deliveries were caesarean sections, indicating life-saving intervention in complicated deliveries.
A number of other measures designed to make the public health system vibrant have helped to improve maternal and newborn survival. Important among these are:

- infrastructure strengthening through upgrades of primary health facilities, providing communications support and flexible funding for regular maintenance and innovative initiatives;
- a committed and sensitized workforce, with continuous capacity upgrades, as well as rationalized allocation of human resource among public health facilities;
- assured availability of essential drugs at the health facilities through improved logistics;
- an effective health management information system;
- empowerment of frontline health care providers through skills upgrades, confidence building, and support for mobility for outreach;
- community sensitization to gender issues;
- on-going monitoring and review at primary, secondary, and tertiary care levels;
- a focus, albeit limited, on urban health;
- an adequate budget.

### Challenges ahead

While Tamil Nadu’s performance over the years in maternal and newborn health is impressive, the state faces a variety of challenges on the road ahead:

- sustaining and even accelerating the momentum gained in the past;
- overcoming the slow pace, or near stagnation, in the decline of the MMR and the infant mortality rate (IMR) in recent years;
- focusing attention on neonatal mortality and the high incidence of stillbirths;
- reducing regional disparities in maternal and neonatal health indicators;
- addressing the high incidence of higher order births in some communities;
- extending emergency obstetric care services to the entire state;
- replicating the innovative initiatives throughout the state;
- placing more emphasis on urban health issues;
- assuring continued budgetary support.

### About this monograph

This monograph documents the path pursued by Tamil Nadu in making pregnancy safer and the lessons learnt about improved maternal and neonatal health (MNH) outcomes. The Tamil Nadu experience, and the lessons learnt, can serve as useful pointers for designing and implementing similar programmes in other places.

Section 2, which follows, profiles the sociodemographic and economic features of the State of Tamil Nadu. Section 3 examines the environment in the state that enabled it to move toward achieving its vision. Section 4 focuses on how the state transformed rhetoric into reality in MNH interventions. Chapter 5 details the strengthening of public health systems in the state that supported improvements in MNH care. The last chapter looks to current challenges and future initiatives.

Case scenarios, an organization chart of the Department of Health and Family Welfare, and additional information on special topics follow.

### Data limitations

The information in this monograph comes from a desk review of relevant literature and the collation and analysis of available data from published and unpublished sources. Key informant interviews and selected site visits contributed insights from the field.

The scope of the monograph is, of course, affected by the extent of data available in secondary sources. Varying reference periods for different data sets are unavoidable, since information has been culled from different sources. Care has been taken, however, to present the latest information available.
Tamil Nadu is one of the most socially and economically developed states of India. It is bounded by the Bay of Bengal on the east, the Indian Ocean on the south, and the Arabian Sea on the west. Karnataka, Andhra Pradesh, and Kerala are the adjoining states. Tamil Nadu's mountain chains are the western ghats and the eastern ghats, while the river systems includes the Cauvery, running the breadth of the state, as well as the Palar, Pennar, Vaigai, and Tamiraparani rivers.

**Fig. 4: Map of Tamil Nadu**
Administration

Tamil Nadu is divided into 31 revenue districts, of which Chennai is entirely urban while the rest are a rural–urban mix (see Fig. 4). The Revenue Districts are subdivided into 206 taluks, spread over 385 development blocks. In each Revenue District a District Collector oversees all activities—revenue, development, and law and order.

Health administration in the state is organized through 42 Health Unit Districts (HUDs). These are usually but not always coterminous with Revenue Districts; a few Revenue Districts span more than one HUD. Each HUD is under the charge of a Deputy Director of Health Services (DDHS), while health administration at the level of the Revenue District is the responsibility of a Joint Director of Health Service (JDHS).

Socio-demographic scenario

Census 2001 estimated the state’s population at 62.4 million, up by 11.1% over the 1991 population.

The socio-demographic picture that emerged in 2001 is:

- the state is on the path towards population stabilization;
- 56% of the population inhabit rural Tamil Nadu, spread over 17,244 villages;
- the state is one of the most urbanized in the nation, with 27.5 million city residents (see Additional Information, Part 5, Urban health);
- population density averages 480 persons per square km, with urban density averaging over seven times the rural density;
- the imbalance in the sex ratio, which had grown over nearly four decades, reversed, with 987 females for every 1000 males born in 2001. The sex ratio varies greatly within the state, with half the districts reporting a sex ratio favouring females;
- the child sex ratio (0–6 years) declined, from 948 females for every 1000 males in 1981 to 942 in 2001, due to son-preference in some communities and consequent sex-selective abortions;
- adolescent females (10–19 years) constitute 18% of the female population, distributed equally between the 10–14 and 15–19 age groups;
- the older population is growing, with 8.8% of the total over the age of 65 years;
- overall, 73% of the population is literate, with females lagging behind males, 64% to 82%. The male–female literacy divide is greater in rural Tamil Nadu than in urban areas—55% for females versus 77% for males;
- the workforce participation rate in 2004–5 was 47.5% overall—35.5% for females and 59.5% for males. The female workforce participation rate is rising;
- compared with the national average, a higher proportion of socially underprivileged population strata—Scheduled Castes (SCs) and Scheduled Tribes (STs)—receive state support: 19% versus the national 16%.

Economy

Agriculture is the mainstay of nearly half the state’s population, directly in cultivation in their own lands or indirectly through wage labour. The vagaries of the monsoons, coupled with loss of arable land due to urbanization, have adversely affected the farm sector, shrinking the farmer’s average holding. The increasing marginalization and indebtedness of the farmers has given a push to rural–to–urban migration. While crop husbandry figures are down, an encouraging rising trend is seen in allied segments such as dairy, sericulture, floriculture, and horticulture.

The growth sectors are, however, the industrial and service sectors, aided by state policies that create a conducive environment. In the service sector the high-end information technology (IT) and other sub-sectors have witnessed rapid growth.

The incidence of poverty has been declining in the state over recent decades. Data from the latest National Sample Survey (2004) suggest that 22% of the state’s population is below the poverty line. In absolute numbers this amounts to roughly 140 lakh
(14 000 000) persons living in poverty. These figures need to be interpreted with caution, however, in view of controversies concerning the estimation of this statistic.

**Human development**

Tamil Nadu is one of the most advanced states in the country in terms of human development, largely due to its history of social reform movements and supportive state interventions. The state’s human development index (HDI) stood at 0.657 in 1999, compared with the nation’s 0.571. Over the last two decades, the state has moved up the ladder on the HDI, from seventh rank among states in 1981 to the third position in 1991, which it retained in 2001 as well. Variations among districts persist, however.

The extent of gender equality is greater in Tamil Nadu than on average in the country as a whole. The gender development index (GDI), based on key indicators such as per capita income, literacy rate, combined gross school enrolment ratio, and life expectancy at birth, is estimated at 0.654 for the state. By comparison, the national GDI was 0.553 in 1999. As with the HDI, regional variations in GDI exist in the state.

**The health scene**

**Health status**

Improvement in the health status of the population is evident in several key indicators:

- the crude birth rate is down from 31.4 per 1000 population in 1971 to 16.2 in 2006;
- a sharp decline in the total fertility rate, from 3.9 in 1971 to 1.7 in 2006, points to Tamil Nadu’s movement towards replacement-level fertility;
- the crude death rate has declined from 14.4 per 1000 population in 1971 to 7.5 in 2006;
- the maternal mortality ratio, at 90 per 100 000 live births in 1971 and 59 in 1990 to 37 in 2005 and 2006;
- the infant mortality rate has fallen significantly, from 113 per 1000 live births in 1971 and 59 in 1990 to 37 in 2005 and 2006;
- the neonatal mortality rate has declined by half in this period. In 1971 the rate was 53 deaths per 1000. In 1990 the rate was 44. By 2005 it had fallen to 26;
- the percentage of deliveries taking place in institutions has risen from 67% in 1993–94 to 98% in 2007–08;
- life expectancy at birth has improved, from 58.2 for males and 57.8 years for females in 1981–86 to 67.0 and 69.8 years in 2006, putting the state on a par with a number of developed countries.

Major indicators related to maternal and child health show that the situation in Tamil Nadu is considerably better than that in India as a whole (see Table 1).

Prominent among Tamil Nadu’s other achievements in health are:

- eradication of guinea worm;
- impressive performance in controlling vaccine-preventable diseases;

| Table 1: Major demographic and health indicators, Tamil Nadu and all India, 2006 |
|-----------------|-----------------|-----------------|
| Indicator       | Tamil Nadu      | India           |
| Birth rate      | 16.2            | 23.5            |
| Infant mortality rate | 37              | 57              |
| Under 5 mortality rate | 50              | 94.9            |
| Maternal mortality ratio | 90              | 301             |
| Sex ratio (females per 1000 males) | 987             | 933             |
| Child sex ratio (ages 0–6) | 942             | 927             |
| Life expectancy at birth | male 67.0 | female 69.8 | male 64.1 | female 65.4 |
near-elimination of leprosy;
- a consistent effort to tackle tuberculosis and cataract blindness;
- special attention to mental health issues and adequate care for the mentally ill;
- prevention of disabilities and rehabilitation of the disabled.

There are, however, several challenges that face the public health system, including:
- a slowdown in the decline in infant mortality in recent times;
- a disturbingly high incidence of stillbirths despite the high rate of institutional deliveries;
- emerging lifestyle disorders and road traffic accidents;
- insufficient outreach support for the vulnerable strata of society in remote areas;
- the persistence of communicable diseases and resurgence of non-communicable diseases.

### Public health infrastructure

The health care needs of the Tamil Nadu population are met by:
- a state-wide infrastructure of health facilities in the public sector;
- hospitals, including corporate hospitals, nursing homes, and medical practitioners in the private sector, mostly serving metropolitan or urban areas;
- hospitals run by non-government organizations (NGOs) or trusts, also largely in semi-urban and urban areas. These organizations run a few clinics or mobile units in rural areas as well.

The practice of self-medication and reliance on local chemists and druggists is prevalent.

Since data limitations preclude in-depth examination of the contribution of the private and NGO sectors, discussion here is confined to the public health system.

Tamil Nadu has a vibrant public health system with a committed public health cadre. The health facilities in the public sector operate at three levels:
- **Primary**—Primary Health Centres (PHCs), Community Health Centres (CHCs), and Health Sub-Centres (HSCs);
- **secondary**—district headquarters hospitals, taluk and non-taluk hospitals and dispensaries;
- **tertiary**—teaching hospitals and specialty hospitals.

The mix at the facility level has undergone continuous change in the past two decades through upgrades and expansion (see Table 2).

The primary level network of PHCs and HSCs has, over the years, offered preventive, curative, and rehabilitative services, essentially to the rural population. Currently, 1421 PHCs are in operation, with 8683 HSCs functioning in their command areas. The PHC/HSC grid in the state by and large meets the national norm—one PHC for every

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### Table 2: Mainline public health facilities in Tamil Nadu

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<td>Teaching hospitals</td>
<td>32</td>
<td>14,689</td>
<td>33</td>
<td>16,374</td>
</tr>
<tr>
<td>District HQ hospitals</td>
<td>15</td>
<td>4,641</td>
<td>22</td>
<td>6,609</td>
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<td>Taluk hospitals</td>
<td>117</td>
<td>6,156</td>
<td>121</td>
<td>7,550</td>
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<td>Non-taluk hospitals</td>
<td>108</td>
<td>9,095</td>
<td>72</td>
<td>2,014</td>
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<td>PHCs and CHCs</td>
<td>392</td>
<td>2,298</td>
<td>1386</td>
<td>5,208</td>
</tr>
<tr>
<td>Health sub centres</td>
<td>ND</td>
<td>ND</td>
<td>ND</td>
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PHCs (Primary health centres); CHCs (Community health centres) ND (not determined)

**Source:** Directorate of Medical Education, Directorate of Medical and Rural Health Services, Directorate of Public Health and Preventive Medicine
30,000 population in plains and every 20,000 in hilly and tribal areas, and one HSC for every 5000 population in plains and every 3000 in hilly and tribal areas. Variations among centres in the size of their command areas are not uncommon.

At the secondary level a variety of hospitals operate, with varying levels of infrastructure and support facilities, and personnel with different skill levels. The numbers of these facilities and of their personnel have increased over the years. Besides offering curative services, these hospitals serve as referral facilities.

At the tertiary level teaching hospitals, including a handful of specialty hospitals, are the highest-level medical institutions.

In addition to these facilities there exist auxiliary facilities, such as TB hospitals, clinics and centres, employees state insurance (ESI) hospitals and dispensaries, leprosy hospitals, and women and children’s hospitals.

Besides these public health facilities, there is a vast network of health care providers in both the private and NGO sectors (formal and informal health care providers) with facilities dispersed across the state but located largely in metropolitan and other urban areas.

**Health human resources**

Sanctioned positions of different skill categories associated with service delivery or with support services, such as managerial, supervisory, and basic services, in the public health system numbered over 84,000 in 2006.

These personnel can be broadly grouped into four categories (see Fig. 5):

- **medical workforce**—doctors and specialists, such as obstetricians, gynaecologists, paediatricians, and anaesthetists;
- **nmw (nursing and midwifery workforce)**—nursing staff and also auxiliary nurse-midwives;
- **para medical workforce**—an amorphous group of pharmacists, optometric assistants, lab technicians, etc.;
- **mas (managerial, administrative, and support workforce)**—a mix of managers, such as directors and additional/joint/deputy directors, as well as support staff in administration, accounts, data-gathering and analysis, and such ancillary services as driving, office maintenance, and security.

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**Fig. 5: Numbers of positions in public health system of Tamil Nadu, by category, 2006**

<table>
<thead>
<tr>
<th>Human resources in public health sector</th>
<th>medical 11017</th>
<th>nmw 23657</th>
<th>para 21058</th>
<th>mas 28684</th>
</tr>
</thead>
</table>

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**Profile of Tamil Nadu**
Three strands

The force propelling Tamil Nadu’s march towards making every pregnancy safer has been a favourable sociopolitical climate. Three strands combined to create this climate. These three vital strands are:

- social reforms;
- gender advancement;
- political commitment to women-centred policies (see Fig. 6).

A commingling of these forces has enabled the public health system to respond with women-focused policies, programmes, and interventions that have helped significantly improve women’s health status.

Social transformation

The dawn of the preceding century saw a steady rise in social activism in the state. The movement led by E.V. Ramasamy Naicker, popularly known as “Periyar”, had a massive impact on the society through his South Indian Liberal Federation. Also, he founded the Self-Respect Movement in 1925 and the Dravidar Kazhagam in Tamil Nadu.

Periyar’s movement was essentially a politico-social movement aimed at ensuring equal rights for all sections of the society. It advocated the representation of communities in state governance and administration proportionate to their population size. The overall purpose was betterment of the community. The South Indian Liberal Federation, or Justice Party, promoted this concept and emphasized intellectual emancipation and a healthy worldview. An egalitarian social order was the goal, to be achieved through abolition of the hierarchical, grade-based, birth-based caste structure.

This reformist movement essentially called for:

- moving away from harmful superstitions, traditions, customs, and habits;
- dispelling ignorance;
- stimulating changes to meet the requirements of the changing times.

In the late 1920s the followers of this group—the Self-Respecters—performed marriages without Brahmin priests and without any religious ceremonies, contrary to the prevailing custom. Instead, respected persons of the locality, mostly

---

1. Dravidar Kazhagam is a sociocultural movement that aims at establishing an egalitarian society by eradicating the system of Varna Jathi (casteism) and by creating conditions in which different segments of the population, including women, have equal status, rights, and opportunities in all walks of life.
political leaders, presided over such marriages. There was no legal sanction for such marriages, but they were recognized as “self respect marriages”. In 1967 the Tamil Nadu government headed by the Dravidian party legalized such marriages.

Important social offshoots of this movement were:
- emphasis on equality between the sexes;
- encouragement of inter-caste and widow marriages;
- a rise in female age at marriage.

The beneficiaries were particularly people belonging to the poorer strata of society.

In terms of women’s health, three crucial principles emphasised by Periyar have immense significance:
- encourage women not to marry before 22 years of age;
- encourage women to avoid having many pregnancies and births too close together;
- promote contraception to liberate women from frequent childbearing.

The initial push given by Periyar for raising the age at marriage and promotion of contraception have continued to receive support from successive political parties in the state.

**Gender advancement**

Tamil Nadu has the pride of a legend in Dr Muthulakshmi Reddy (1886–1968), who, alongside Periyar, first addressed gender concerns and launched advocacy for women’s advancement and gender equality. Dr Reddy fought constantly for the emancipation and uplifting of women in India.

Facing opposition from many quarters, Dr Reddy enlisted the support of no less a personage than Mahatma Gandhi when she sought to liberate devadasi women from the tyranny of their tradition. Gandhiji made public speeches and wrote in his published columns in support of Muthulakshmi’s efforts to raise the status of women in India.

Dr Muthulakshmi Reddy (1886–1968) was one of India’s most distinguished women of her time. She was the first woman to be admitted as a medical student at the Madras Medical College. She was also the first woman nominated to the Madras Legislative Council, where she was elected Deputy Chairman. She was founder–president of the Indian Women’s Association and became the first alderwoman of the Madras Corporation.

Dr Reddy was thus the prime mover behind the legislation that abolished the devadasi system in 1929 and played a key role in raising the minimum age of marriage for girls in India. The Dr Muthulakshmi Reddy Maternity Benefit Scheme is an offshoot of her efforts. Through this scheme the Government of Tamil Nadu provides Rs. 3000 during pregnancy to every woman below the poverty line and another Rs. 3000 in the postpartum period. The money makes up for lost wages and helps poor women maintain good nutrition, thus avoiding low birth weight of babies.

Despite such emphasis on social reforms and the political support that they received, the pace of transformation in the status of women has been quite slow. The social milieu and traditional beliefs and misconceptions were the major barriers. Gender inequality, the inadequacy or lack of women’s decision-making power, and also strong son–preference in some communities have placed women in a relatively disadvantaged position. In these circumstances women naturally had limited ability to make their own reproductive choices.

It is only in recent years that women are moving, albeit slowly, towards realization of their rights. Awareness-raising in various forums, gender sensitization sessions for men, and facilitation of women’s self-help groups have imparted momentum to women’s advancement.

**Literacy improvement**

The advancement of literacy emphasized by social reformers has received a boost from political commitment. That commitment is based on the
conviction that a child’s development is linked with social progress. “Education for all” has been encouraged to ensure harmonious development of a child’s personality in an atmosphere of happiness and love and in a spirit of peace, dignity, tolerance, freedom, and equality.

Universal elementary education in the age group of 6 to 14 years has been the primary intent of the programme sponsored by the Government of India, known as the Sarva Shiksha Abhiyan. The objectives of the programme are:

- by 2007 all children would be completing five years of primary schooling;
- by 2010 all children would be completing eight years of elementary schooling;
- to assure good-quality elementary education, with emphasis on education for life;
- to close gender and social gaps at the primary stage by 2007 and at the elementary education level by 2010.

Tamil Nadu has initiated several welfare measures to help meet these goals, including:

- free supply of text books to all children studying in government and government-aided schools, including self-financing sections in aided schools and children studying in recognized but self-financing institutions adopting the state syllabus;
- free supply of uniforms for Noon Meal Scheme beneficiaries in Standards I to VIII;
- free bus passes to facilitate school access for students in Standards I to XII.

Statistics on school enrolment and retention point to the success of the state's efforts in education:

- the net enrolment rate (NER) has increased to 99.3% at the primary level;
- the NER is 98.3% at the upper primary level;
- dropout rates at primary and upper primary levels, at 1.9% and 4.1% respectively, in 2006–07 were nearly half of the previous year’s levels and just 13% of the levels in 2002;
- the dropout rates of girls and boys are similar, with the rate for girls slightly lower than that for boys at both primary and upper primary levels.

**Nutrition schemes**

Nutrition has always been high on the political agenda in the state. Many nutrition programmes for young children and mothers have been implemented in recognition of the fact that social investment in nutrition will reduce health care costs, reduce the burden of non-communicable diseases, improve productivity and economic growth, and promote education.

A school mid-day meals scheme has operated since 1956, when it began in 8000 elementary schools and covered 2 lakhs (200 000) children. Started initially with voluntary contributions, the scheme has been funded subsequently by the government. In 1961 coverage was extended to 16 lakhs (1 600 000) children in 30 000 schools. In 1967 the system was radically modified to operate through Central Kitchens, where food was cooked and packed in polythene packets. Vehicles deliver these packets to the schools 200 days a year.

The mid-day feeding through the Noon Meal Programme was expanded significantly in 1982 during the administration of the former Chief Minister Dr M.G. Ramachandran, who felt that no child should go hungry. At first the State focused on the difficult-to-reach rural pre-school age group, 2 to 5 years, who cannot be covered in the centres unless brought there by an adult. Subsequently, urban pre-schoolers in this age group were also covered through a network of centres. At a later stage older school children in rural areas, up to 15 years of age (i.e. class X), were also brought under the scheme.

Despite bureaucratic doubts about funding and logistics, personal commitment and political will contributed to the success of this ambitious programme. Successive governments have continued to commit very significant portions of the state’s budget to this programme. This programme, with its strong “food bias”, has caught the imagination of the Government of India, which is now starting to support similar efforts in all states.
While the scheme was initiated as a feeding programme, over the years the State has tried to include other services, such as health care, immunization, growth monitoring, pre- and postnatal care, and communication and nutrition education, along with feeding. This has been done through two main nutrition and child development programmes—the Integrated Child Development Services Scheme (ICDS), started as a small pilot project in 1976, and the Tamil Nadu Integrated Nutrition Project (TINP), which began in 1980. Both these nutrition schemes were subsequently integrated with the Noon Meal Programme infrastructure for pre-schoolers.

The state government has continued to emphasize complementary feeding and at the same time has brought about an integration of all major health and nutrition interventions for children. In 1994 a State Policy on Nutrition was drafted with technical support from UNICEF. Tamil Nadu was probably the first Indian state to have such a policy, following the National Nutrition Policy, 1993.

**Age at marriage**

Social reforms, gender advancement, and nutrition and education reforms have had the positive impact of raising the age at marriage for girls (see Fig. 7) and drawing greater attention to women’s health status. The emphasis on delayed marriage, contraception, birth spacing, and regulation of family size was the harbinger of the family planning programme introduced throughout the country by the Government of India.

**Political commitment, policies, and programmes**

Tamil Nadu has been fortunate that there has been adequate realization, on the part of the political establishment, of the importance of improving women’s health in general and maternal health in particular. This realization is reflected in the continuing political commitment and policy support for the various health initiatives over the years, regardless of which party was in power.

**Tamil Nadu Public Health Act**

Tamil Nadu was the first state in India to enact a law relating to public health—the Tamil Nadu Public Health Act, 1939. The State enacted the law under the stewardship of the then Honourable Minister for Health Dr T.S.S. Rajan. The Act was amended in 1941, 1944, 1958, and 1970.

The Tamil Nadu Public Health Act, 1939 places health at centre stage in the development of the people of Tamil Nadu. It also assures continuing emphasis on health regardless of the political party in power. Section 82 under Chapter VIII of the Act deals specifically with maternity and child welfare.

This Act provides for:

- formulation of policies for improving the health of the people, especially women and children;
- cost–sharing between the Government of Tamil Nadu and local government bodies, at the ratio of 1:2, in urban areas;
- cost–sharing between the Government of Tamil Nadu and the Government of India for better funding of health services in rural areas, in varying proportions depending on the activities.

**Policy transition**

Public health policy regarding family planning underwent a paradigm shift beginning in the 1980s.
Two sets of objectives were set forth for family welfare programmes and, thus, for their services:

- macro objectives, which are basically demographic, aimed at arresting population growth and lowering fertility by use of contraceptives;
- micro objectives focused on families and their welfare.

This shift acted as a forerunner for maternal and child health (MCH) policies.

India’s Family Welfare Programme (or Family Planning Programme, as it was known earlier) was launched in the mid-1950s. The programme was entrusted to the Ministry of Health, Government of India. It was a low-key programme at this stage and not well funded.

A decade after its inception, the Family Planning Programme attracted the attention of the large international donors. In 1966 the arrival of a UN Advisory Mission precipitated an increase in international funding for family planning programmes.

Accepting the advice of the UN Mission, the Government of India created separate directorates within the central and state ministries and departments of health, renaming them as those of Health and Family Planning. The nation’s top priority at that time was population control, with fertility reduction dominating the health services agenda.

In 1977 there was widespread dissatisfaction with some of the means adopted by the programme. The programme was renamed the Family Welfare (FW) Programme, bringing within its fold the Mother and Child Health (MCH) Programme. The emphasis in the late 1980s through mid-1990s was survival of mothers and children.

These changes at the national policy level spurred the Tamil Nadu government to initiate policy reforms relating to MCH. The Government of Tamil Nadu capitalized on the opportunity provided by the nationwide Child Survival and Safe Motherhood Project (CSSM).

The child survival and safe motherhood project

The child survival and safe motherhood project, funded by the World Bank, operated country-wide with the overall objectives of:

- shifting India’s family welfare programme from its nearly exclusive concern with fertility regulation to a focus on MCH;
- providing a social safety net during the period of financial stringency and economic reforms.

The project was approved on 17 September 1991 and made effective on 5 March 1992. The credit was closed on 30 September 1996.

The specific objectives of the project were to:

- increase child survival;
- promote safe motherhood, including establishing first referral units (FRUs) for secondary-level care of mothers and their newborns;
- strengthen the delivery of services by improving institutional capability.

An important landmark in improving the quality of health of mothers and children in the state was the issuance of Government Order (GO) Ms No. 353 Health and Family Welfare Department, dated 30 May 1995, with retroactive effect from 1 June 1994. The crux of this GO is a significant change in emphasis in the Family Welfare Programme from a target orientation to the target-free approach. The impact of this GO is examined in Chapter 4.

The operationalization of MCH and FW policy reforms were taken further through both centrally sponsored and externally funded projects in the public health sector in Tamil Nadu.

India population project funded by the World Bank

The India Population Project (IPP V) was approved on 21 June 1988, and the credit was closed on 31 March 1996. Initially, the project covered India’s second and fourth largest urban agglomerates—Bombay (Maharashtra), Greater Bombay Municipal Corporation and Chennai, Chennai Municipal
Corporation (Tamil Nadu) and four adjoining smaller municipalities. In 1990 the geographic coverage expanded to include Navi Mumbai Municipal Corporation in Mumbai and all urban areas in Tamil Nadu with populations of more than 100,000.

The objectives of IPP V were to:

- expand family welfare services, with emphasis on MCH, birth spacing, and increased use of temporary contraceptive methods;
- improve the quality of family welfare services;
- strengthen the capacity of Greater Mumbai, Chennai City, and Chingleput District in Tamil Nadu to plan, manage, and implement family welfare programmes in the urban areas;
- increase the participation of private voluntary organizations (PVOs) and private medical practitioners in urban family welfare programmes.

**Danida-supported area development project on health in Tamil Nadu**

The Danish International Development Agency (Danida) supported the health and family welfare programmes in Tamil Nadu for over two decades (1981–2003). The period of coverage paralleled a phase of substantial development in Tamil Nadu’s health policy framework, with a sharpened focus on the delivery of primary health care, particularly to the rural poor.

The Danida project commenced with the coverage of two districts—Salem and South Aroct—but eventually supported health and family welfare activities in eight Revenue Districts (10 Health Unit Districts) along with support to selected statewide activities—systems strengthening in human resource development, essential drug supplies, and the Health Management Information System (HMIS) (see Chapter 5).

**Reproductive and Child Health (RCH) Project, Phase I**

This nationwide World Bank funded project began in mid-August 1997. Its development objective was assisting the Government of India to improve the performance of its Family Welfare Programme. The work aimed at reducing maternal and infant mortality and morbidity and unwanted fertility, thereby eventually contributing to population stabilization.

Built on the successes of the Universal Immunization Programme, the Child Survival and Safe Motherhood Programme, and the Family Welfare Programme, RCH I aimed at providing high-quality care, empowering the community to demand better health services, and substantially improving the performance of the health care delivery system. RCH I covered all aspects of women’s health across their reproductive lifecycle from puberty to menopause.

The broad objectives of the project were to:

- improve the health status of women, adolescents, and children;
- improve women’s health care-seeking behaviour;
- increase the credibility of service providers by improving quality of care.

In Tamil Nadu RCH I was implemented in two Districts—Madurai and Theni. The RCH programme enabled the State to pilot innovative MCH initiatives and helped with scaling these up subsequently, in RCH II, to cover the entire state.

**National Population Policy, 2000**

The national government’s commitment to voluntary and informed choice and to the consent of citizens in availing themselves of reproductive health care services was affirmed in the National Population Policy, 2000 (NPP 2000), along with continuation of the target-free approach to providing family planning services. NPP 2000 provides the policy framework, for the current decade, for meeting the reproductive and child health needs of the people of India and achieving net replacement-level fertility by 2010.

The policy emphasizes the need for:

- addressing simultaneously issues of child survival, maternal health, and contraception;
increasing outreach and coverage of a comprehensive package of reproductive and child health services by government, the for-profit sector and the voluntary non-governmental sector, working in partnership.

**Reproductive and Child Health Programme, Phase II**

The outcomes envisioned in NPP 2000, the Millennium Development Goals (MDG), the Tenth Plan Document (2002–2007), and the National Health Policy 2002, as well as the lessons of RCH I, were built into the vision of the RCH II programme, which was launched in 2007.

The development objective of RCH II is expansion of the use of essential reproductive and child health services of adequate quality with a reduction in geographic disparities. The salient features of RCH II are:

- an integrated vision, addressing family planning, maternal and newborn/child health, adolescent health, and control of reproductive tract and sexually transmitted infections (RTI/STI control);
- a comprehensive sectoral approach;
- partnership with private and NGO sectors;
- institutional strengthening, decentralized planning, and devolution of state ownership;
- a results-based approach, focusing on outputs and outcomes.

RCH II covers the entire state of Tamil Nadu and has the following objectives:

- reduction of Maternal Morbidity and Mortality (MMR);
- reduction of Infant Morbidity and Mortality (IMR);
- reduction of under-5 morbidity and mortality;
- reduction of the total fertility rate;
- promotion of adolescent health;
- control of RTIs/STIs/cancer.

RCH II interventions have made a significant contribution to the state’s progress towards making pregnancy safer. These are discussed in the next chapter.

The RCH programme has received the strong support of the Tamil Nadu government, which has provided all the necessary policy initiatives and resources for implementing the various interventions under the programme. This support is reflected in the Health Policy Notes submitted to the Legislative Assembly every year by the Honourable Health Minister of the Government of Tamil Nadu (see box).

**National Rural Health Mission (NRHM)**

The National Rural Health Mission (NRHM), launched in 2005 and funded by the Government of India, aims (1) to make structural changes in the health system that will enable it to effectively handle increased allocations and (2) to improve management and service delivery policies. The goal is to improve the health of the people, especially those living in the villages. The vision is to provide universal access to equitable, affordable, and good-quality health care services, accountable to the needs of the people. The NRHM will be in force from 2005 to 2012.

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**The role of the state legislature**

All health initiatives are implemented in the state only after they are presented, along with the budgetary implications, in the state Legislative Assembly each year in the Policy Note by the Honourable Health Minister of the Government of Tamil Nadu. This Policy Note is discussed at the Assembly sessions and duly passed.

Also, the Honourable Finance Minister of the Government of Tamil Nadu incorporates the financial requirements into the state budget and presents it to the state Legislative Assembly every year for approval.

Only after these approvals does the state government issue the necessary Government Orders (GOs) for implementing the various health initiatives.
The objectives of NRHM are:

- providing universal access to public health services—women's health, child health, safe drinking water, sanitation and hygiene, nutrition, and universal immunization;
- prevention and control of communicable and non-communicable diseases;
- population stabilization, addressing gender and demographic factors;
- providing access to integrated and comprehensive primary health care;
- revitalizing local health traditions and mainstreaming the Indian System of Medicine (ISM);
- promotion of healthy lifestyles.

The NRHM has not only lauded Tamil Nadu's achievements in the health field, in particular in improving maternal and newborn health, and has even suggested replication of the state's health interventions in other states in the country.

The continuing support of the NRHM and the Government of Tamil Nadu give added strength to the commitment of the RCH Directorate, whose Project Director has been renamed Mission Director. The commitment of the state government with support from the NRHM assures that the RCH initiatives will continue beyond the programme period.

**Lessons learnt**

Tamil Nadu's experience in dealing with women's health issues in general and maternal and newborn health issues in particular has revealed that:

- an enabling environment will help propel women-centred initiatives;
- political consensus, regardless of parties in power, is essential to fuel such initiatives. In the state the Tamil Nadu Public Health Act, 1939 placed health at centre stage, supporting further policy changes;
- centrally driven policies and programmes in family welfare have had an impact on the state's priorities, even though health is a state responsibility;
- Tamil Nadu utilized the opportunities for policy reforms in MCH and FW provided by externally funded and centrally funded programmes and projects. These programmes and projects provided space for pursuing the state's priorities;
- project funding was seen as a means for policy reform to improve service delivery to mothers and children, as well as for strengthening institutions;
- Tamil Nadu's FW and MCH policy reforms, particularly the target-free approach to FW and the MCH route to achieving FW goals, contributed to the design of the RCH Project, Phases I and II, and the National Population Policy, 2000.
The Constitution of India states in its Directive Principles that:

The enjoyment of the highest attainable standard of health is one of the fundamental rights of every human being, without distinction of race, religion, political belief, economic or social condition.

The government of Tamil Nadu has set its health goals, including stabilization of population size by 2010, based on these principles. Most importantly, Tamil Nadu’s Health Policy 2003 focuses on greatly improving access, equity, and quality of care and on reforming health care financing.

Key initiatives

Public health facilities and health services have played key roles in improving the health status of the population in the state. Initiatives contributing to these improvements, and particularly to safer pregnancy and childbirth, are listed below. Other chapters describe these initiatives in more detail.

Infrastructure, staffing, and services at facilities

- Primary Health Centres (PHCs) offer local access to skilled obstetric services and referral for complications. Three nurses on eight-hour shifts assure 24 hour a day care. Laboratory equipment and operating theatres have been upgraded in these centres. Annual grants support maintenance of the PHCs and other primary-level facilities;

- comprehensive Emergency Obstetrics and Newborn Care (CEmOC and newborn care) centres handle obstetric emergencies day or night, with obstetricians, gynaecologists, anaesthetists, and paediatricians always available;

- anaesthetists, obstetricians, and paediatricians from the private sector are hired in as needed to fill staffing gaps at CEmOC and newborn care centres;

- more doctors from PHCs and secondary-level hospitals are being trained in anaesthesia skills for emergency obstetric care;

- ambulance services transport emergency obstetrics cases to health facilities. A referral control room in each district takes emergency calls and coordinates ambulance services and blood supply;

- blood banks stay stocked with all blood groups year-round, thanks to regular blood donation drives and lists of donors willing to contribute blood in an emergency;

- the birth companionship programme allows a woman who is delivering to have a female relative or friend with her at the health facility;

- many centres that offer basic emergency obstetric and newborn care also conduct family health clinics on Mondays, Wednesdays, and Fridays, providing laboratory tests for RTIs/STIs and voluntary HIV testing and counselling;

- facilities are continuously monitored and periodically evaluated.
Outreach

- Village Health Committees, established in the 1990s in all Health Sub-Centres, participate in planning and implementing all health programmes. Also, these committees and the panchayats play an important role in multimedia communication campaigns to improve health-seeking behaviour and to change health-related practices. Under the RCH II programme these Village Health Committees have become Village Health and Water Sanitation Committees, with enlarged scope. A revised norm calls for such committees in all villages with populations over 1500 to bring together community leaders and village officials on board;
- Mobile medical units have been established to serve coastal and difficult-to-reach villages. As per schedule, the mobile units offer the entire range of reproductive health services, including antenatal, postnatal, and newborn care and family welfare services, as well as other health services;
- The PHCs and their field staff conduct regular outreach services to meet the needs of various health programmes;
- Trained “health link volunteers”—one woman for every 1000 population—in the tribal areas serve their communities by providing information on healthy practices and available health services, identifying and referring high-risk pregnancies, treating minor ailments, and performing various other functions;
- Poor mothers receive six months of financial aid for nutritious food during pregnancy and to compensate for lost wages.

Current plans and proposals for scaling up

To continue progress, diverse initiatives will be scaled up:
- To address adolescent reproductive and sexual health issues, adolescent-friendly services will be established throughout the state, scaling up from a pilot project.
- The programme will combine special times and days for adolescents in public health institutions, counseling, and outreach to school children, college students, and youth working in industries;
- PHC medical officers will receive training on MVA, tubectomy, obstetric sonography, anesthesia, emergency obstetric and newborn care, breast and cervical cancer detection, colposcopy, and blood bank operations;
- Staff nurses and auxiliary nurse-midwives at PHCs will be trained in basic emergency obstetric and neonatal care, integrated management of neonatal and child illnesses, adolescent-friendly services, detection of breast and cervical cancer, and skilled birth attendance;
- Efforts to prevent and control gestational diabetes will include training for doctors, adequate supply of drugs for the PHCs, and awareness-raising in the community;
- A multifaceted programme will seek to reduce disabilities among newborns. The efforts will include rubella vaccination for all adolescent girls, screening of high-risk newborns, training medical and paramedical staff, and organizing referral clinics in district hospitals;
- All PHCs will receive computers to help with data entry and transmission;
- Each family will receive an electronic “smart cards” that stores their health information. A pregnant woman will receive a similar card, and all maternity benefits will be claimed and monitored through the card.

Also, several new initiatives are proposed:
- Maternity waiting homes would be set up in remote and tribal areas, so that women could avoid the travelling to a health care facility, rather than risk lengthy and difficult travel that could prove fatal in an emergency;
- RCH Centres of Excellence would be set up in several institutions. They would serve as the primary training institutes on reproductive health for personnel at all levels—not just from Tamil Nadu but from throughout India.
Strategic issues

On the demographic front, the family welfare interventions have contributed to population stabilization. Similarly, there has been a steady decline in the infant mortality rate and the maternal mortality ratio over the years. During the decade of the 1990s, however, the rates of decline in IMR and MMR have slowed.

On the epidemiological front, most of the infectious diseases that once took a heavy toll of lives and well-being have been largely contained. New health conditions have come into prominence, however, such as HIV/AIDS, non-communicable diseases, lifestyle disorders, mental illness, injuries, and road traffic accidents. Overall, therefore, the burden of disease in the state has not fallen significantly.

On the infrastructure front, significant gains have been made, but uneven distribution and underserved pockets remain in the state, resulting in inequity.

Finally, health care costs in both the public sector and the private sector have been increasing, straining the state exchequer and family incomes.

Clearly, there is scope for improvements in health service delivery in the public sector. Improved planning and management of health services, with the goals of improving access, equity, quality, and health care resources, is a major focus of policy. Despite undoubted advances and achievements in demographic, epidemiological, and infrastructural indicators over time, Tamil Nadu's health system faces such challenges as regional disparities in health status, differentials in access to health service delivery, distributional issues in health resources, and inadequacies in quality of care, planning, and management. The possibility of public–private partnerships that improve health service delivery also needs to be explored, drawing on the experience already gained in the state.

Infant and maternal mortality

A key focus of policy is maternal and child health. The state saw a significant decline in the IMR between 1971 and 1989, from 113 to 52 per 1000 live births. During the 1990s the rate of decline slowed. By 2006 the IMR in the state was 37. While a perceptible decline in post-neonatal mortality has been achieved, the neonatal mortality rate has remained stubbornly high. Rates of early neonatal mortality, in particular, have been practically stagnant. This rate was 33.8 in 1971 and 32.1 in 2002.

Substantial success has been achieved in the state in improving the quality of ante-natal care and in promoting institutional delivery. Currently, 90% of deliveries are institutional, and 99% are attended by trained personnel. The MMR was 90 in 2006—a considerable improvement over earlier levels. The main factor behind maternal mortality reduction is the capacity building to ensure readily accessible emergency obstetric care round-the-clock throughout the state.

Gender and health

It is recognized that women are unequally placed in Indian society. Patriarchal structures and value systems inhibit women's access to health facilities and services in various ways. Women and girl children also face nutritional discrimination within the household, even while carrying an inordinate share of the burden of household work. Adolescent girls are particularly vulnerable. They are poorly served by government programmes because they fall between programmes dealing with children and those for mothers. The resulting gender discrimination in health care leads to poorer health outcomes for females. The female IMR is higher than the male IMR in the state, the incidence of anaemia is greater among women, especially among adolescent girls, and so on.

The issue of gender discrimination in health needs to be addressed. Resulting improvements in women's health today will have substantial benefits for the health of the next generation, both men and women. (See Community sensitization on gender-related health issues, p. 47).
Tamil Nadu has adopted a threefold approach to ensuring safer pregnancy and newborn survival:
- reduce the likelihood that a woman becomes pregnant when she does not wish to;
- reduce the likelihood that a pregnant woman experiences a serious complication of pregnancy or childbirth;
- reduce the likelihood of death among pregnant women who experience complications.

The core strategy developed to achieve these objectives has three corresponding strands:
- prevention and termination of unwanted pregnancies;
- promotion of good-quality antenatal care and institutional deliveries—that is, routine essential obstetric care and additional care as needed;
- promotion of access to good-quality emergency obstetric care at the first referral level—that is, specialized obstetric care.

Path 1: Prevention and termination of unwanted pregnancies

Fertility reduction

Reduction in the likelihood or frequency of a woman's becoming pregnant is an effective way to lessen the number of maternal deaths. The Family Welfare Programme plays a key role here.

As mentioned in the previous chapter, the Family Welfare Programme (earlier known as Family Planning Programme) shifted emphasis from fertility reduction to protection of the health and survival of mothers and children. The target–driven, method–specific approach that dominated the scene before 1995 has since moved towards what is popularly known as “the MCH route to family welfare”, with its target–free approach, choice of contraceptive methods, and planning based on expected level of demand as determined by community needs assessment. Under this approach the decline of fertility has continued but at a slower rate than the dramatic decline between 1980 and 1990.

Through successful implementation of the Family Welfare Programme, Tamil Nadu has ushered in a demographic transition toward the replacement level of fertility. Two key indicators chart the impressive achievements over the years (see Fig. 8):
- the Total Fertility Rate (TFR) has declined markedly, falling from 3.9 in 1971 to 2.0 in 2000 and, further, to 1.7 in 2005;
- similarly, the Crude Birth Rate (CBR) is on a downward curve, falling from 31.4 in 1971 and 19.3 in 2000 to 16.2 in 2006.

Unmet need

Despite the achievements of the Family Welfare Programme and a progressive decline in fertility over the years, there still exists an unmet need for family welfare services. The National Family Health Survey 2 (NFHS 2) estimated such unmet need at 13.0% of married women of reproductive age in Tamil
Nadu in 1998–99. By 2005–06 (NFHS 3) unmet need appeared to have declined to 9%. By comparison, NFHS 3 estimated the unmet need for family welfare services at the national level at 13% in 2005–06.

Regional disparities persist within the state. In some areas a relatively large number of women giving birth already have two or more children. The Government of Tamil Nadu took a policy decision in 2003–04 to emphasise permanent methods of contraception in these areas and to emphasize spacing methods in other areas. The objective is to arrive at levels of demand for contraception throughout the state that will reduce regional disparities.

Termination of unwanted pregnancies: access to safe abortion services

Women provide emotional, physical, and economic support for their families. The death of a mother is one of the most traumatic events that can befall a family. Deaths and severe illness due to unsafe abortion, which women may resort to when pregnancy is unwanted, need to be prevented at any cost.

Abortion is not unique to Tamil Nadu. It is a universal phenomenon. Women have always sought to terminate pregnancy through abortion, whether by a formally trained health care provider or an informal health care provider. Despite increased use of contraception, the demand for abortion persists.

India was one of the first countries in the world to legalize abortion, promulgating the Medical Termination of Pregnancy (MTP) Act in 1971. Tamil Nadu followed suit with a similar act in 1971 and the Medical Termination of Pregnancy Rules, 1975, which provide for termination of certain pregnancies by registered medical practitioners.

Despite this, unsafe abortions do continue. In these cases women resort to unsafe abortions either due to lack of knowledge or access to safe abortion services or for fear of stigmatization if they openly visit a health facility for this service.

An estimated 150 000 unwanted pregnancies occur each year. By comparison, statistics show that about 65 000 to 68 000 MTP procedures are performed annually (see Fig. 9). Thus, only 43% to 45% of unwanted pregnancies are safely terminated. Most of the remainder of these unwanted pregnancies result in births, but in too many instances women resort to unsafe, clandestine abortion—sometimes with dire consequences. Analysis of verbal autopsies has revealed that lack of access to MTP services explains 6% of maternal deaths in Tamil Nadu.
Methods of termination

A majority of abortions—80% to 90%—are performed during the first trimester of pregnancy.

Surgical vacuum aspiration

The standard method of pregnancy termination in the first trimester is surgical evacuation of uterine contents after cervical dilatation (vacuum aspiration). When provided properly by trained personnel, vacuum aspiration is a safe procedure. In India doctors undergo special training before being certified to carry out legal surgical abortions, and the places where they are conducted also need to be certified.

Manual vacuum aspiration

Manual Vacuum Aspiration (MVA) is a simple technique to terminate pregnancies within eight weeks of conception. In Tamil Nadu MVA was piloted in 2004–05 under RCH I in five districts through seven medical colleges as well as through Chennai Corporation. This pilot scheme could provide 6000 MVA procedures in one year. Based on the success of the pilot scheme, RCH II/NRHM is scaling up MVA services.

Strategy for scaling up MVA

The goal of scaling up is to increase performance of MVA by 5 to 10 cases per month in each participating health institution and so to reduce the number of later MTP procedures. The initiatives for scaling up are:

- women are encouraged to use MVA services, if they need them, through discussion in outpatient services (antenatal and postnatal outpatient and well-baby clinics) and also in the respective wards. All medical and paramedical staff members of the hospitals/PHCs are involved in raising women’s awareness of MVA;
- pamphlets prepared in Tamil are distributed to the women attending clinics as outpatients, and sign boards are put up in the wards;
- hoardings are put up in prominent public places advertising the availability of MVA services at the local hospitals/PHCs;
- local cable television stations are approached for free display of line advertisements during their programmes;
- wherever available, FM radio stations are approached for free broadcasting of messages about MVA;
- self-help groups and anganwadi workers help to inform people about MVA and its availability;
- through proper counselling, care is taken to ensure that a woman does not come to rely on this method instead of contraception;
- training of doctors on MVA is ongoing. To overcome the problem of the trained doctors being transferred, more doctors, including interested male medical officers, are trained in MVA;
- monitoring of MVA-related activities is undertaken by the Deputy Director of Health Services at the district level and by the State Coordination Team at the state level.

Path 2: Promotion of good-quality antenatal care and institutional deliveries

While impressive progress toward demographic and fertility goals has been made, the trends in reproductive health goals, such as MMR and IMR, while in the right direction, have not gone as far or as fast as desired. There has, no doubt, been an overall decline in both the MMR and the IMR over the past three decades (see Fig. 1 in
Chapter 1). In the most recent decade, however, the pace of decline has slowed. In the case of the IMR, stagnation is noticeable between 2005 and 2006.

Paradigm shift in policy

In the mid-1990s the Government of Tamil Nadu recognized the need for:
- universalizing access to good-quality antenatal care;
- improving access to skilled delivery care in institutional settings;
- improving the quality of essential obstetric care;
- improving the quality of emergency obstetric care.

These steps are essentially designed to make pregnancy safer, reduce maternal mortality, and assure newborn survival.

Antenatal care


The highlights of the Government order are:
- registration of pregnancies within 12 weeks of conception;
- screening for high-risk factors and referral to higher-level medical facilities;
- five antenatal visits and administration of tetanus toxoid;
- screening for RTIs and STIs; counselling and treatment;
- institutional deliveries and deliveries by skilled birth attendants—nurses, doctors, ANMs, and VHNs; deliveries by trained “dais” (traditional birth attendants) will take place only if other skilled birth attendants are not available, and deliveries by untrained birth attendants will be avoided;
- postnatal care and infant care;
- growth monitoring;
- immunization services for infants and children;
- offer of contraceptive choices and counselling that satisfies clients’ needs;
- safe abortion services.

This Government Order paved the way for improvement in the quality of essential obstetric care through good-quality antenatal care and an increase in institutional deliveries.

Scenario analysis

National Family Health Survey data document nearly universal antenatal care coverage in both rural and urban Tamil Nadu. An upward trend in antenatal care in Tamil Nadu from 1992–93 (NFHS 1) to 2005–06 (NFHS 3) can be seen in data from the National Family Health Surveys (see Table 3).

<table>
<thead>
<tr>
<th>Table 3: Antenatal care performance in Tamil Nadu</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mothets receiving any AN care</td>
</tr>
<tr>
<td>Mothers with at least three AN visits during last pregnancy</td>
</tr>
<tr>
<td>Mothers who had consumed iron–folic acid for 90 days or more during last pregnancy</td>
</tr>
<tr>
<td>Deliveries assisted by a doctor/nurse/LHV/ANM/other health personnel</td>
</tr>
<tr>
<td>Births in institutions</td>
</tr>
<tr>
<td>Mothers who received postnatal care from a doctor/nurse/LHV/ANM/ other health personnel within two days after delivery</td>
</tr>
</tbody>
</table>

ND, not determined; NFHS, National Family Health Survey; AN, antenatal; LHV, Lady Health Visitor; ANM, auxiliary nurse-midwife
* 95.6% in 2005–06 according to state government data
Institutional deliveries

Institutional delivery is promoted as a state policy. In 1993 the state population policy, announced by the State Population Council chaired by the Honourable Chief Minister of Tamil Nadu, recommended a goal of 90% institutional deliveries by 2000 as one of the family welfare service packages. To promote institutional deliveries, incentive packages announced included:

- a payment of Rs. 50 per woman to Village Health Nurses (VHNs)/auxiliary nurse-midwives (ANMs) if five antenatal care visits are provided and institutional delivery is conducted by the VHN/ANM;
- an incentive of Rs. 25 if only antenatal care is provided by the VHN/ANM but the woman is referred for institutional delivery.

This health reform has paved the way for improving both the quality of antenatal care and the rate of institutional deliveries.

Data show acceleration in the growth of institutional deliveries:

- an upward trend occurred between 1971, at 20.3%, and 1991, at 56.8%—an increase of 36.5 percentage points in two decades;
- by comparison, in the decade between 1996 and 2005, there was a growth of nearly 30 percentage points, from 64.7% to 94.3%.

The findings of the three rounds of the National Family Health Survey (NFHS) are similar to the data on institutional deliveries reported by the State (see Fig.10).

The distribution of institutional deliveries by sector presents an interesting picture (see Fig. 11). The share of deliveries taking place at home has declined over time, with a distinct shift towards institutional delivery in the public health system. In 2008 domiciliary deliveries accounted for only 2% of all deliveries. In general, deliveries at PHCs have grown dramatically between 2006 and 2008, while at all other locations the percentages have declined slightly (see Fig. 12).

In several districts the distribution of deliveries reveals a shift over time from the private sector to the public sector, specifically to PHCs and HSCs. The picture in Theni District is a case in point. In Theni District there has been a substantial decline in home deliveries, from 25.2% in 1999–2000 to 4.8% in 2004–2005, with a corresponding increase in institutional deliveries at the primary care level (see Fig. 13). This is a clear example of the improved quality of public-sector health care in Tamil Nadu.
What motivates the passion of public health administrators and PHC providers to enhance the quality and increase the use of PHC services in general and of maternal, newborn, and child health services in particular? Motivating factors include the following:

- innovations piloted in a district can be scaled up state-wide based on evidence and experiences;
- exchange visits to better performing PHCs and districts provide for on-site learning from evidence and experience;
- better performing administrators and PHC providers receive public recognition, which fosters healthy competition;
- elected local government representatives and ministers publicly express appreciation of public health administrators and providers;
- the availability of good physical infrastructure, good training, modern equipment, and essential drugs and other supplies encourages providers to do their best;
- under NRHM decentralization of decision-making on the use of flexible financing empowers PHC providers;
- the public information campaign of NRHM services and the mass media inform the public and build a positive image of the government health care delivery system by the following means:
  - marketing services through “maternity picnics”;
  - raising awareness of the essential emergency first aid services for mothers, newborns, and children available at the point-of-care in Primary Health Centres;
  - promoting referral companionship, which allows a female family member or friend to accompany the patient when she is transported from the primary level to a first level referral health facility.

**Encouraging institutional delivery among women below the poverty line**

*Tamil Nadu Government special scheme for pregnant women.* Under the Dr Muthulakshmi Reddy Maternity Assistance Scheme, the Government of Tamil Nadu provides cash assistance of Rs. 6000 for each pregnant woman from a Below Poverty Line (BPL) family. The payment compensates for loss of wages and pays for nutritional supplementation to prevent low birth weight babies. To operationalize the scheme, EDD (Expected Date of Delivery) surveillance of pregnant women is undertaken in
each and every village; a seniority list is maintained in the PHCs; and, based on the budget allocation, Rs. 3000 is distributed before the delivery and Rs. 3000, after the delivery.

**Government of India special scheme for pregnant women.** The *Janani Suraksha Yojana* (JSY) under NRHM aims to reduce MMR and IMR by helping to support skilled attendance during childbirth for BPL families. The cash assistance under the scheme varies with the area and place of delivery.

<table>
<thead>
<tr>
<th>Area</th>
<th>Institutional delivery</th>
<th>Home delivery</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rural</td>
<td>Rs. 700</td>
<td>Rs. 500</td>
</tr>
<tr>
<td>Urban</td>
<td>Rs. 600</td>
<td>Rs. 500</td>
</tr>
</tbody>
</table>

The BPL criteria are not applicable to scheduled caste (SC) and scheduled tribe (ST) families.

**Maternity picnics promoting delivery at PHCs**

The Department of Public Health has introduced a new way to encourage more pregnant women to deliver at PHCs—“maternity picnics”. The picnics attract pregnant women to tour their local PHC and see the recent improvements made in the facilities and the quality of care. During the visit the women can meet the doctors and nurses and see the ultrasound scan facility, the labour room, and the 24-hour care centre. At the same time the woman can obtain appropriate medical tests and check-ups. The strategy is to show women that the PHCs are welcoming places with friendly staff and thus give them confidence to choose to deliver at a government health institution.

**Birth companionship programme**

Unfortunately, as medicine and care of women during childbirth has become technically more advanced, in many places the role and importance of companions during childbirth seems to have been sidelined and forgotten. Not so in Tamil Nadu.

Tamil Nadu has introduced a birth companionship programme for institutional deliveries. The presence of a companion during childbirth is meant to ensure that a woman is never left alone during this intensely stressful and frightening time. She is comforted, reassured, and encouraged throughout childbirth.

The birth companionship programme is a low-cost intervention that has numerous benefits:

- shorter duration of labour;
- less need for pain medication;
- fewer medical procedures;
- decreased rates of caesarean section;
- decreased augmentation of labour with oxytocin;
- mothers’ increased satisfaction with the birthing experience;
- better bonding between infant and mother;
- increased breastfeeding success;
- decreased postpartum depression;
- reduced informal payments in the hospital.

Previously, the environment in hospitals was quite different. Relatives were not allowed to enter the maternity wards, and women delivered without any support. Relatives normally accompanied the woman to the hospital but remained outside the wards until they were told about the outcome of labour.

Birth companions were first allowed in a private hospital, CMC Vellore, several years ago. Then, during the extended period of RCH I, Chennai Corporation started implementing this activity in two 24-hour emergency obstetric care (EOC) centres. It appeared that women appreciated the new policy.

The service package and facilities in this programme comprise:

- presence of a companion during the process of labour;
- facilities at the hospitals for birth companionship;
- screens between the labour boards to ensure privacy;
- seating for the birth companion.

The duty nurse counsels the birth companion before allowing her inside the labour room. All the doctors...
and the staff nurses are sensitized to the birth companionship programme.

**Strategy for scaling up birth companionship**

In view of the impact of birth companionship on the quality of care, reducing the need for surgical interventions during delivery, RCH II/NRHM has scaled up this programme throughout the state, in all the public health facilities conducting deliveries.

The processes in the scaling-up of birth companionship in the health facilities at different levels began with two state-level meetings to sensitize the obstetricians and district officials to the birth companionship programme. During the state-level meetings the participants developed:

- an action plan to implement this activity in their hospitals;
- a form to obtain feedback from a sample of the beneficiaries;
- monitoring forms to assess the impact of the programme on birth outcomes.

Also, one senior obstetrician/senior doctor in each hospital was identified as the nodal officer for implementing this activity and for collecting and submitting reports. The name of each nodal officer was sent to the Directorate of Medical Education (DME), the Directorate of Medical Services (DMS), and the Directorate of Public Health (DPH). In the medical colleges the services of postgraduate students are used to document this activity.

Following the state-level meetings, the Heads of Department of Obstetrics and Gynaecology of the medical colleges briefed the obstetricians, postgraduate students, and staff nurses working in the labour wards on the birth companionship programme. At the district headquarters hospitals, the Joint Directors of Health Services and senior civil surgeon specialists sensitized the obstetricians and staff nurses of the headquarters hospitals and the obstetricians/lady doctors of all the sub-district hospitals. In turn, the obstetricians held sensitization sessions for the doctors and all the staff nurses in the hospitals.

**Gestational Diabetes Mellitus—Prevention and Control at PHCs**

Gestational diabetes mellitus (GDM) is a disorder that is on the increase. It causes abortion, stillbirth, big baby, birth defects, respiratory distress, neonatal death, and, at times, even maternal death. GDM can be prevented and managed at PHCs to ensure safer pregnancy and newborn survival.

**Special efforts for hard-to-reach populations and communities**

Improvement in access to health facilities and health services for the underprivileged sections of society, as well as the population in remote areas including the tribal population, has been one of the key goals in all the health interventions in the state. This focus is reflected in the provision of outreach services, ambulance support, waiver of charges for families below the poverty line, routine visits by the Village Health Nurses to such communities, and the like.

The tribal populations constitute a unique segment. The majority are economically deprived, socially marginalized, and lacking resources. Their access to health care, education, employment, and other income-generation opportunities is limited. Also, the literacy level among the Scheduled Tribes is low. The health problems of the tribal people across Tamil Nadu are not uniform. Despite a number of interventions by the state government, the vulnerable tribal community is still unable to obtain access to basic health care.

In view of this, a special tribal component forms part of the RCH programme. This component has been integrated into a cohesive Tribal Development Plan along with all the other health-related programmes addressed to tribal populations, such as leprosy eradication, TB control, and on-going welfare schemes. This plan supports extensive NGO participation in health care delivery to the tribal populations in the state.
The four-pronged strategy adopted to prevent and control GDM comprises:
- supply of semi-auto analyzers for blood sugar estimation;
- training of doctors, laboratory technicians, and nursing staff;
- patient education;
- awareness-raising at the community level.

**Path 3: Reducing the likelihood of death among women who experience complications**

Pregnancy, although a normal process, carries with it risks of disability and death. Unfortunately, many women are either unaware of such risks or fail to appreciate the seriousness of the risks.

The maternal mortality ratio (MMR) in Tamil Nadu was disproportionately high before 2000 despite the positive shift towards institutional deliveries. Thus additional actions were needed to lower the MMR even further.

Besides promoting good-quality antenatal care and the shift to institutional deliveries, Tamil Nadu’s public health initiatives to decrease maternal deaths geared up to:
- improve surveillance of maternal deaths;
- conduct verbal autopsies, pinpointing the determinants of maternal deaths to identify preventable causes of delay;
- initiate corrective measures.

The impact of these efforts is visible in the declining trend in the MMR since 2001.

**Causes of maternal deaths**

Both direct and indirect causes contribute to maternal deaths (see Fig. 14). Important among the direct, obstetric causes are severe bleeding, eclampsia, complications of unsafe abortion, obstructed labour, sepsis, and pregnancy-induced hypertension. If these conditions are managed and treated promptly and adequately, nearly all maternal deaths can be prevented. Thus, when deaths occur, it is often because circumstances have prevented prompt and adequate care. Such circumstances include unwillingness to seek appropriate medical assistance in time, cultural constraints, and absence of adequate transport to reach the appropriate health facility in time.

The poor health condition of the women, due to malnutrition, anaemia, HIV infection, or repeated childbearing, in the absence of a woman’s freedom to choose whether and when to have a child, is yet another causative factor.

Maternal deaths can occur:
- at any stage—before, during, or after delivery;
- at any place—at home, at the health facility, or during transit.

Adequate monitoring of each pregnancy and appropriate strategy to handle any emergency is the only way to deal with this serious issue. Most maternal deaths and disabilities can be averted if adequate care is exercised at all the different stages—pregnancy, childbirth, and the puerperium.

Delays in seeking care, delays in access to a health facility, and delays in getting adequate and timely medical care all play their roles in causing maternal deaths. Lack of readiness at health facilities to handle emergency situations and provide comprehensive
emergency obstetric care also are contributing factors, as are poor antenatal, natal, or postnatal care.

The three delays

An analysis of the determinants of maternal deaths in 2004 revealed how much each of the “three delays” contributed (see box at right). The case studies in Annexure 1 illustrate how the three delays play out in specific circumstances.

In view of this finding, the Government of Tamil Nadu gave the three delays the highest degree of attention. Appropriate interventions were designed to shorten all three delays, which could make the critical difference between life and death for a pregnant woman.

- the first delay is shortened by the presence of a skilled birth attendant at the place of delivery;
- reducing the second delay requires emergency transport;
- shortening the third delay depends on the skill and responsiveness of medical and support staff, equipment, drugs, and supplies at the first referral facility.

The same analysis revealed that multiple referrals—sending the woman on to another centre—accounted for two thirds of maternal deaths, as shown in Fig. 15.

The systemic corrections initiated addressed the key issues:

- surveillance of maternal deaths;
- continuum of care from the community to the first referral level health facility, with shortening of the Three Delays;
- around-the-clock access to emergency obstetric care services at the first referral level.

Surveillance of maternal deaths and estimating the actual number of maternal deaths

Most maternal deaths can be averted even where resources are limited. The right kind of information is essential, however, to guide appropriate action. Just knowledge of the levels of maternal mortality is not enough. Information is needed also on the causes and circumstances that have led to maternal deaths so that corrective measures can be taken.

Identification of maternal deaths is the first step in the surveillance process. Tamil Nadu initiated identification and compulsory reporting of maternal deaths in 1994. It was mandated that each and every maternal death be reported by the Village Health Nurse working at the level of the Health Sub-Centre, the medical officers of primary health centres, first referral unit (FRU) and non-FRU centres.

### The three delays in Tamil Nadu, 2004

- **Delay 1:** Delay in deciding to seek appropriate care, contributing to 40% of maternal deaths
- **Delay 2:** Delay in reaching a first-level referral facility, contributing to 37% of maternal deaths
- **Delay 3:** Delay in receiving adequate care at the referral facility, contributing to 23% of maternal deaths

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![Fig. 15: Percentage of maternal deaths, by number of institutions visited before death, Tamil Nadu, 2004](image-url)
government hospitals, district public health nurses, and Deputy Directors of Health Services.

The efficacy of reporting has improved over time. By 2001 all maternal deaths were being reported (see Fig. 16). The apparent increase in the number of maternal deaths between 1994 and 2001 seen in the graph reflects improvements in reporting due to a better surveillance system. It does not reflect an actual increase in maternal deaths.

Investigation of maternal deaths and findings

Along with the identification and reporting process, investigations began into the causes of maternal deaths. The investigation methods are multidimensional:

- **verbal autopsy.** Community-based maternal death reviews help to identify the medical and non-medical causes of deaths and to ascertain the personal, family, or community factors that may have contributed to the deaths of pregnant women occurring outside a health facility.

In the verbal autopsy people who are knowledgeable about the events leading to death, such as family members, relatives, neighbours, and traditional birth attendants, are interviewed. The public health nurses and medical officers of primary health centres are trained to conduct verbal autopsies.

- **facility-based maternal death reviews**
  A qualitative in-depth investigation of causes and circumstances takes place when a maternal death occurs at a health facility. Deaths are initially identified at the facilities, but such reviews try to identify the contributory factors both at the facilities and in the community;

- **near-miss case audits.** Surveys investigate the severe morbidity of any pregnant or recently delivered woman (within six weeks after termination of pregnancy or after delivery) whose immediate survival was threatened and who survived, whether by chance or because of the hospital care that she received;

- **clinical audits.** A quality improvement process seeks to improve patient care and outcomes through the systematic review of care and identification and implementation of needed changes. The quality of the care processes and outcomes of care are examined and evaluated against explicit criteria. Where indicated, changes are made at the individual, team, or service level, with further monitoring to confirm improvements.

All these reviews are aimed at answering the following questions:

- why do women die of pregnancy?
- is it because they were unaware of the need for care or unaware of the warning signs of problems of pregnancy?

### Findings from analysis of verbal autopsies of maternal deaths

1. Maldistribution of First Referral Units (FRUs) and shortage of specialists
2. Sub-standard care in the institutions and poor accountability of service providers
3. Unnecessary referrals
4. Lack of emergency transport facilities
5. Overcrowding of FRUs
6. Unmet need for MTP and tubectomy services
7. Poor skills of field health functionaries
8. Lack of community awareness
is it because the services did not exist or were inaccessible for reasons such as distance, cost, or socio-cultural barriers?

Are women dying because the care they receive is inadequate or even harmful?

The Verbal Autopsy conducted in Tamil Nadu has brought to light several key issues (see box). For more on maternal death audits, see Additional Information, Part 4, Continuous monitoring and periodic evaluation.

**Interventions to shorten the three delays**

**Interventions to shorten the first delay—the 24x7 model**

Providing safe delivery services to the pregnant woman at any point in the day requires the around-the-clock presence of qualified personnel in the Primary Health Centres (PHCs), which are the most accessible health care facilities. RCH I piloted a scheme to provide 24 hour a day availability of staff nurses—three nurses on eight-hour shifts instead of the usual two nurses—in 90 PHCs located in the remote rural areas of Madurai District. The scheme, known as the 24×7 model, has now been scaled up to cover the entire state—all 1421 PHCs.

Staff nurses have been recruited on a contractual arrangement and are paid a consolidated salary of Rs. 2500 per month, along with a payment of Rs. 25 for each delivery attended. In addition, they receive a bonus of Rs. 1000 for accepting a rural posting. The staff nurses have been trained in obstetric and newborn care skills through the RCH Integrated Skills Training Programme.

The services of the staff nurses have been of great support in conducting normal deliveries, attending to sick newborns, and referring complicated pregnancies to the FRU/CEmOC and newborn care centres for management by obstetrics specialists. The nurses’ responsibilities include:

- conducting normal deliveries;
- identifying complicated deliveries and referring to CEmOC and newborn care centres;
- identifying danger signs during labour and arranging for timely transport to CEmOC and newborn care centres;
- attending to newborn care and services;
- referring newborns with complications;
- assisting medical officers in out patient clinic;
- inserting IUDs;
- assisting medical officers in family welfare surgical procedures—tubectomy and IUD insertions, both postpartum and interval;
- providing first aid to emergency cases reporting outside outpatient hours and referring to First Referral Unit (FRU)/CEmOC and newborn care centres.

The staff nurses also assist the PHC medical officers with treatment of minor ailments, especially outside the outpatient clinic hours. They also train the auxiliary nurse-midwives in the conduct of safe deliveries.

To support the staff nurses in their service activities, two sanitary workers have been posted to each PHC on a consolidated salary along with a driver to transport labour cases at the first signs of life-threatening danger.

This intervention has substantially improved the delivery performance in the PHCs and aided in early identification of childbirth complications for timely referral to FRU/CEmOC and newborn care centres. Thus, the first delay has been shortened by the presence of a skilled birth attendant at the place of delivery.

Performance analysis has found that PHCs with these staff nurses conducted an average of 15.5 deliveries per month in 2003–2004. By comparison, the average for all PHCs in the state was only 4.2 deliveries per month (see Fig. 17).

Also, with the primary level handling normal deliveries, pressure at the secondary and tertiary levels for normal deliveries is enormously reduced.
This allows such facilities to concentrate more on providing emergency obstetric and newborn care.

From the economic perspective, it costs as much to employ one doctor as it does to pay three contracted staff nurses. Therefore, this intervention has proved to be technically and economically sustainable.

**Scaling up the 24x7 model**

Given such promising results, the 24x7 model has been scaled up in phases. The objective is to ensure the quality of and access to antenatal and postnatal care, 24 hour a day delivery services, BEmONC services, and prevention of parent-to-child HIV transmission (PPTCT) services in the upgraded PHCs and Block PHCs.

The upgrade of public health centres to Basic Emergency Obstetric and Newborn Care (BEmONC) centres has incorporated the RCH and HIV prevention convergence strategy. This strategy includes promotion of safer sexual behaviour, condom use for dual protection against pregnancy and STI/HIV, HIV counselling and testing, elective caesarean sections for HIV-positive women, nevirapine prophylaxis for mother and baby, and counselling on appropriate breastfeeding and infant feeding practices.

The service package at the upgraded PHC/Block PHC level comprises:

- weekly antenatal/postnatal clinics;
- around-the-clock availability of essential obstetric and newborn care services;
- around-the-clock availability of emergency first aid services for stabilizing obstetric emergencies before referral;
- around-the-clock availability of referral services for complicated deliveries and obstetric emergencies;
- around-the-clock availability of emergency transport services;
- breastfeeding and infant feeding counselling;
- around-the-clock availability of PPTCT services, antiretroviral prophylaxis, and counselling for HIV-positive mothers on breastfeeding and infant feeding practices;
- Integrated Management of Newborn and Childhood Illnesses (IMNCI);
- a range of contraceptive services to prevent unwanted pregnancies;
- MVA services for termination of unwanted pregnancies;
- weekly RTI/STI clinics, syndromic management of STIs/STDs, and treatment of opportunistic infections;
- community outreach services for a range of RCH services, syndromic management of STIs, and treatment of opportunistic infections;
- cervical cancer screening, breast self-examination, and referral services;
- mainstreaming of the Indian System of Medicine in all RCH services;
- universal precautions, infection control protocols, and biomedical waste management practices.

The European Commission, in its 2004 report *Good Practices and Cost Effectiveness*, described and commended the 24-hour delivery care scheme of Tamil Nadu as a sustainable model. The report noted: “The critical factor was 24-hour availability of skilled female paramedical staff. In the PHCs which instituted this regime, there was a large increase in..."
the number of deliveries being carried out including during the night.”

Support to staff nurses in the PHCs

Even with a recruitment incentive of Rs. 1000, most staff nurses have been reluctant to work in the PHCs, largely because of their rural location. Moreover, the PHCs lack residential facilities, and the nurses have had to struggle even to find places to stay in the villages. Staff nurses who are recruited on consolidated salary have been paid Rs. 2500 per month regardless of where they are posted.

This situation has resulted in large number of vacancies in the PHCs, adversely affecting the delivery services and the availability of around-the-clock basic emergency care. To correct this, it is proposed to pay a special allowance of Rs. 1500 per month to all staff nurses posted in the PHCs.

Some PHCs are located in remote and inaccessible places. Action has already been initiated to identify these PHCs and to declare them “difficult” PHCs. It is proposed to pay the staff nurses posted in these difficult PHCs a further special allowance of Rs. 2000 per month, in addition to the payment of the PHC special allowance of Rs. 1500 per month.

A further move is on in the state to empower paramedical functionaries, such as the staff nurses and auxiliary nurse-midwives, to perform life-saving obstetric procedures—obstetric first aid and prompt management of postpartum sepsis in newborns including use of injectable antibiotics.

Valaikappu for pregnant women

The “bangle ceremony” is traditionally performed for a pregnant woman during the odd-numbered months of pregnancy and particularly during the seventh month. As part of the ceremony, her family and guests give her many bangles to wear. The sounds of these bangles are said to reach the womb, conveying the mother’s happiness to the foetus to make it happy.

Traditionally, this ceremony takes place in the home of the pregnant woman’s mother. In Tamil Nadu the primary health centres conduct the bangle ceremony for women receiving antenatal care. Thus, traditional Tamil culture and modern health care join together to foster healthy pregnancy. A press clipping on valaikappu is reproduced on this page.

Interventions to shorten the second delay—emergency transport services

Most of the maternal deaths are due to delays in arrival at a FRU/CEmOC and newborn care centre. Most often, lack of transport at the crucial hour has caused this fatal delay.

Even if private transport is available, the patient may not be in a position to afford the often high cost. Most of the poor could not hire private transport. Also, precious time is lost in mobilizing resources for transport. Furthermore, women often are brought

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to a health facility where emergency obstetric care is not available, resulting in multiple referrals.

Although the absence of specialists and blood in the health facilities also are important contributors to maternal deaths, lack of transport of obstetric emergencies is the single most important non-medical cause of maternal deaths. Indeed, the two causes are closely related. Referral from one health facility that lacks specialists or blood to another facility increases the transport cost and the risk of death due to delay in the initiation of treatment.

Government ambulance facilities at the FRUs/CEmOC and newborn care centres and the PHCs have not been available around the clock. Moreover, due to fuel restrictions, the vehicles were available for only a few days in each month.

Pilot scheme

In recognition of this need, RCH I tried an innovative initiative in the sub-project area of Theni district, establishing emergency ambulance service with support from an NGO, Seva Nilayam Society.

Seva Nilayam, in association with the Ryder-Cheshire Foundation, expressed its willingness to organize emergency transport. Hence, the organization was identified as the sole-source agency to run the ambulance service in Theni district (see box).

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**NGO Seva Nilayam Operates ambulance service**

Seva Nilayam Society (Home Service) is a non-profit health and development initiative located in the picturesque Theni District, about 67 km west of Madurai. British–born Dara–Mary Scarlett, MBE, established the institution in 1962, motivated by an altruistic desire to work for the medico-social betterment of the rural poor.

Nearly four decades later Seva Nilayam has moved beyond its initial focus on social service to its current status as a development organization implementing diverse health and development programmes through 450 women’s self help groups and a federation of 7000 women. All Seva Nilayam programmes are people-centred, participatory, and geared towards sustainable development. Seva Nilayam has a well-equipped hospital and laboratory, a 15-bed TB/AIDS isolation ward, and support services such as siddha and homeopathy clinics, a model herb garden, and a training centre.
Salient features of the referral transportation scheme are described in the Additional Information, Part 1, Referral transport.

**Outcome**

The positive outcomes of this scheme were evident:

- on average, 30–45 emergency cases were transported per month, of which 30% were obstetric emergencies;
- all accident emergencies were transported free of cost;
- there was a growing demand for more ambulances. The Rotary Club of Theni District and the Road Transport Corporation came forward to provide four more vehicles to the NGO;
- other NGOs expressed their willingness to run a similar service in other districts;
- dead bodies also were transported in the ambulances.

Despite such positive outcomes, there were also a few areas of concern. The NGO reportedly incurred a loss of Rs. 5000 per month in this operation. Also, the vehicles broke down frequently because they were old.

**Scaling up**

The aim is to have, with NGO partnership, a viable and efficient ambulance service around the clock for immediate and specialized treatment of patients in need. Under the World Bank-supported Tamil Nadu Health System Project (TNHSP), a District Emergency Ambulance Services Society was formed, with the District Collector as Chairman. The Committee identified suitable NGOs to operate such services in the Districts. TNHSP provided new vehicles to the NGOs—one per block, for a total of 385 ambulances.

**Referral control rooms in all districts**

Referral control rooms in each district give the public access to timely ambulance transportation to health services. People in need of ambulance services call the control room on a telephone helpline that has the same number throughout the state. The control room immediately arranges for the transportation of the emergency case to a nearby hospital. Simultaneously, the control room alerts that hospital to be ready to receive and attend to the patient. (For more about the control rooms, see Additional Information, Part 1, Referral transport.)

**Interventions to shorten the third delay—strengthening emergency care**

In 2004 three quarters of all maternal deaths took place during the natal and postnatal periods, while one quarter occurred during the antenatal period. Available data also indicate that about one fifth of all maternal deaths occur during the process of finding transportation and travelling to an appropriate and affordable health facility following the onset of an obstetric emergency.

Given these statistics, further reduction in the MMR in the state depends crucially on provision of emergency obstetric services. Tamil Nadu has entered a phase in which high-quality natal and postnatal care in health facilities and follow-up care in the field are essential to further improve rates of maternal survival. Emergency obstetric services must be established in appropriately situated institutions so that people everywhere in the state have ready access to them. Also, the quickest possible transportation of the mother to such institutions has to be ensured.

Tamil Nadu has brought down the infant mortality rate (IMR) substantially over the years. Its IMR in 2006, at 37 infant deaths per 1000 live births, is unquestionably low. It is a matter of concern, however, that the pace of decline has been slow or stagnant recently. Further reduction in the state's IMR can come only from reduction in neonatal mortality, especially early neonatal mortality—deaths occurring within the first seven days after birth. This calls for special attention to newborn care.

**Safe motherhood programme for strengthening First Referral Units (FRU/CEmOC and newborn care) to provide emergency obstetric care services**

First, some preceding developments are worth recalling for a proper perspective on the state
initiatives. In 1990 the Government of India launched the Child Survival and Safe Motherhood Programme (CSSM), with a component strengthening FRUs for emergency obstetric and newborn care. Tamil Nadu followed this with several initiatives. Of the 163 FRUs identified in 1994 under the Child Survival and Safe Motherhood Project, 24 hour a day comprehensive emergency obstetric care including caesarean-section was available in only 30%.

Strengthening these units involved the following steps:

- the state FRU Task Force was formed in 1994 to coordinate the strengthening of 163 FRUs to provide emergency obstetric and newborn care. UNICEF provided support and partnership;
- equipment for strengthening emergency obstetric and newborn care in all FRUs was procured in 1995, using unspent funds of Rs. 40 crores (Rs. 400 million) from the World Bank-supported IPP V Project and from UNICEF/GOI funds;
- a Government Order was issued for specialist postings in FRUs, and a special recruitment drive was undertaken. Some 60 specialists (including 45 gynaecologists and 15 anaesthetists) were posted in various FRUs in 1996;
- with support from UNICEF in 1995–97, 82 obstetricians, 103 paediatricians, and 128 nurses from 163 FRUs were trained for 21 days on skills in providing emergency obstetric and newborn care;
- a Government Order was issued for conducting death audits in all FRUs, and in 1996–97 the RCH project intensified the reporting and investigation of maternal deaths;
- review meetings were regularly held in 2000–03 at regional and state levels, with UNICEF support, for rigorous monitoring of FRU services.

A mass transfer of specialists from FRUs to PHCs took place in 1999–2000 due to their promotion to Senior Civil Surgeons. A gap in services at FRUs resulted.

Transition from FRU to CEmOC and newborn care in 2002–03

Instead of equipping all FRUs to handle obstetric emergencies, the Government of Tamil Nadu took a policy decision to upgrade strategically located FRUs in each District to Comprehensive Emergency Obstetric and Newborn Care (CEmOC and newborn care) centres. This revitalization of the CEmOC and newborn care concept and the around-the-clock availability, accessibility, and affordability of services in the centres are essentially directed at bringing down the MMR and IMR in the state.

Government orders were issued for the provision of 24-hour CEmOC and newborn care services in two or three hospitals in each district. Some 62 strategically located hospitals—10 teaching hospitals and 52 FRU/CEmOC and newborn care centres (secondary-level hospitals)—were identified. These facilities were chosen so that any complicated delivery can reach one of these hospitals within one hour of travel.

Service package and support structure

The following services are available around the clock in the CEmOC and newborn care centres:

- manual removal of the placenta;
- dilatation and curettage;
- instrumental vaginal deliveries;
- caesarean section;
- management of pregnancy-induced hypertension and related disorders;
- management of diseases complicating pregnancy;
- emergency laparotomy and hysterectomy;
- blood transfusion services;
- supporting laboratory and imaging services;
- emergency newborn care.

Coordination/review meetings take place once a month. They bring together the obstetricians and superintendents of the hospitals, medical officers of the nearby hospitals/PHCs, and Village Health Nurses. The purposes of the meetings are to strengthen the referral system, to discuss issues involved in service delivery, and to contribute to mentoring and motivation.
Staff and infrastructure

The medical professionals in each CEmOC and newborn care centre comprise four obstetrician and gynaecologists; two general surgeons; four paediatricians, and two anaesthetists. An obstetrician and a paediatrician are on stay-in duty around the clock. An anaesthetist is on call duty (see box). The anaesthetists’ telephone numbers are available in the labour ward. The staff nurses are trained in operating theatre, blood bank, labour room, and newborn care services. This ensures the availability around the clock of staff nurses trained in all these areas.

Facilities

Every CEmOC and newborn care centre has the following facilities, services, and supplies available around the clock:

- blood bank;
- lab services;
- operating theatre;
- adequate drug supply;
- linkage with ambulance services.

These centres have separate obstetric and paediatric casualty services in addition to general casualty.

Contracting-in and training assure availability of anaesthetists

There is an acute shortage of anaesthetists in the public sector. This is especially true at front-line referral institutions (secondary-level health facilities) and also at the primary level, where the shortage constrains the performance of sterilizations. As of early 2009, only 123 qualified anaesthetists are available in the 270 secondary-level referral hospitals. These anaesthetists are mostly distributed among 29 district and major sub-district hospitals. The other doctors are not adequately skilled in administering anaesthesia for elective and emergency surgical operations.

This skill shortage has been addressed to some extent by permitting the health facilities to engage private anaesthetists. All hospitals providing emergency obstetric services are permitted to hire the services of private anaesthetists whenever needed. The funds are provided under RCH II/NRHM. The key elements of the initiative are:

- private anaesthetists are hired for Rs. 1000 per caesarean section or, for tubectomy operations, per visit;
- health facilities are permitted to hire whenever staff anaesthetists are not available in the facilities;
- government anaesthetists are not eligible for the honorarium.

Figs. 18 and 19 indicate the contribution made by hired anaesthetists.

This attempt at forging a public–private partnership in a limited fashion has proved beneficial in handling emergency caesarean sections, tubectomies, and major obstetric surgeries, such as hysterectomy, in front-line referral hospitals, with a resulting reduction in the incidence of maternal deaths.
In each of the certified hospitals a sign board indicates that CEmOC and newborn care services are available. The whereabouts of 24-hour CEmOC and newborn care services in each district is widely publicized, thereby reducing referrals to hospitals that do not provide emergency services.

Certification of CEmOC and newborn care centres

The CEmOC and newborn care centres are certified and accredited by the government, following well-defined protocols. Certification requirements make the service providers and district managers accountable for the provision of around-the-clock emergency obstetric and newborn care services.

The certification committee, drawn from the medical colleges and consisting of the professor of obstetrics and gynaecology and the professor of paediatrics, is empowered to certify the CEmOC and newborn care centres. Monitoring is done at the district level by the District Collector and at the state level by the NRHM Mission Director and Secretary (Health and Family Welfare). At the state level a committee consisting of expert resource persons advises the government on the functioning of the CEmOC and newborn care centres.

Partnership arrangements for strengthening CEmOC and newborn care centres

TNHSP supports strengthening of the 62 CEmOC and newborn care centres that currently are reachable within an hour of travel. The RCH II/NRHM Programme supports the upgrading of another 36 FRUs to CEmOC and newborn care centres during Phase II so as to reduce access time to half an hour or less.

Blood banks

In the CEmOC and newborn care centres blood bank/blood storage centres have been established. They function around the clock. All doctors, staff nurses, and lab technicians working in the CEmOC and newborn care centres have been trained in blood grouping, cross-matching, transfusion of blood, and management of transfusion reactions. A list of volunteer blood donors and donor organizations, along with their telephone numbers, is available in the blood banks/blood storage centres as well as in the Help Line Centres at the district level.

To improve the availability of blood supply for patients in need, a computerized network links the major government-run blood banks in the state. The network was launched in July 2004 by the Tamil Nadu State AIDS Control Society (TANSACS). The network links six blood banks in Chennai and five in Madurai, Thanjavur, Coimbatore, Tirunelveli, and Nagercoil. It is proposed to cover eventually 83 blood banks in the government sector and 123 in the private sector.

The network has put up a web site that enables the administrators to monitor the stock position of...
collected blood and to make arrangements for its supply where needed. The web site also provides information about donor lists, blood donation camps, and the availability of kits for five mandatory tests of blood (for HIV, syphilis, hepatitis B, hepatitis C, and malaria). At the district level an official monitors and coordinates the movement of blood to public institutions.

**Blood donation camps**

At present the activity of organizing blood donation camps has been entrusted to the blood bank medical officers of the government hospitals. There are many NGOs and voluntary organizations, in addition to TANSACS, that are willing to extend a helping hand in organizing the blood donation camps, but lack of coordination among district health officials has been the main obstacle. The field health staff is under the direct control of DDHSs, who are not directly involved in organizing the blood donation camps.

An innovative project was piloted in Theni District under RCH I to assure timely availability of blood for emergency obstetric and other cases. The activity involves both conducting blood donation camps throughout the year and keeping up-to-date directories of blood donors who can be called on whenever needed. The Theni model is being scaled up to cover the entire state by organizing such camps on fixed dates every month and on the birthdays of leaders. For more on the blood donation effort, see the Additional Information, Part 3, Voluntary blood donation for blood banking.

**Utilization of CEmOC and newborn care centres**

Between 2001 and 2005 an average of over 235,000 deliveries took place each year in secondary-level institutions, including but not limited to CEmOC and newborn care centres. Just over 10% of these were caesarean sections (see Fig. 20).

A survey of CEmOC and newborn care centres undertaken in 2004–05 produced encouraging findings. These include:

- one third of the beneficiaries belonged to underprivileged sections of society;
- indicating the extent of community awareness, 78% of the mothers approached the centres directly;
- some 86% of the mothers could reach the CEmOC and newborn care centres within half an hour;
- within a half hour of arrival, 83% of the women admitted had received care. Another 12% received care in one half hour to one hour;
- wrong referrals figured in just 18% of the cases, resulting in delays in reaching the centres.

This baseline survey was undertaken in the teething phase of the CEmOC and newborn care programme. The current situation may prove even more encouraging.

**Monitoring and review**

On-going monitoring and periodic reviews at different levels have helped in:

- assessing performance levels at the health facilities;
- rapidly identifying bottlenecks;
- initiating timely corrective actions;
- reviewing the performance of personnel in different categories.

Monitoring reports are generated at the primary, secondary, and tertiary levels.
At the primary care level, the reports generated include:
- MCH report—outreach and institutional—based on MCH registers;
- institutional Services Monitoring Report;
- Maternal deaths report—within 24 hours, by telegram, fax, or e-mail;
- Integrated Management of Neonatal and Child Illness (IMNCI) reports;
- infant death report;
- Integrated Counselling and Testing Centre (ICTC) report;
- RTI/STI clinics report and special clinics report;
- impact assessment of programme interventions.
- data on special camps, such as Family Health Awareness camp and Varumun Kappom Thittam (preventive health camps).

At the secondary and tertiary care levels, the reports cover CEmOC and newborn care hospitals and health-related departments. From the CEmOC and newborn care hospitals information is generated through:
- daily reporting by telephone;
- monthly report;
- maternal deaths report (within 24 hours).

The reports from the health-related departments include:
- nutritional assessment reports from the Social Welfare Department;
- births and deaths report from the Revenue Department and local entities.

Reviews are conducted at different levels and with varying periodicity. These include:
- fixed-day weekly review meeting in the PHCs to review PHC/HSC performance;
- monthly review meetings of PHC medical officers and supervisors at the district level;
- monthly reviews of secondary-level hospitals at the district level;
- regional reviews twice a year for secondary-level hospitals;
- audits of deaths taking place in health care institutions, at the district level.

For more on monitoring and evaluation, see Additional Information, Part 4, Continuous monitoring and periodic evaluation.
Behind the specific efforts to make pregnancy safer in Tamil Nadu, described in the previous chapter, lies an overall effort to continuously improve the public health care delivery system. Important components of this effort include:

- improving the health infrastructure;
- rationalizing health human resources;
- assuring the continuous availability of essential drugs and supplies;
- upgrading the Health Management Information System (HMIS);
- developing systematic monitoring and review.

### Infrastructure development

As described in Chapter 2, the state’s public health system operates at primary, secondary, and tertiary levels.

Over the years the primary-level infrastructure has attracted increasing attention.

At the secondary level (district, taluk, and non-taluk hospitals), the in-patient bed strength has grown slightly, from 19,892 beds in 1980 to 20,763 in 2006. At the tertiary level the growth is greater, a 45.7% increase; the number of in-patient beds rose from 14,689 to 21,399 over the same period.

The rise in patient numbers, shown in Table 4, is one indication of the level of utilization of the PHC facilities. Another indication is the percentage of deliveries taking place in PHCs, described in

<table>
<thead>
<tr>
<th>Year</th>
<th>Total number of outpatients treated/year (lakhs)</th>
<th>Average number of outpatients treated/day/PHC</th>
<th>Total number of inpatients treated/year (lakhs)</th>
<th>Average number of inpatients treated/month/PHC</th>
</tr>
</thead>
<tbody>
<tr>
<td>2001–02</td>
<td>421.17</td>
<td>ND</td>
<td>1.18</td>
<td>ND</td>
</tr>
<tr>
<td>2002–03 (April 02–Feb 03)</td>
<td>498.00</td>
<td>ND</td>
<td>ND</td>
<td>ND</td>
</tr>
<tr>
<td>2003–04</td>
<td>582.73</td>
<td>115</td>
<td>2.56</td>
<td>20</td>
</tr>
<tr>
<td>2004–05 (April–Dec 04)</td>
<td>452.70</td>
<td>119</td>
<td>2.29</td>
<td>18</td>
</tr>
<tr>
<td>2005–06</td>
<td>628.67</td>
<td>124</td>
<td>3.82</td>
<td>23</td>
</tr>
<tr>
<td>2006–07</td>
<td>716.80</td>
<td>141</td>
<td>5.51</td>
<td>33</td>
</tr>
</tbody>
</table>

ND, not determined

Note: 1 lakh = 100 000
Chapter 4. The growth in the percentage of deliveries taking place in PHCs indicates that, over the years, the PHCs have become the first choice of pregnant women in rural areas because of the quality of care available. Between 2006 and 2007 there was a 59% rise in PHC deliveries. Not all the PHCs have performed equally impressively, however. There are a few laggards still, but efforts are ongoing to bolster these PHCs as well.

The factors contributing to such an impressive performance are many:
- availability of service 24 hours a day;
- access to skilled personnel at all times, with the three nurses—24x7 model;
- training and sensitization of the doctors and the staff;
- continuous monitoring.

**Grants to facilities**

Under NRHM Patient Welfare Societies (*Rogi Kalyan Samitis*—RKS) are formed for better management of PHCs, taluk/non-taluk hospitals, and district headquarters hospitals. The Patient Welfare Society in each district headquarters hospital receives a grant of Rs. 5 lakhs (Rs. 500 000) per annum, while in taluk/non-taluk hospitals and PHCs each society gets Rs. 1 lakh (Rs. 100 000) under NRHM.

In addition, an annual maintenance grant of Rs. 1 lakh goes to each 24-hour BEmONC centre for upkeep of physical infrastructure. Similarly, each PHC receives an annual maintenance grant of Rs. 50 000, and each HSC receives Rs. 10 000. This funding has enabled PHCs and HSCs to provide a clean and safe environment including supply of potable water, uninterrupted electricity, a solar heater to heat water for bathing of mothers and children, the pathway to the centre, and gardens within the centre’s site.

Also, under NRHM each HSC gets Rs. 10 000, while a PHC is given Rs. 25 000 and a BEmONC centre, Rs. 50,000, as unrestricted grants for any health activity that meets local demand. A few PHCs have utilized this fund for innovative experiments, such as providing nutritious meals to pregnant women once a week, when they come for antenatal care. This initiative has been replicated in all PHCs. Working with the local women's Self-Help Groups in this activity has helped involve the community in maternal and child health issues.

**Strategy to upgrade PHCs**

It has been proposed to upgrade the remaining 255 Block-level PHCs into 30-bed health facilities. Thus, all the Block-level PHCs in the state will become 30-bed facilities to meet the growing health care needs of the rural population. So far, 130 PHCs have been upgraded with 24 to 30 beds and equipped with ultrasonography, ECG, and X-ray equipment, a semi-autoanalyser, and an ambulance. New buildings will be constructed for the PHCs and HSCs now in rented premises.

**Communications upgrade**

Effective communication facilities play a key role in improving the accessibility and utilization of the health facilities and also in quick data transfer from the field. Some of the measures undertaken or proposed include:
- telephones provided to PHCs and hospitals;
- mobile phones for Village Health Nurses;
- a special toll-free telephone number for reporting data from CEmOC and newborn care centres;
- computers and Internet facilities at PHCs and hospitals, introduced in phases;
- computer training centres in three Regional Training Centres;
- palmtop computers for data collection by grass-roots health personnel (proposed).

**Health human resources**

**Institutional distribution**

Of the several directorates, the Directorate of Medical and Rural Health Services (DMRHS) and the Directorate of Public Health (DPH) together account for the major portion—63%—of the health workforce of more than 80 000 people (see Table 5). The Directorate of Medical Education (DME) engages another 31% of the human resources in this sector, mostly employed in hospitals. The rest are in the...
other three directorates, mostly in the Indian System of Medicine (ISM) but also in drug control and in health transportation.

**Rationalized distribution of specialists**

Under the World Bank-funded Tamil Nadu Health Systems Project, rationalization of service norms, human resources norms, infrastructure norms, and quality of care norms for secondary-level health facilities was proposed. The government has already begun the process of rationalization of specialists in secondary-level hospitals, in an effort to match supply to demand. The objective is to remove the imbalances that currently exist by shifting obstetrics and gynaecology specialists and paediatric specialists from PHCs and ESI hospitals to secondary-level facilities, where their services are in more demand. This rationalization exercise will cover 270 secondary-level hospitals at taluk and non-taluk levels.

**Empowerment of front-line health care providers—Village Health Nurses**

The Village Health Nurse (VHN) posted at the HSC in rural areas is normally people’s first point of contact with the health care system. The VHN undertakes a year and a half of training before taking up her post at the HSC. She reports to the nearest PHC medical officer on a weekly basis.

The basic work of the VHNS involves:
- holding regular antenatal clinics for pregnant mothers;
- counselling them on nutrition and providing them with iron supplements;
- referring cases with complications to a PHC or a hospital;
- providing postnatal care of mother and child;
- ensuring regular immunization of infants and children;
- treating minor ailments;
- diagnosing suspected cases of TB and leprosy and referring them to the authorities concerned;
- participating in awareness-raising programmes on health and social issues;
- conducting domiciliary deliveries if needed;
- motivating couples to adopt temporary or permanent family planning methods.

Although near the bottom of the ladder in the health system, the VHN is often much appreciated in the community if she offers good service. To enable her to offer good-quality service, periodic training sessions upgrade her skill levels. The VHN has been provided with the requisite skills to deal with common complaints such as anaemia, menstrual disorders, reproductive tract illnesses, fever and headache, digestive disorders, arthritis and body pains, skin disorders, allergies, leprosy, breast care, newborn care, and first aid. She is also exposed to the Indian systems of siddha and herbal medicines. HSCs are now supplied with siddha and ayurvedic medicines, along with allopathic drugs. In training sessions an attempt is also made to equip her with computer literacy, build her confidence, and address gender issues.

**Table 5: Profile of public health sector workforce, 2006**

<table>
<thead>
<tr>
<th>Department</th>
<th>Directorate staff</th>
<th>Medical</th>
<th>Nursing/mid-wifery</th>
<th>Paramedical</th>
<th>Administrative/support staff</th>
<th>All</th>
</tr>
</thead>
<tbody>
<tr>
<td>DME</td>
<td>25</td>
<td>1</td>
<td>–</td>
<td>–</td>
<td>262</td>
<td>288</td>
</tr>
<tr>
<td>Medical colleges</td>
<td>–</td>
<td>2910</td>
<td>–</td>
<td>1387</td>
<td>2121</td>
<td>6418</td>
</tr>
<tr>
<td>Teaching hospitals</td>
<td>–</td>
<td>1388</td>
<td>4579</td>
<td>2996</td>
<td>10 699</td>
<td>19 662</td>
</tr>
<tr>
<td>DMRH</td>
<td>310</td>
<td>2533</td>
<td>5027</td>
<td>3427</td>
<td>6686</td>
<td>18 003</td>
</tr>
<tr>
<td>DPH</td>
<td>300</td>
<td>3076</td>
<td>13952</td>
<td>12 375</td>
<td>5889</td>
<td>35 592</td>
</tr>
<tr>
<td>Drug control</td>
<td>106</td>
<td>–</td>
<td>–</td>
<td>51</td>
<td>226</td>
<td>383</td>
</tr>
<tr>
<td>ISM</td>
<td>–</td>
<td>1089</td>
<td>99</td>
<td>822</td>
<td>1391</td>
<td>3401</td>
</tr>
<tr>
<td>Health transport</td>
<td>7</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>662</td>
<td>669</td>
</tr>
<tr>
<td><strong>All</strong></td>
<td><strong>748</strong></td>
<td><strong>11 017</strong></td>
<td><strong>23 657</strong></td>
<td><strong>21 058</strong></td>
<td><strong>27 936</strong></td>
<td><strong>84 416</strong></td>
</tr>
</tbody>
</table>
To increase VHNs’ mobility, in 1996 the state government approved a scheme to sanction loans to VHNs and auxiliary nurse-midwives to buy mopeds. Half of the eligible field workers availed themselves of the loan. In the initial stages, however, social barriers, coupled with the VHNs’ lack of interest in learning to drive, despite the offer of training, proved to be a damper. The situation is improving over time.

The Health Management Information System (see below) simplifies the VHN’s task of maintaining records. Record-keeping has improved greatly: The ease of documentation leads to accurate and complete reporting, and.

Construction of buildings for HSCs has taken care of the space constraints of the VHNs, both for service delivery and residential use, as she is expected to stay at the HSC premises. This, along with skill upgrades and confidence-building, has helped to increase institutional deliveries and ensure skilled attendance in domiciliary deliveries. Data on deliveries in the state in 2005–06 revealed that the percentage of deliveries taking place at home had decreased to just 4.4% (see Chapter 1). VHNs attended nearly half of these domiciliary deliveries.

**Improved availability of essential drugs and supplies in all public health facilities**

A major innovative initiative in Tamil Nadu’s public health system is the significant improvement in drug supply to the public health facilities. The improvement results from centralized procurement and decentralized distribution, with the health facilities having the freedom to choose what they want and when they want it. The fact that several other states in the nation are now trying to replicate Tamil Nadu’s new approach is itself a testimony to the success of this initiative.

The new system was instituted only after a long struggle to make do with the previous system. For years, lack of medicines at the right time in the right place was an Achilles heel, compromising quality and undermining public confidence in the public health system. The impact of mal-distribution and irregular supply were compounded by poor storage and careless dispensing. Usually, facilities at the lower end of the supply chain, essentially the primary-level facilities, were the worst hit.

The World Health Organization’s action programme on essential drugs has emphasized such key factors as selection, quantification, procurement, storage and distribution, rational drug use, and also user satisfaction as the crucial attributes of effective drug logistics. In Tamil Nadu all these are taken care of by the drug logistics system established with support from the Danida-assisted Tamil Nadu Health Care Project. Its twin objectives are to:

- improve drug supplies to government health facilities, ensuring continuous availability;
- upgrade the skill levels of service providers in drug management and usage.

Through its three phases of operation, the Danida project has systematically helped improve the supply of drugs to the public health system in Tamil Nadu. The key processes are:

- supplying drug kits in the project districts and funds for HSC maintenance and proper storage of drugs, in Phase I;
- strengthening logistics to maintain the cold chain by supplying refrigerators, cold rooms, and vaccine carriers for the universal immunization programme;
- setting up drug warehouses—at Villupuram, Cuddalore, and Salem—to facilitate drug distribution to the health facilities in their command areas, in Phase II;
- establishing the Tamil Nadu Medical Services Corporation Limited (TNMSC) in 1994 to take care of drug procurement and distribution in the entire state;
- since 1996, pooling budgets from all departments and procuring and distributing drugs to public health facilities in the state through TNMSC.
The salient features of the drug logistics programme are:

- compilation of an essential drugs list, comprising 271 drugs, based on the WHO list of essential drugs and modified to suit Tamil Nadu's specific requirements; surgical supplies and consumables are also procured and supplied;
- centralized procurement of the drugs through a streamlined and transparent tendering system;
- strict quality control of drugs procured from the pharmaceutical companies;
- decentralized distribution of drugs to the health facilities through district drug warehouses, one in each district, managed by TNMSC;
- supply of drugs in foil/blister packs—not loose, as before—to help improve the credibility of public health facilities and increase patient satisfaction;
- need-based drawing of required drugs from the district warehouses by the health facilities, based on an indenting system;
- fixing of an upper monetary limit on drugs drawn by each facility from the warehouse, albeit with some flexibility;
- flexibility for health facilities to make local purchases to meet emergency needs;
- continuous monitoring of drug inventory levels at the warehouses through a computerized information system.

The district-level warehouses ensure continuous availability of drugs at the health facilities, eliminating stock-outs. Indenting freedom for the health facilities avoids surpluses or wastage at the health facilities due to date expiration. Also, by procuring generic drugs, rather than branded products, TNMSC has optimized purchases within the available drug budget.

The continuous availability of good-quality drugs at the health facilities, thanks to the drug logistics system, along with provision of skilled attendance, has been instrumental in increasing utilization of public health facilities for obstetric care as well as for other health care. For more on logistics, see Additional Information, Part 2, Logistics and the supply chain.

Health management information system

Another area where the state health service has made use of advances in information technology is streamlining recording, reporting, and monitoring systems, initiated by the Danida and RCH projects.

Institutional Services Monitoring Reporting (ISMR)

Until the late 1990s the monitoring system covered only outreach activities. Data on institutional activities and events, especially regarding PHCs, were not readily or consistently available, as there was no data collection and monitoring service.

The ISMR, introduced in April 1999, was a first step towards bridging this gap. Filled out by PHC staff under the supervision of the medical officer, this report provides extensive information on all institutional activity at the Health Unit District (HUD)/PHC level on a monthly basis. The data collected include outpatient and inpatient attendance, number of deliveries, laboratory investigations, minor surgeries, vaccines administered, sterilizations performed, siddha outpatient attendance, utilization of ambulances and PHC vehicles, and many other indicators (see Fig. 21 for a portion of the ISMR form).

To handle this voluminous information coming in from the PHCs throughout the state, Danida provided an optical mark reader (OMR) to scan the special format of the ISMR and, through the computer link, tabulate, consolidate, and analyse the information. This analysis is available for each level—PHC, HUD, district, and state—and is provided to field-level staff through the districts.

The system enables quick and comprehensive analysis and feedback. Shortfalls and lapses are highlighted, and queries are raised. Consistently good performance is also highlighted, and achievements are recorded. The ISMR has proved to be an excellent tool for constructive criticism that leads to better service.
Fig. 21: Example of institutional services monitoring report
The ISMR was mainstreamed in 2003 after exhaustive testing and sensitization sessions with the health care providers at different levels. Soon after introduction the effectiveness of ISMR in improving health services was decisively demonstrated. The system has helped identify and resolve specific problems, such as long-term vacancies—particularly where female medical officers are needed. The result has been a more balanced distribution in medical officer postings. (For more about the ISMR, see Additional Information, Part 4, Continuous monitoring and evaluation).

**HMIS registers**

The second initiative under the HMIS scheme was the rationalization and design of registers for health service personnel. Technical working groups, comprising experts from all health departments, were set up to study the record-keeping needs of VHNs at HSCs and of other categories of staff.

Through the HMIS initiative significant changes were made in the reporting and monitoring system. The reporting process was streamlined, and the number of records was reduced considerably, avoiding duplication. The information collected is computerized at the PHC and sent to the district level for further consolidation.

Danida’s Phase III mid-term review has highlighted the benefit of the new system. The system saves many person–days of time for the VHNs, giving them more time for field activities and service to clients. The fact that the system was developed in consultation with the users has made it easy for the service providers to adopt it and has ensured both relevance and ease of use. Programme-specific requirements were identified and accommodated in the HMIS.

**Vital events survey**

Four vital events surveys (VES) preceded development of the ISMR and HMIS registers. Supported by Danida, these state-wide surveys between 1996 and 1999 covered all vital indicators, such as birth and death rates, IMR, and female infanticide.

The surveys covered roughly one sixth of the state’s population, with a sample of two lakh (200 000) rural and one lakh (100 000) urban respondents in each district. The surveys were conducted by the staff of DPH, Family Welfare and the India Population Project V of the Chennai Corporation.

Data from the VES were compared with figures from other sources, none of which, however, was as comprehensive. Survey results were used to work out, among other statistics, the male and female life expectancies in the state. They were also used by the State Planning Commission in computing the Human Development Index for Tamil Nadu and for decentralized planning (see Chapter 2).

The VES was discontinued after the initial phase. As a follow-up, monitoring of all PHCs in the state, using the OMR system, was initiated. Monitoring reports are generated for primary, secondary, and tertiary care.

**Computer literacy for health staff**

Advanced computerized systems for reporting and monitoring require that the health staff at various levels are adequately equipped to handle the tools developed. Computerization at the PHC level began in 2001 with a pilot effort. Subsequently, Danida provided computers to all Block PHCs in the project districts.

Initial computer training was provided for 2400 persons selected from all over the state, including the health staffs in the project districts. Subsequently, RCH provided computers to Block PHCs in two more districts.

Currently, there is a proposal to provide computers to all Block PHCs in the state to implement E-governance throughout the state’s health system.

**Benefits of the HMIS**

The HMIS has helped to:
- streamline easy reporting and effective monitoring;
- reduce the workload of field functionaries, who can invest the time saved in improving the quality of their work;
- provide quick feedback for critically examining existing conditions and practices and improving them;
- help decision-making for staff management and posting;
- make available both macro and micro views of health status at various levels, to pinpoint where corrective action is needed.

Health financing

Financing of public health is organized through the state’s budgetary allocations, augmented by central government funds. Budgeting for public health has been rising over time in the state. Currently, the budget of the Health and Family Welfare Department accounts for 5% of the state revenue budget. Two thirds of this budgetary allocation is spent on the salaries and wages of health personnel (see Table 6). In a system that engages over 80,000 people of different categories, this is not surprising.

Medicines, consumables, and equipment are the other major ingredient. The Tamil Nadu Medical Services Corporation Limited (TNMSC), which is charged with procurement, storage, and distribution of drugs and supplies throughout the state, currently spends roughly Rs. 107 crores (Rs. 1070 million) on drugs and supplies each year. By comparison, such spending was Rs. 75 crores (Rs. 750 million) in 1995–96.

Health funds also come to the state from the national government through different channels—through general transfers, for vertical programmes, and also through scheme-specific matching grants. Vertical programmes are designed to achieve nationally defined health goals.

About 90% of the state’s family welfare programme budget comes from the central government. The rest comes from state resources, primarily to meet staff salaries for implementing family welfare programmes. Overall, the budget share coming from the centre is around one fifth of the state’s budget for public health (see Table 7).

Since a large proportion of the state’s health budget goes to salaries and wages, there is limited budget for such expenditure as infrastructure maintenance, drugs and equipment, fuel, electricity, telephone, and day-to-day office expenses. This naturally impinges on service delivery.

Sectoral allocation

The allocation of the state’s health budget presents an interesting picture:
- about 45% goes to primary health care services. This share has remained more or less unchanged over the years (see Table 8);
- there was a decline in the second half of the 1990s in the share allocated to secondary-level health services.

### Table 6: Components of total state spending on health, Tamil Nadu, 1991–2002

<table>
<thead>
<tr>
<th>Year</th>
<th>% Salaries</th>
<th>% Drugs</th>
<th>% Others</th>
</tr>
</thead>
<tbody>
<tr>
<td>1991–92</td>
<td>65.8</td>
<td>16.4</td>
<td>17.8</td>
</tr>
<tr>
<td>1992–93</td>
<td>65.9</td>
<td>18.0</td>
<td>16.1</td>
</tr>
<tr>
<td>1993–94</td>
<td>65.4</td>
<td>19.7</td>
<td>14.9</td>
</tr>
<tr>
<td>1994–95</td>
<td>65.5</td>
<td>17.4</td>
<td>17.1</td>
</tr>
<tr>
<td>1998–99</td>
<td>74.0</td>
<td>15.0</td>
<td>11.0</td>
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<tr>
<td>2000–01</td>
<td>75.4</td>
<td>15.1</td>
<td>9.4</td>
</tr>
<tr>
<td>2001–02</td>
<td>72.8</td>
<td>14.3</td>
<td>12.9</td>
</tr>
</tbody>
</table>

### Table 7: Central share in total health spending, Tamil Nadu

<table>
<thead>
<tr>
<th>Year</th>
<th>Central share (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1985–86</td>
<td>13.9</td>
</tr>
<tr>
<td>1991–92</td>
<td>22.5</td>
</tr>
<tr>
<td>1992–93</td>
<td>22.2</td>
</tr>
<tr>
<td>1993–94</td>
<td>23.7</td>
</tr>
<tr>
<td>1994–95</td>
<td>23.3</td>
</tr>
<tr>
<td>1995–96</td>
<td>23.6</td>
</tr>
<tr>
<td>1996–97</td>
<td>20.6</td>
</tr>
<tr>
<td>1997–98</td>
<td>19.0</td>
</tr>
<tr>
<td>1998–99</td>
<td>17.1</td>
</tr>
<tr>
<td>1999–2000</td>
<td>20.7</td>
</tr>
<tr>
<td>2000–01</td>
<td>21.4</td>
</tr>
<tr>
<td>2001–02</td>
<td>22.2</td>
</tr>
</tbody>
</table>
Tamil Nadu, like other states in the country, receives major financial support from national government for family welfare programmes and various disease control programmes designed to achieve defined national health goals. In disease control programmes, financing varies from scheme to scheme. Some are fully financed, while others are partially financed on a matching basis. Some of the major disease control programmes of the State currently address malaria, leprosy, filariasis, and TB. Of these, malaria and leprosy programmes together account for three fourths of the state’s budget for disease control programmes.

The National Health Policy 2002 envisages a near doubling of the central grants to the health sector in the states. The envisaged increase in central funding will obligate the state not only to improve its absorptive capacity but also to raise additional resources to make effective use of the additional central grants. The growing burden of the state’s fiscal deficit, however, will limit its capacity to raise allocations to the health sector significantly. What is feasible, given the constraints, is a more judicious use of the available resources.

Other departments of the state besides Health and Family Welfare, such as tribal welfare, nutrition, personnel, labour, and education, also spend on health-related activities. In addition, every department provides a staff medical allowance through the established health facilities or by reimbursement. Such spending by the departments, however, accounts for less than 5% of the state’s total health budget. Even here, central transfers account for roughly one quarter of the state expenditure.

To overcome budgetary constraints, Tamil Nadu has tried new initiatives in public–private participation. The government has invited industrialists and NGOs to adopt selected public facilities and undertake necessary investment to improve service delivery. The investors, mainly the industrialists, were given the option to adopt a given facility either fully or partially.

Their expected contributions ranged from purchase of equipment and medicines to construction, repair, and renovation of buildings, to payment of staff salaries. This initiative took off well but could not be sustained.

Another initiative was charging user fees in selected categories of health facilities. The amount collected was used for better upkeep of the facilities. This, also, could not be sustained.

There are wide regional disparities in the state in per capita government health spending, ranging in 2002–03 from a low of Rs. 76 in Tiruvallur District to a high of Rs. 245 in Madurai District. The variations in spending mainly reflect wide variations in the allocations to medical and public health spending rather than allocations to family welfare programmes. The per capita spending on family welfare in 2002–03 ranged between Rs. 20 and Rs. 30, except in a few districts such as Ramnad, Sivaganga, Nilgiris, and Perambalur, where the spending exceeded Rs. 30 per capita. Linkages between public spending and the health status of the population are not clearly established, however.

<table>
<thead>
<tr>
<th>Year</th>
<th>% Primary</th>
<th>% Secondary</th>
<th>% Tertiary</th>
<th>% Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>1991–92</td>
<td>46.1</td>
<td>16.5</td>
<td>33.1</td>
<td>4.3</td>
</tr>
<tr>
<td>1995–96</td>
<td>45.4</td>
<td>34.6</td>
<td>15.6</td>
<td>4.4</td>
</tr>
<tr>
<td>2000–01</td>
<td>44.2</td>
<td>28.2</td>
<td>22.3</td>
<td>5.3</td>
</tr>
<tr>
<td>2001–02</td>
<td>45.8</td>
<td>25.0</td>
<td>24.7</td>
<td>4.5</td>
</tr>
</tbody>
</table>
Social constraints affect the health status of a community and service utilization levels. It is difficult to motivate people to seek and use the health services offered until this root cause of poor service utilization is effectively addressed.

For women, most of the social barriers are rooted in gender-based beliefs and practices. The low status of women and strong son-preference have encouraged the practice of early marriage, frequent pregnancies, and female infanticide in some areas and communities, thus endangering women’s health. Neglect of women’s nutrition and medical needs have worsened the situation. Gender-based beliefs and practices have placed a low value on a woman’s life and health.

Kalaipayanam

Only awareness-raising in the community on various gender issues and their deleterious effects can help to promote community involvement in public health. Since the mid-1990s correcting gender imbalances and reducing female infanticide have formed an essential component of health and welfare policy in the state. Several programmes and initiatives have been tried. The Kalaipayanam, or street theatre, was one imaginative initiative. Under the Danida Project it was tried out initially in Dharmapuri district, which had a high incidence of female infanticide, and later replicated in Tiruvarur.

The topics covered in such street plays included dowry, violence against women, early marriage, and maternal health and mortality. Particularly powerful was the message on gender equality in decision-making. In view of its positive impact, this mode of street play was replicated in Theni District under RCH I.

PRI training

Another programme tried out was training for members of the Panchayat Raj Institution (PRI), sensitizing them to gender issues affecting health and to the PRI members’ role in improving community health and welfare.

The strategy was to approach directly members of elected bodies to educate them on health and health-related issues, the various health programmes available, and their utilization for the benefit of the community. The underlying idea was to create demand for health services among the public by raising their awareness levels.

MCH care was an important topic covered in such sessions. Sessions addressed such issues as registration of pregnancies, informing the VHN about pregnancies, obtaining antenatal care, and facilities for emergency transport to a hospital.

Social marketing

Social marketing is yet another strategy adopted to educate the community about health services and facilities available to them, thereby increasing the demand for public health services. The initiative addressed high-risk couples, adolescent girls,

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1 PRIs are the elected local bodies for local governance in rural and urban areas.
panchayat members, other community leaders, and members of women's Self-Help Groups.

Group-specific topics were addressed. For example,
- high-risk couples were apprised of the need to limit family size and space pregnancies, the risks involved in early marriage, and the implications of a declining sex ratio due to strong son-preference;
- adolescent girls were made aware of the physical and emotional changes of adolescence, nutrition needs, body mapping and the reproductive system, maintenance of health and hygiene, sex-related infections, and the importance of gender equality.

The impact of this initiative was noticed in:
- many men, especially the younger ones, taking responsibility for the health of their children;
- greater attendance at antenatal clinics;
- later age at marriage;
- greater readiness for sterilization after two or three girl children;
- improved health-seeking behaviour.

Behaviour change communication

Using multiple channels to reach the individual, behaviour change communication provides empowerment and skills to individuals to make changes and creates a supportive environment in which individuals can make and sustain these changes.

Effective communication is based on a thorough understanding of personal behaviour responsible for poor health outcomes, of people's knowledge, practices, beliefs, myths and misconceptions, and value systems and of cultural and religious practices as well as levels of education. Not only the messages but also the modes of communication have important roles in effective communication.

Radio broadcasting was tried as a means to raise health awareness among adolescents. A project for adolescents—the Malarnadhum Malaratha Adolescent Health Education Project—was launched under TNHSP with the cooperation of the Tamil Nadu Science Forum (TNSF) and All India Radio (AIR). This project addressed adolescents in 10 Danida project districts.

The objectives of this programme were to:
- familiarize adolescents in rural areas with health-related issues—physical, emotional, and social;
- foster empowerment through collective discussion and interaction following group listening to AIR broadcasts on various topics;
- forge links between the health service providers and the community.

About 150 episodes were broadcast in 2000–2002. The episodes covered a wide range of topics such as physical health, changes during adolescence, sex, marital relationships, AIDS and other diseases, addictions, education, friendship, self-confidence, and gender issues.

In each district TNSF coordinators formed 10 or more radio listeners' clubs, each with a membership of 10 boys and 10 girls, all adolescents. Among the members were school children, dropouts, and working children. The programme's activities focused on these clubs.

Each club was given a radio-cum-cassette recorder. Club members listened, took notes, and discussed the topics after the broadcasts. Group leaders, mostly girls, were chosen from among club members and trained to conduct the discussions.

In addition to the weekly club meetings, workshops took place at the district level; at cluster level, bringing together participants from three or four districts; and also at the state level, with representative participants from all 10 districts.

The programme helped bring together boys and girls who would otherwise have led narrow, gender-segregated lives. It provided them with a forum for healthy interaction with their peers. It opened up new prospects for them in several spheres, making them realize that ordinary friendship with the other
sex, without sexual implications, was possible and rewarding.

The participating adolescents learned a variety of skills—the abilities to question, analyse, debate, and communicate. For the girls, in particular, the experience was a liberating one, bringing them out of a protective, conservative family and social circle and thereby fostering self-confidence.

The programme promoted a rational attitude, self-confidence, and a sense of equality cutting across religion, caste, gender, and other social restrictions. Feedback from participants indicated that many of them changed beliefs, attitudes, and practices because of the programme. Also, through example and persuasion, many influenced family members and friends to adopt more rational, gender-sensitive, and helpful behaviour. The radio programme also helped to bring several dropouts and working children back to school.

The programme had an impact on many parents as well. Several girls’ parents, who had earlier been reluctant to let their children participate in such mixed clubs, became enthusiastic supporters when they saw how it helped their children grow into reasoning and caring adults. Parents who attended the workshops at various levels were among those who were most enthusiastic about the clubs.

The programme ran for three years. Since its termination many of the listeners’ clubs have continued as informal groups.
Tamil Nadu has achieved substantial success in improving the quality of antenatal care and in promoting institutional delivery over the years. Still, challenges remain. Inability to ensure readily accessible emergency obstetric care around the clock in all areas has adversely affected maternal mortality rates. The other important issue is gender discrimination in health, resulting in poorer health outcomes for females. Until this is effectively addressed, substantial further improvement in women's health is unlikely.

Addressing these crucial issues forms the cornerstone of Tamil Nadu’s health policy interventions in the Reproductive and Child Health (RCH) programme. Under this programme a substantial management and administrative structure has been established at the state level, while at the district level resources have been strengthened effectively.

Despite remarkable achievements over the past several decades, the state still has a lot of unfinished tasks in the health field. Specific areas of concern are:

- regional disparities in several indicators—institutional deliveries, skilled attendance at birth, sex ratio, health-seeking behaviour, and, generally, performance levels in the field;
- lack of a significant reduction recently in neonatal mortality;
- female foeticide in some areas;
- lack of consistently high-quality antenatal and postnatal care in all health facilities;
- anaemia in adolescents and pregnant women;
- substantial numbers of higher order births;
- poor male participation in contraception;
- insufficient focus on urban health issues.

The following proposed initiatives address some of these concerns, but there is still room for improvement.

- scale-up of “near miss” audits for maternal mortality to cover the entire state and generate lessons learnt for systemic improvements;
- scale-up of use of partographs to assess the progress of labour;
- restricted use of episiotomy;
- active management of the third stage of labour;
- steroid administration for premature labour, to prevent neonatal respiratory distress syndrome;
- prophylactic use of antibiotics for premature rupture of membranes;
- anaemia control through ISM drugs;
- protocol for the use of oxytocin;
- use of an antishock garment for treatment of postpartum haemorrhage;

The National Urban Health Mission is in the pipeline. It will address reproductive and child health issues in cities and towns.

With a strategic vision, Tamil Nadu has taken a number of initiatives to strengthen the public health systems at the primary level of care. Giving primary care a human face has improved both providers' behaviour and the care-seeking behaviour of the public, who come in increasing numbers to maternal, newborn,
and child health services. Tamil Nadu will continue to sustain this momentum to improve the quality of life of mothers and children. As articulated by WHO,

“The health and well-being of women and children are completely linked. There is a strong consensus that maternal, newborn and child health (MNCH) programmes will only be effective if there is a continuum of care, from pregnancy through childbirth into childhood. This continuity requires greatly strengthened health systems with MNCH at their core.”

Tamil Nadu has a good and well-developed health infrastructure with adequate trained manpower. Poor access to these institutions in times of need has been a major problem, however, in spite of the good roads and communications network in the state. One of the weakest links in the health care delivery system is the referral system, in spite of the various initiatives taken by the government to improve it.

An effectively functioning referral system will not only reduce maternal and child morbidity and mortality but also reduce the cost of treatment for the poor. It also will lessen anxiety and tension during emergencies.

The challenges posed by an ineffective referral system were:
- unnecessary referrals to institutions that lacked specialists to handle the case;
- the absence of a single agency to coordinate referrals at the district level;
- lack of coordination and communication among various tiers of the health system;
- lack of a government ambulance in emergencies;
- no advance notice to the referral hospitals about the arrival of emergency cases;
- poor preparedness and responsiveness of the public health facilities in handling emergencies;
- lack of awareness among both the people and the referring institutions about the availability of emergency services in the referral hospitals;
- lack of proper monitoring and documentation and also of feedback on referrals;
- poor accountability of service providers due to the lack of a monitoring system.

**Strengthening the referral component**

In response to this situation, an initiative was taken in 2005 to strengthen the referral component through an effective Referral Information Networking System. This initiative, piloted under the Reproductive and Child Health Programme (RCH) I, was subsequently replicated throughout the state.

**The strategy**

**24 hour a day control rooms**

A 24 hour a day referral control room has been set up in the offices of the Deputy Director of Health Services (DDHS) in each of the Health Unit Districts (HUDs). Health inspectors run these control rooms. They are selected based on their aptitude for this type of work. A team of doctors and counsellors trains the inspectors to manage the referral system.

A telephone with a dedicated toll-free number is installed in each control room. The control room has the telephone numbers of all local public hospitals, private hospitals, private anaesthetists, government and private blood banks, obstetricians, ambulances (both government and private), blood donors clubs, and blood donors. A district map showing where ambulances are stationed, with the mobile
telephone numbers of the drivers, is available in the control room.

The computer in the offices of the DDHS is used for documentation. Referral information received from the public and from health and social welfare functionaries, as well as detailed patient information that is passed on to the health facilities, is entered into the computer system. The district officers use this information, along with details on services provided at the referral institutions, to monitor the functioning of the referral system.

Information flow

The referral control room receives information from the general public, health functionaries, *anganwadi* functionaries, members of self-help groups, and panchayat elected leaders (see Fig. 22). The information could indicate that referral and/or transportation are needed for any of the following:

- for normal delivery cases to the PHCs;
- for obstetric emergencies to CEmOC and newborn care centres;
- for newborn emergencies to CEmOC and newborn care centres;
- for accident victims;
- for cases in epidemic outbreaks.

On receiving such information, the referral room coordinator takes the following actions:

- the coordinator records the details in the computer or register;
depending on the type of emergency, the referral room coordinator suggests to the caller the nearest health facility to which the patient can be moved. If the services are needed for a woman in labour, she is sent to a 24 hour a day PHC. The PHC is advised by phone to be prepared to receive the pregnant woman. In a separate register the PHC records the details received from the control room;

if the pregnant woman has a problem that can be handled only at a CEmOC and newborn care centre, the pregnant woman will be moved to the nearest CEmOC and newborn care centre;

the obstetrician in the CEmOC and newborn care centre is informed about the details of the obstetric emergency, including the woman’s blood group, so that the centre will be ready to receive the emergency case and initiate treatment without delay. The duty obstetrician records in the register the date and time that the information is received, patient details, and other relevant information;

if transportation is required, the referral coordinator telephones the ambulance stationed in a strategic location in the block and directs the driver to pick up the emergency case and go to the appropriate health facility;

if the caller wants to take the case to a private hospital, the referral coordinator informs the private hospital of the patient details and instructs the driver to take the case to the private hospital as the client has requested;

if the CEmOC and newborn care centre needs a particular blood group for the emergency, the referral coordinator contacts other blood banks in the district, including the private blood banks, and arranges for an ambulance to collect the blood and deliver it to the CEmOC and newborn care centre;

the referral coordinator also, if needed, contacts the blood donors club or a donor for collection of blood during emergencies;

two ambulances are stationed at the control room in the DDHS office, with drivers available around the clock. These vehicles are standby vehicles for emergencies, in addition to the ambulances stationed in the blocks in various parts of the district;

the ambulances run by NGOs are permitted to collect transport charges from the patient, for one way only, at the rate of Rs. 5 per km. Pregnant women below the poverty line are given vouchers by the Village Health Nurse. The pregnant woman can use the vouchers instead of payment for ambulance transportation. At the hospital the voucher is stamped and handed over to the ambulance driver. (Vouchers are also given in advance to mothers below the poverty line for management of postnatal problems and newborn emergencies. The NGOs are reimbursed for the vouchers);

in case of any delay in getting care at the referral facility, the coordinator contacts the DDHS, the Joint Director of Health Services (JDHS), and the Deputy Director (DD) (Medical) through their mobile telephones to obtain further help;

if needed, the numbers of referral coordinators and telephones in the control room are increased;

also, if needed, voluntary organizations such as the Lions and Rotary clubs are involved;

depending on the response needed, more vehicles from the PHCs are put into the emergency transport system.

Publicity

The referral control room telephone numbers are widely displayed in all public places—anganwadi centres, PHCs, HSCs, ration shops, buses, hoardings, etc. The mass media are actively involved in publicizing the referral system. The mother and child health cards issued to pregnant women display the referral control room telephone number. The telephone number also is printed in the telephone directory under “essential services”.

Ambulance support

Reputable NGOs run the ambulance service in the districts (see Chapter 4). The Tamil Nadu Health
The ambulance service is a cooperative effort linking the NGOs and the government through two-year renewable contracts:

- the Government of Tamil Nadu/Tamil Nadu Health Systems Project (TNHSP) provides ambulances with equipment free of cost to the NGOs selected;
- TNHSP pays the cost of insurance and expenses towards getting the vehicle fitness certificate every year;
- TNHSP also provides a nominal amount, Rs. 7000 per month per vehicle, towards topping up operating expenditures;
- TNHSP contributes a one-time grant of Rs. 10 000 per vehicle towards creating public awareness of the services;
- the NGOs see that the ambulances are maintained and covered under an annual maintenance contract;
- the NGO pays the operating costs of the ambulance;
- the NGO recruits, hires, and trains the drivers and nurses.

Effective use of emergency transport has gone a long way toward avoiding or greatly reducing in-transit delays, which are one of the three major delays responsible for maternal mortality and morbidity. The timely availability of ambulances is linked with availability of timely, good-quality services in the public health facilities. The transport service also helps reduce the two other delays that cause maternal deaths—delays in seeking care and delays in obtaining appropriate care once at the facility.

**Monitoring**

Along with efficient coordination, the robust monitoring system has contributed greatly to the success of the transport system. Once a month the District Emergency Ambulance Society meets and reviews all the referrals received from the DDHS offices and their outcomes.

The referral details also are sent to the appropriate PHCs and municipalities for follow-up. Also, the Director of Public Health and the Director of Medical and Rural Health Services receive a consolidated report on referral outcomes every month.

The performance of the ambulances also is regularly assessed. The indicators used for such assessment are:

- number of cases transported;
- number of emergency cases transported;
- number of obstetric cases transported;
- number of cases of road traffic accidents transported;
- number of non-emergency cases transported;
- number of poor people (below the poverty line) exempted from payment;
- total distance travelled, in km;
- receipts/expenditures;
- vehicle downtime.

### Advantages of the referral information networking system

The benefits include:

- one-stop solution to all referral problems;
- trained referral coordinators providing guidance and support to patients in receiving appropriate care at the health facilities;
- patient-friendly referral system, with the referral coordinators trained in counselling techniques;
- good coordination among various tiers of the health system;
- transportation support without delay because the referral control room communicates with all ambulances including private ambulances;
- better emergency preparedness—and thus less delay—at the referral hospitals thanks to advance notice and basic information about the referral cases, such as the patient’s blood group;
- improvement in the overall quality of the referrals;
- close monitoring and tracking of every referral case;
- accountability among the service providers, due to close monitoring;
- documentation of the entire referral process through the computerized system;
- feedback to various referring institutions about the outcome of the referrals;

- avoidance of unnecessary referrals;
- encouragement of community participation in the referrals;
- sustainability of the NGO-run ambulance services through sufficient revenue generation;
- ability to identify and recognize good performers.
2. Logistics and the Supply Chain

**Background**

Timely availability of medicines has been one of the major problems of the public health system in Tamil Nadu. Free treatment loses its value when the patient is told to buy medicines elsewhere or is given drugs that have passed their expiry date. Inadequate and irregular supply, poor distribution and storage, and, at times, careless dispensing all have played havoc with drug delivery in the public health system.

While all health facilities have suffered from these problems, those at the far end of the supply chain, that is, PHCs and HSCs, have borne the brunt. Dumping of unwanted drugs at the health facilities was another irritant. All this resulted in a situation of periodic stock-outs at some times and surpluses at other times.

The key components of the World Health Organization's action programme on essential drugs are selection, quantification, procurement, storage and distribution, and rational drug use as well as user satisfaction. In Tamil Nadu Danish International Development Assistance (Danida) has aided the state's essential drugs programme. The focus has been on improving logistics, management, and human resource development. This effort has improved drug supply to government health facilities, has assuring continuous availability, and at the same time has upgraded the skills of the service providers in drug management and usage.

Danida also assisted, in Phase I of its project, in the supply of drug kits in the two project districts along with funding for maintenance of HSCs to ensure, among other things, proper storage of drugs. At that time poor refrigeration at district and PHC levels made it difficult to maintain the cold chain for storage and supply of vaccines. Under the Universal Immunization Programme, initiated in Salem District in 1985–86 and in South Arcot District in 1987–88, Danida provided refrigerators, cold boxes, and vaccine carriers to strengthen logistics for immunization.

In Phase II there was a further increase in inputs from Danida, under a special scheme, to strengthen the drug supply system. Important among these inputs was setting up drug warehouses in Villipuram, Cuddalore, and Salem to facilitate drug distribution.

Still, the mid-term review of Phase II and the Phase I evaluation drew attention to the persistence of irregular, inadequate, and inappropriate drug supplies at several points. It was decided that a major overhaul of the entire drug supply system was essential. This was the impetus for the establishment, in 1994, of the Tamil Nadu Medical Services Corporation Ltd. (TNMSC), charged with implementing the essential drugs programme.

**Essential drugs programme**

The salient features of this programme are:
- compilation of an essential drug list, consisting of 271 drugs as well as surgical supplies and consumables; this list was based on the WHO list of essential drugs, modified to meet the state's requirements;
centralized procurement of the drugs on the list by TNMSC, using streamlined procedures;

establishment of district drug warehouses, managed by TNMSC, for decentralized, streamlined distribution;

an indenting system, which facilitates procurement of required drugs from the district warehouse by the health service facilities in its catchment area;

fixing of an annual monetary limit (with some flexibility) on supplies drawn by each facility from a warehouse;

flexibility for the health facilities to make local purchases to meet emergency needs;

a computerized information system for continuous monitoring of inventories in the warehouses;

strict quality control of drugs purchased, through inspection of drug manufacturing facilities and regular quality testing of drugs purchased and stored.

TNMSC began its procurement and distribution operations towards the end of Phase II. It was in Phase III, commencing in 1996, however, that much of the innovative activity took place, building up the system and making it a “Best Practice”. It was also in 1996 that the drug supply management system developed for the project districts was reviewed and replicated throughout the state.

The first step was to emphasize need for essential drug listing and rational use of drugs, and not just availability, in drug supply in the public health system. It was also recognized that supplying loose drugs meant unnecessary handling, resulting in poor quality and loss of credibility with the public. Packaging of all drugs in foil and blister packs and preparation of the essential drugs list were two of TNMSC’s early steps.

**TNMSC structure**

From the beginning TNMSC was seen as a means to ensure supply of “the best drugs in the best packaging to the poorest of the poor”. It was not seen as an organization cast in the conventional government mould, but rather as a corporation (it was incorporated under the Companies Act in 1994) with minimal staff and minimal paperwork and making effective use of information technology. Chaired by the Health Secretary, the TNMSC board includes the Finance Secretary and another Indian Administrative Service officer, a general manager for administration, a doctor as technical manager, a quality control manager, and a purchasing manager. Much of its daily functioning, including the front office work and the computer section, has been outsourced from the beginning.

More than a decade after its incorporation, TNMSC maintains its efficient functioning, with a streamlined structure. Most of the staff members are on deputation from other government departments, thus keeping overheads low and offering the flexibility to reduce staff size as and when necessary.

**Essential drugs list**

The Corporation’s brief has been to ensure both efficiency and flexibility in the supply of drugs. To this end, TNMSC brought out an essential drugs list, based on the WHO model list but suitably modified, using generic names for uniformity in prescription and use. The drug list, which is the only basis for procurement and distribution, is updated every year. This updating promotes timely and proper procurement and efficient storage and distribution, resulting in saving of time and money and avoiding wastage.

The compilation of the essential drugs list was an exercise in rationalization. It involved removing several drugs of doubtful benefit. It also followed the principle that unnecessary injections and antibiotics should be avoided. It put a stop to unjustified accumulation of certain items, such as liquid paraffin. Rationalization has also ensured appropriate prescription of drugs in their proper dosage and durations of administration.

The process of rationalizing the drugs list faced strong opposition from many in the medical establishment. Having convinced the Health Ministry and secretariat of the need for such rationalization, however, TNMSC was able to implement it. Originally
containing 170 drugs, the list was later expanded to 210. Currently, the list includes 271 drugs.

**Transparency and quality control in procurement**

TNMSC procures drugs through an open tender system and competitive negotiation, followed by direct supply from manufacturers and delivery to its warehouses. This eliminates one leg of storage and delivery in bulk, from a central storage place to the district warehouses. Direct procurement from manufacturers bypasses dealers and thus reduces cost. The open tender system is also an anti-corruption measure that increases efficiency.

The tender system is an example of the detailed planning that is the hallmark of TNMSC activity. Tenders are floated once a year. Each bidder must submit two covers, A and B, the first containing a technical bid and the second, a commercial bid. The technical bid has to provide notarized information about the bidder's years of experience in the manufacture of every product in the list, any convictions for drug malpractice within the last five years, credibility in marketing in India and abroad, equipment status, manufacturing capacity, and annual turnover of business operations. Scrutiny of this information is followed by inspection of the manufacturing premises, which includes checking on water sources and their use and also on waste disposal.

Only suppliers who pass this rigorous technical test participate in the commercial bidding process. The opening of commercial bids is computerized and open to view by all. The lowest bid is identified, and there are negotiations with other close bidders to match it. Depending on the volume of the requirement, orders are distributed among a minimum of three and a maximum of nine suppliers.

The Corporation’s procurement of drugs is based on continuous monitoring of the consumption pattern. This ensures drug availability at all times and prevents stock surpluses as well as wastage due to expiry. Special packing with a logogram has minimized pilferage at all points in the distribution chain. Together, all these measures have reduced the cost of essential drugs. Such savings has made it possible for TNMSC to optimize its drug purchases. Within a very short time since its establishment, TNMSC had developed into a self-sustaining institution.

The old method of obtaining drugs in bulk, in loose form or in bottles, has been replaced by procurement of strips or blister packs. This packaging makes handling easier and prevents deterioration. Rigorous quality control measures, such as regular checking by independent approved laboratories, also are followed.

A system of vendor rating and performance appraisal, through monthly meetings with vendors and meetings of warehouse pharmacists, was set up in the early days of the TNMSC. This system provides for immediate follow-up on complaints.

One initial hitch in the procurement system was incorrect assessment of requirements, leading to excessive ordering. Also, some companies that met the initial requirements were not able to maintain quality or meet delivery deadlines. With time and experience the process has smoothed out.

**Distribution network**

As noted, Phase II of the Danida project witnessed the establishment of warehouses in Villipuram, Cuddalore, and Salem. Even as TNMSC was being planned, the rented premises in Salem and Cuddalore were replaced with newly constructed central drug warehouses catering to the needs of the health facilities in their districts. Later, the Villipuram warehouse was built. During Phase III the establishment of central drug warehouses, in either newly built or rented premises, was extended to non-project districts as well. On demand, manufacturers supply these warehouses with centrally purchased drugs. A computerized inventory management system supports this process.

The central warehouses in the districts ensure continuous availability of drugs to the health facilities. The facilities are allowed to draw their supply, based on their requirements, from the
warehouse through the indenting process. This prevents accumulation of unneeded drugs at the health facility. Further flexibility comes from a system of transfer according to need both among districts and among PHCs. This method of sending the drug where it is needed reduces storage beyond expiry date. Along with supply, storage conditions at the health facilities also have been improved.

Each health facility is issued a passbook indicating its annual fund allotment, within which it can draw drugs from the central drug warehouse. Each time the health facility indents for drugs, its passbook is updated to indicate the balance remaining. This has helped to impart a sense of rationalization in drug indents, curbing the temptation of health facilities to draw costly drugs in excess of their needs.

There exists, however, a certain amount of flexibility. The health facilities are permitted to draw in excess of their fund allotment in emergencies and to meet genuine requirements. The justification needs certification by higher authorities.

To improve management and develop human resources, warehouse pharmacists are trained in store management and inventory control. Pharmacists at the health facilities also are trained, to upgrade their skills and knowledge concerning rational indenting, proper stocking, inventory management, and tracking of expiry dates.

**Drug supply management**

TNMSC works on a number of fronts to improve and maintain efficiency in drug supply—for example, drug quantification studies, a training seminar for central warehouse managers and pharmacists in drug supply management, and management information systems. External consultants have been used when necessary. TNMSC also has assessed the pre- and in-service training needs of its staff and ensured that drug supply management is included in the training curriculum for PHC staff such as medical officers and pharmacists.

**E-governance in drug supply**

Monitoring is another responsibility that falls within the Corporation’s purview. TNMSC has effectively used information technology such as computerized monitoring of procurement and stocks. Internet connections for the TNMSC and the central drug warehouses, and regular updating of drug stock status on its website, enhance efficiency, speed, and transparency.

The storage system in the central warehouses facilitates easy handling of materials. Racks are constructed so as to avoid wasting space. Drugs are stored according to essential list classification and arranged according to frequency of handling for storage and retrieval. Automated systems such as electric stackers are used.

The model of the racking system is fed into the computer, which makes a plan of drug storage space available whenever a note for issue of drugs is generated. It is estimated that storage and retrieval from storage have become 30% more efficient as a result.

Other aspects of the integrated system of computerization are E-tendering through the web server; linking the chain of order placement, suppliers, and warehouses; production of invoices; and printing of cheques.

When samples from warehouses are sent to testing laboratories for quality control, the results are obtained through e-mail. Details of test failures are passed on to the central warehouses in the same way.

The Internet connection between TNMSC and the central warehouses makes possible speedy stock monitoring. The information system links each warehouse with the main office for passbook and order information, indents received and filled (subject to fund allotment), and orders placed with suppliers and their status.

The information system also keeps track of and produces reports on problem areas, such as slow
moving transfers, expiry of drugs, unexecuted order statements, and pending bills. It is planned to incorporate bar coding and video conferencing into the system soon.

An expanding institution

The drug logistics and supply system was initially intended for only the primary health facilities. It has extended over the years, however, and now covers:

- all medical teaching institutions in the state, including employees state insurance (ESI) hospitals and local-body dispensaries;
- medical facilities of the State Electricity Board, Transport Corporation, cooperative sugar factories, police, prisons, and juvenile homes;
- supply of veterinary drugs to the animal husbandry department and all veterinary institutions in the state.

Expansion of activities includes establishment of magnetic resonance imaging (MRI) centres and Computerized Tomography (CT) scan centres that provide diagnostic services at nominal rates; managing the rate contract for blood banks; purchasing consumables for the Tamil Nadu AIDS Control Society; supplying equipment for the Directorate of Rehabilitation of the Physically Handicapped and also specialty departments of hospitals; and consulting for other states on drug warehousing and logistics. TNMSC has also added a construction wing, which manages construction for various projects. The construction wing of TNMSC has built new central drug warehouses, and it repairs and maintains the warehouses and the health facilities as required.

The drug logistics and supply chain operating successfully in Tamil Nadu has now become the forerunner and model for similar ventures in several other states.
Ready availability of blood of all kinds can save lives during emergencies. Field experience indicates that there are enough volunteers willing to donate blood during camps or on call. What is required is to establish proper linkages between the volunteers and the blood banks.

In Theni district in 2003, under RCH I, the Deputy Director of Health Services tried an innovative project to conduct voluntary blood donation campaigns systematically throughout the year, in collaboration with the government blood banks and the Red Cross Society. Availability of blood in all the government blood banks, including the blood banks in the medical colleges in this district, was thus ensured all through the year. In view of the success of this initiative, it has been scaled up, under RCH II, throughout Tamil Nadu.

**The problem**

Often in practice there is a large collection of blood on special occasions, but then some of the blood collected goes waste due to:
- huge collection during a few months of the year but without appropriate storage conditions;
- the short shelf-life of blood—just 45 days;
- lack of blood component separation facilities in some hospitals;
- lack of networking of blood banks in the state.

The blood requirement for emergencies, especially obstetric emergencies and accidents, is more or less uniform throughout the year. But the collection of blood is not uniform throughout the year. Fortunately, there are adequate numbers of willing donors throughout the state. The blood donation camp addresses the requirements of blood evenly throughout the year.

**Objectives**

The objectives of the organized voluntary blood donation campaign are to:
- ensure ready availability of the required group of blood 24 hours a day and 365 days a year in all the approved blood banks;
- create and update a directory of voluntary donors so that the required blood can be obtained on short notice and without delay;
- build up the capacity of the PHC system to organize blood donation camps regularly;
- generate awareness on blood donation and its significance in saving lives in emergencies, particularly obstetric emergencies and accidents.

**Strategy**

An annual plan for organizing blood donation camps is drawn up in each Health Unit District in consultation with the blood donors clubs, Lions Clubs, Rotary Clubs, Red Cross Societies, industry representatives, college authorities, and NGO representatives. The blood banks in the state are networked.
The salient features of the strategy are to:
- organize blood donation camps throughout the year, on a fixed day every month, according to the district annual plan;
- organize community-based blood donation camps in industries, colleges, NGOs, and blood donors clubs depending on the needs;
- develop a strategy for organizing blood donation camps during school and college vacations;
- assess the annual blood requirement of all public health facilities in the district and put in place suitable logistics to ensure periodic supply of the needed blood to the blood banks;
- prepare a directory of voluntary donors;
- create awareness on blood donation, and its vital importance, during the blood donation campaigns;
- strengthen the existing system of blood collection;
- in order to reduce wastage, develop a system to monitor collection and utilization of blood on a monthly basis.

All these activities are being carried out in consultation with the Tamil Nadu AIDS Control Society.

**Partners in the scheme**

The blood donation campaigns are a joint effort of the:
- joint Director of Health Services and team;
- deputy Director of Health Services and team;
- blood bank medical officers and team;
- deputy Director (Medical & Family Welfare) and team;
- concerned PHC medical officers and team;
- Indian Red Cross Society;
- local community-based organizations, individual volunteers, and philanthropists;
- National Service Scheme/Youth Red Cross units of colleges.

**Activities**

Operationalizing the strategy involves:
- selection of villages and sites for camps;
- fixing of a date, 15 to 20 days in advance;
- logistics and mobilization of blood donors by the Deputy Director of Health Services and Primary Health Centre team;
- technical guidance and support to blood collection units by blood bank medical officers and team;
- coordination and reimbursement of contingency expenditure by local sponsors;
- blood collection by the blood bank team;
- issuance of certificates to the donors at the campsite by the blood bank medical officer.

During such camps community members observe and learn about blood donation and its significance in saving lives.

The collected blood is subjected to mandatory tests before it is made available to patients admitted in government hospitals or, on payment of the prescribed fee, in private hospitals.

Currently, there are in the state:
- 81 government blood banks;
- 140 private blood banks;
- 26 storage centres.

All the doctors and staff nurses in government hospitals have received blood bank training.
On-going monitoring and periodic evaluations form an integral part of the interventions on pregnancy outcome in the state. The information generated in the process is used not only to track progress but also to pinpoint bottlenecks in the field and the actions needed to overcome them.

This information-gathering exercise is conducted through a mix of:
- routine reporting;
- review meetings;
- specific surveys;
- feedback process.

**Routine reporting**

Monthly and other periodic reports are generated in the field at the levels of both primary care and secondary and tertiary care.

As noted in Chapter 4, the information collected at the primary level includes:
- MCH Report (outreach and institutional), based on the basic MCH registers;
- Institutional Services Monitoring Report (ISMRF), through optical mark reader forms;
- maternal death report to the state, within 24 hours by telegram, fax, or e-mail;
- Integrated Management of Neonatal and Childhood Illness (IMNCI) reports;
- infant death report;
- Integrated Counselling and Testing Centre (ICTC) report;
- RTI/STI clinics report and special clinics report;
- data from special camps—Family Health Awareness camp and Varumun kappom thittam.

The data on secondary and tertiary care flow from:
- daily reporting system through the telephone;
- Monthly Institutional Services Monitoring Report;
- maternal death report (within 24 hours).

**Flow of reporting**

The reporting process is depicted in Fig. 23.

**Fig. 23: Flow of reporting in the Tamil Nadu public health system**

**MCH report**

The monthly MCH report collects vital information for monitoring MCH service delivery. The data collected cover:
- % of pregnant women\(^1\) who are registered;

\(^1\) The number of pregnant women is estimated from the birthrate for each district and block.
% of pregnant women registered within the first 12 weeks of pregnancy;
% of pregnant women registered within 12–28 weeks of pregnancy;
% of pregnant women registered after 28 weeks;
% of pregnant women vaccinated with tetanus toxoid—TT-1, TT-2, or booster;
number of antenatal visits;
% of pregnant women with five antenatal visits;
% of pregnant women who are anaemic;
% of pregnant women treated with 200 iron-folic acid tablets;
% of deliveries taking place in institutions (institutional deliveries);
number of deliveries conducted in government hospitals;
number of deliveries conducted in PHCs;
number of deliveries conducted in HSCs;
number of deliveries conducted in private hospitals;
% of deliveries taking place at home (domiciliary deliveries);
number of domiciliary deliveries attended by health staff;
number of domiciliary deliveries conducted by trained dais;
number of domiciliary deliveries conducted by untrained dais;
% of deliveries that received skilled attendance;
number of low-birth-weight babies;
number of high-risk mothers;
% of births that were stillborn;
number pregnancies terminated as per the MTP Act;
% of pregnancies resulting in live births, by sex;
birth order of live births and sex;
number of high-risk newborns;
number of immunization sessions held;
% of children covered with all immunizations, by sex;
number of contraceptive adopters, by method.

**Institutional services monitoring report**

Until the late 1990s the monitoring system covered only outreach activities. Thus, data on institutional activities and events, especially regarding PHCs, were not readily or consistently available. The ISMR, introduced in April 1999, was a first step towards filling this gap. Filed by PHC staff and signed by the medical officer each month, this report provides extensive statistical information about all institutional activity at the HUD/PHC level. The ISMR is yet another new initiative in the Tamil Nadu Public Health System supported by Danida.

The data canvassed in the ISMR cover a wide range—out-patient and in-patient attendance; numbers of deliveries, laboratory investigations, minor surgeries, vaccines administered, and sterilizations done; **siddha** out-patient attendance, utilization of ambulances and PHC vehicles, and several other statistics.

With information coming in from all the PHCs in the state, the amount of monthly data was too voluminous even for computer entry and tabulation. Hence, Danida provided the statistical wing of the health service with the optical mark reader (OMR), which scans the special format of the ISMR and, through a computer link, makes possible tabulation, consolidation, and analysis. The analysis is available for each level: PHC, HUD, district, and state.

By the 10th of every month this special format is sent through the district offices to the state capital. By the 15th it is scanned, consolidated, analysed, and sent to the Chief Minister’s office, the Health Ministry, and state-level health officials. By the 20th the field-level staff receives feedback through the district.

A portion of the ISMR report is reproduced as Fig. 19 in Chapter 5.

**ISM R training and fine-tuning**

The introduction of the ISMR followed many months of planning and preparation. Several workshops
took place to finalize the format and to sensitize staff to its use and benefits. All health-related departments, such as public health, family welfare, and medical services, were brought into the consultation and training process.

For a little over a year after introduction of the ISMR, the same information was also recorded in the previous format at the PHC level, and copies were sent to the DDHS and the Directorate of Public Health (DPH). These reports were compared with the new format to spot mistakes and discrepancies that might occur because of the PHC staff’s limited familiarity with new ISMR. Initial problems in the use of the ISMR format related mostly to inaccuracy in shading, ink spots, smudging, and folding or creasing of the paper, all of which made it difficult for the optical mark reader to read the report. Once the new format was well understood and accepted as routine work, the duplicative filing of the conventional forms was abandoned. The process was internalized in the health system with the DPH taking receipt of the optical mark reader from Danida. This mainstreaming of the ISMR system took place in April 2003.

**Results and uses of the ISMR**

Within a short period after its introduction, the value of the ISMR had been decisively demonstrated. Covering about 12 institutional activities, the feedback provided by the ISMR has sharply raised awareness of performance levels. At the district level feedback goes not only to the DDHS but also to the District Collector. Review meetings at both district and PHC levels discuss the results. Dramatic improvement over four years in overall performance figures for certain activities can be attributed in large measure to this detailed monitoring and feedback, although there have also been other inputs such as infrastructure improvement.

ISMR statistics also have helped to identify specific problems, such as long-term vacancies. Once identified, such vacancies have been filled, particularly where female medical officers are needed. The result has been a more balanced distribution of medical officer postings.

### Simplification of the recording and reporting process

Along with introduction of the ISMR, an effort was made to rationalize, redesign, and simplify the registers used by health service personnel. The major objectives were to:

- assess information needs at various levels of the health system;
- design an optimal recording and reporting system;
- develop suitable indicators of progress;
- design appropriate feedback systems;
- pre-test certain areas of the system and refine them based on feedback;
- define and distinguish manual and automated operations;
- design training packages;
- develop appropriate software for computerization.

The goals of this exercise were mainly:

- simplification of records at the grassroots level;
- ensuring upward flow of data from HSCs to the state level through the computer network;
- analysis of data at the HUD level;
- easier analysis of data by social class and gender;
- provision of feedback for rapid decision-making.

Some significant changes were introduced in the reporting and monitoring system. There is now a single report from the HSC to the various higher levels. For Village Health Nurses (VHN), who previously had to fill in as many as 24 registers, the process was streamlined and the number of records brought down to 9, greatly reducing the workload and making it more logical, eliminating repetition.

The VHN’s nine records comprise eight registers and Form 9, which contains the consolidated records. Form 9 is keyed into the computer at the PHC and sent to the district level for further consolidation. Transmitting the information thus became a standard, once-a-week process.
At the PHC level registers have been provided for all the staff. In all, there are 16 modules containing 102 registers. The report section of each register contains a duplicate copy on perforated paper, which is removed and sent to the DDHS for consolidation and forwarding to the state level. These registers cover all programmes for all the staff at the PHC level, both institutional and outreach.

At the next level—taluk, non-taluk, and district hospitals—another 16 modules of 120 registers have been provided, covering all activities. The consolidated institutional-level monitoring report is part of this.

A significant number of person-days per year have been saved through this simplification process, enabling the service providers to concentrate more on service delivery.

**Maternal death audits**

Two types of audit are done—the institution-based maternal death audit and the verbal autopsy. In the former only maternal deaths occurring in institutions are reviewed, to find out the causes of death and the related factors. The latter cover all deaths—institutional or domiciliary. In the case of domiciliary deaths, information is collected from the relatives of the dead with the help of a detailed questionnaire.

**Institutional death audit**

The institutional audit of maternal deaths came first. No doubt it helped sensitize the district officers, chief medical officers, and specialists to the importance of conducting maternal death audits. Minutes of the maternal death audit meeting are regularly sent to the Commissioner, MCH and Welfare.

There have been a few challenges as well:
- There is very little motivation on the part of the service providers to conduct a sincere audit, and often case records are poorly maintained;
- The supervisory officers tend to protect their subordinates rather than to find out about lapses in service provision;
- The relatives of the dead are not involved in the process;
- Very little information is provided in the audit reports on the quality of care or about delay in the provision of care at the institutions;
- Often the reports blame the field-level health functionaries;
- Non-medical and other contributory factors usually are not identified.

**Verbal autopsy**

Given this situation, a new initiative was undertaken in 2004, under RCH, to conduct verbal autopsies of all maternal deaths. Here, the investigators contact not only the institutional staff but also the relatives of the dead to collect crucial information on all factors that contributed to the death, such as lack of preparedness and delays in transit and getting timely assistance at the institutions, financial constraints, and other related aspects. A detailed questionnaire is administered to collect the relevant information.

The protocols for operationalizing this verbal autopsy included:
- Sensitization of health functionaries and line listing (online reporting) of maternal deaths;
- Maternal death notification protocol;
- Investigation of maternal deaths within 15 days, using a structured format;
- Facility-based audit and community-based maternal death audit by medical officers using the verbal autopsy format;
- District maternal death verbal autopsy meetings convened by the District Collector.

**District verbal autopsy meetings**

The District Collectors review the maternal deaths in their districts each month with all the concerned officials. All the service providers, district officials, and the relatives of the deceased participate in the verbal autopsy meeting. At these meetings the findings of the verbal autopsy are discussed. Also, the relatives describe the events leading to
the death of the family member. Various delays, barriers in access to care, delays in providing care, and quality of care, as well as informal payment in the institutions, are some of the topics discussed at these meetings.

Following the meeting:
- all the service providers are sensitized to the various delays and issues concerning the quality of care;
- all the contributory factors for each maternal death are analyzed, and the findings guide policy changes.

Findings

The verbal autopsy reviews in 2004 pinpointed several weaknesses in operations at the health facilities. These were:
- more deaths among the poorer families;
- misdistribution of First Referral Units and specialists;
- sub-standard care in the institutions and poor accountability among service providers;
- unnecessary referrals;
- lack of emergency transport facilities;
- overcrowding in First Referral Units for normal delivery;
- need for accreditation of more private health facilities;
- unmet need for MTP and tubectomy services;
- poor skills among health functionaries;
- lack of empowerment of health workers to provide obstetric first aid;
- lack of community awareness.

Review meetings

Periodic review meetings are another important means of monitoring. The types of reviews conducted include:
- fixed-day weekly meetings in the PHCs to review HSC and PHC performance;
- monthly review meetings of PHC medical officers and supervisors at the district level;
- monthly review of secondary-level hospitals at the district level;
- regional-level review meetings twice a year for secondary-level hospitals;
- institutional death audit review at the district level.

Nutritional assessment reports from the Social Welfare Department and birth and death reports from the Revenue Department and the local bodies are other sources of vital information.

Surveys

Surveys are conducted periodically at both the state and district levels. The types and frequency of surveys are shown in Tables 9 and 10.

<table>
<thead>
<tr>
<th>Survey</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sample Registration System (birth rate, death rate, infant mortality rate)</td>
<td>Annually</td>
</tr>
<tr>
<td>National Family Health Survey (antenatal coverage, immunization, family welfare)</td>
<td>Once in 5 years</td>
</tr>
<tr>
<td>Census (population, sex ratio, literacy, etc.)</td>
<td>Once every 10 years</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Survey</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vital Events Survey* (birth rate and other fertility indicators, death rate, infant mortality rate)</td>
<td>Once in 3–5 years</td>
</tr>
<tr>
<td>RCH Household Survey (antenatal/ intranatal/postnatal services, immunization, and family welfare)</td>
<td>Once in 5 years</td>
</tr>
<tr>
<td>Assessment surveys by external agencies</td>
<td>Whenever required</td>
</tr>
<tr>
<td>Coverage Evaluation Survey</td>
<td>Annually</td>
</tr>
<tr>
<td>Sentinel Survey for HIV</td>
<td>Annually</td>
</tr>
</tbody>
</table>

* Now suspended
Resources at the district level for monitoring

The resources available for monitoring at the district level include:
- qualified statistics personnel (at the district level and the block level);
- computer facilities;
- units of the National Informatics Centre, with satellite connectivity, at all district headquarters;
- video conference facilities at state and district levels.

Monitoring of quality of care

The tools adopted for assessing the quality of care comprise:
- client satisfaction surveys and exit interviews at CEmOC and newborn care centres;
- inspection reports;
- formation of Patient Welfare Societies in all the health facilities;
- convergence of health programmes monitoring through a single District Society;
- district planning with funds released to the District Societies under the National Rural Health Mission.

The initiatives in this connection include:
- “near miss review” for serious maternal morbidity;
- mapping of all health facilities to decide on locations for 24 hour a day CEmOC and newborn care and BEmONC services;
- mapping of catchment areas of the health facilities;
- analysis of data from the perspective of gender equity—e.g. immunization coverage, infant deaths by sex, sex ratio of births;
- further collection of statistics on utilization of health services in remote areas and by the poor.

Several initiatives for performance improvement have been launched recently. These include an infant death verbal autopsy and a pilot initiative to audit stillbirths.

E-governance

Technological support provided to the personnel in the health facilities assists the monitoring process. It comprises:
- telephones in all the PHCs and hospitals;
- computers and Internet connections at PHCs and hospitals, being phased in;
- computer training for the health functionaries;
- computer training centres in three Regional Training Centres;
- a special toll-free telephone number for CEmOC and newborn care data reporting;
- mobile phones for Village Health Nurses.

It is proposed to provide palmtop computers soon to Village Health Nurses for data collection.
Tamil Nadu is one of the most urbanized states in the country, with 44% of its population living in its urban areas. Natural increase apart, urban population growth has been fuelled by the development of manufacturing and service sectors and in-migration from the rural hinterland. This has posed enormous challenges in meeting the people’s aspirations in respect of health care, clean water supply, sanitation, and a healthy environment.

Health hazards confront the people in many of these areas, especially the people residing in slums. Of the state’s urban population, one in every 10 people resides in a slum. The challenges in urban health can be appreciated by examining the rural–urban divide in several health indicators in Tamil Nadu (see Table 11).

Salient features are:

- a narrowing gap between rural and urban birth, death, and infant mortality rates, but with a relatively slow pace of decline in urban rates;
- an adverse trend in the stillbirth rate in urban areas;
- a similar trend in perinatal and neonatal mortality rates;
- a comparatively slower reduction in the general fertility rate in urban than in the rural areas.

Given this situation, a strategic urban-specific approach is essential for handling the urban health requirements.

The situation

Only limited information is available on the status and operations of urban PHCs state-wide. Information available for Chennai Corporation points to:

- shortages of human resources, both medical staff, including specialists, and paramedics;
- inadequate infrastructure: Of the 93 functioning centres, only 39 have maternity wards, 15 have operating theatres, and 20 have infant warmers;
- poor maintenance of the existing facilities;
- lack of complete asepsis in labour wards;
- poor laboratory support, due to shortages of technicians, equipment, and reagents;
- a range of diagnostic services—X-ray, ECG, ultrasonography, automated blood analysis—reportedly offered at nominal charges, but in fact, of the four diagnostic centres functioning, only two have ECG technicians and only one has a radiographer;
- insufficient MCH care and poor high-risk care, partly due to staffing and skill constraints;
- lack of emergency obstetric services: Only two emergency obstetric care centres now functioning;
- insufficient staff knowledge of obstetric emergencies, resulting in poor referrals;
- family health awareness campaigns and mobile clinics operating only in a limited fashion;
- poor anaemia management;
- poor awareness among the public of the availability of the range of services;
- unsuitable out-patient hours;
- insufficient linkages between the community and the health workers;
- community Link Leaders, intended to provide this link, function in only a few places;
- ineffective monitoring or evaluation of the activities.

Table 11: Change and urban–rural differences in key demographic and health indicators, Tamil Nadu

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Rural</th>
<th>Urban</th>
<th>Rural–urban gap</th>
</tr>
</thead>
<tbody>
<tr>
<td>Birth rate</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1981</td>
<td>29.7</td>
<td>23.9</td>
<td>5.8</td>
</tr>
<tr>
<td>2006</td>
<td>16.5</td>
<td>15.9</td>
<td>0.6</td>
</tr>
<tr>
<td>% reduction over 1981</td>
<td>44.5</td>
<td>33.5</td>
<td>NA</td>
</tr>
<tr>
<td>Death rate</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1981</td>
<td>13.5</td>
<td>7.9</td>
<td>5.6</td>
</tr>
<tr>
<td>2006</td>
<td>8.3</td>
<td>6.4</td>
<td>1.9</td>
</tr>
<tr>
<td>% reduction over 1981</td>
<td>38.5</td>
<td>25.0</td>
<td>NA</td>
</tr>
<tr>
<td>Infant mortality rate</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1981</td>
<td>104</td>
<td>55</td>
<td>49</td>
</tr>
<tr>
<td>2006</td>
<td>39</td>
<td>33</td>
<td>6</td>
</tr>
<tr>
<td>% reduction over 1981</td>
<td>62.5</td>
<td>40.0</td>
<td>NA</td>
</tr>
<tr>
<td>Stillbirth rate</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1981</td>
<td>9.9</td>
<td>4.8</td>
<td>+5.1</td>
</tr>
<tr>
<td>1997</td>
<td>11.0</td>
<td>13.1</td>
<td>-2.1</td>
</tr>
<tr>
<td>% change over 1981</td>
<td>+11.1</td>
<td>+172.9</td>
<td>NA</td>
</tr>
<tr>
<td>Perinatal mortality rate</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1981</td>
<td>60.6</td>
<td>26.2</td>
<td>34.4</td>
</tr>
<tr>
<td>1997</td>
<td>47.2</td>
<td>35.4</td>
<td>11.8</td>
</tr>
<tr>
<td>% change over 1981</td>
<td>-22.1</td>
<td>+35.1</td>
<td>NA</td>
</tr>
<tr>
<td>Early neonatal mortality rate</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1981</td>
<td>51.2</td>
<td>21.5</td>
<td>29.7</td>
</tr>
<tr>
<td>1997</td>
<td>36.6</td>
<td>22.6</td>
<td>14.0</td>
</tr>
<tr>
<td>% change over 1981</td>
<td>-28.5</td>
<td>+4.2</td>
<td>NA</td>
</tr>
<tr>
<td>Age-specific death rate, 0–4 years</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1981</td>
<td>42.1</td>
<td>17.6</td>
<td>24.5</td>
</tr>
<tr>
<td>1997</td>
<td>15.1</td>
<td>9.7</td>
<td>5.4</td>
</tr>
<tr>
<td>% reduction over 1981</td>
<td>64.1</td>
<td>44.9</td>
<td>NA</td>
</tr>
<tr>
<td>Total fertility rate</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1981</td>
<td>3.7</td>
<td>2.7</td>
<td>1.0</td>
</tr>
<tr>
<td>2005</td>
<td>1.8</td>
<td>1.6</td>
<td>0.2</td>
</tr>
<tr>
<td>% reduction over 1981</td>
<td>51.3</td>
<td>40.7</td>
<td>NA</td>
</tr>
<tr>
<td>General fertility rate</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1981</td>
<td>115</td>
<td>89.4</td>
<td>25.6</td>
</tr>
<tr>
<td>2005</td>
<td>62.1</td>
<td>55.2</td>
<td>6.9</td>
</tr>
<tr>
<td>% reduction over 1981</td>
<td>46.0</td>
<td>38.3</td>
<td>NA</td>
</tr>
</tbody>
</table>

NA, not applicable
Resource constraints, limited interface between the local body and the Health and Family Welfare Department, lack of a distinct focus on urban health, and relatively more emphasis on solid waste management and sanitation are also constraining factors.

Positive aspects of the situation in Chennai include:

- two “walk-in clinics” operating since 2004, providing MTP services on demand and maintaining confidentiality;
- the Chennai AIDS Preventive and Control Society, set up with World Bank assistance in 1999, offering prevention and care and support services such as targeted intervention for high-risk groups, awareness-raising among the general population, integrated counselling and testing services, STI/RTI treatment, prevention of parent-to-child transmission, and referral linkages with antiretroviral treatment (ART) centres for people living with HIV/AIDS.

The status of public health in other corporations and municipalities is not likely to differ significantly from those in Chennai. In these circumstances, until the urban health policy is implemented in all respects, no noteworthy improvement in the situation is likely.

**Public health**

Responsibility for health in cities and towns falls to the municipal corporations and municipalities dotting the state. The municipalities function within the framework of the Tamil Nadu Public Health Act 1939, Madras City Municipal Act 1919, Prevention of Food Adulteration Act 1954, Birth and Death Registration Act 1969, and such other acts as are formulated from time to time.

The Public Health Act requires all municipalities to earmark 30% of income from all sources, other than government grants on expenditure, for advancement of public health. These health services cover preventive and curative care and health promotion, while secondary and tertiary support is the responsibility of the Health and Family Welfare Department.

Urban health was regarded as one of the thrust areas of the Tenth Five Year Plan, the National Population Policy 2000, and the National Health Policy 2002. The goal of the National Health Policy 2002 was to provide high-quality integrated primary health care services to the urban community with a focus on the vulnerable strata. The main objectives were to:

- provide an integrated and sustainable system for delivering primary health care services in urban areas to meet the requirements of slum populations and other vulnerable groups;
- enhance the capacity of urban local bodies to plan and implement such service delivery;
- bring about an overall improvement in the urban health situation through both the primary level and a strengthened referral system.

In Tamil Nadu there are many variations in the distribution of health delivery infrastructure and staffing. The variations in levels of service delivery result from the:

- influence of urban local bodies and the level of service availability;
- types of services being provided;
- extent of involvement of state government, with differing levels of financial support at times.

Lack of sustainability after the withdrawal of donor support is another problem in some areas.

In urban Tamil Nadu the primary health facilities are concentrated in the municipal corporations or municipalities having more than one lakh (100 000) population. There are 75 municipalities with less than one lakh population that lack adequate urban primary health infrastructure.

**Tamil Nadu urban health policy, 2002**

The Government of Tamil Nadu developed an urban health policy in 2002, setting forth its vision for urban health. The main objective is to improve the access, equity, and quality of service delivery in urban local bodies.
Rationalization of the infrastructure norms, staffing norms, service delivery, and cost-sharing between the Department of Health and Family Welfare and the Department of Municipal Administration and Water Supply were the key features of this policy.

**Urban primary health centres**

Many health indicators suggest that urban areas are slipping badly in health care vis-à-vis the rural areas. The causes are:

- lack of technical guidance and supervision from the Directorate of Public Health, Medical and Rural Health Services, Family Welfare, and Indian System of Medicine;
- technical officers’ lack of knowledge;
- multiple agencies with overlapping functions;
- the acute resource constraints of the local bodies, with low priority given to health services;
- lack of trained and qualified personnel in the local bodies to tackle the current community health situation and problems;
- a poor reporting system and poor review of health programmes;
- the preference of municipal public health personnel to focus on conservancy and solid waste management rather than health services;
- lack of outreach services in urban slums, leading to higher morbidity and mortality, particularly among mothers and children.

The new urban health care delivery policy was formulated to address these issues. The salient features of the policy are these:

- the scheme will be implemented in all six municipal corporations and 102 municipalities (since increased to 152);
- one Urban Primary Health Centre will be set up for every one lakh (100 000) population to provide a systematic referral linkage to secondary and tertiary institutions. Municipalities having less than 1 lakh population will have Type A Urban Primary Health Centres, while the others will have Type B Urban Primary Health Centres. The norms for establishing these centres are shown in Table 12. In all, 82 Type A and 119 Type B Urban Primary Health Centres will be established;
- these centres will cater to all primary health care needs, such as maternal and child health care, deliveries, sterilization, medical termination of pregnancy, temporary methods of contraception, treatment of minor ailments, and first aid as well as surveillance and treatment of communicable diseases such as tuberculosis, malaria, and leprosy;
- the centres will also provide a variety of outreach services, such as:
  - antenatal and postnatal care for women and children;
  - outreach services for general public health;
  - disease surveillance for the population attached to each centre.
- available buildings and other infrastructure under the control of local bodies are to be used for these centres and maintained by the local bodies;

### Table 12: Norms for distribution of urban primary health centres

<table>
<thead>
<tr>
<th>Population (in Lakhs)</th>
<th>Type</th>
<th>No. of centres</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;1</td>
<td>A</td>
<td>1</td>
</tr>
<tr>
<td>1–1.5</td>
<td>B</td>
<td>1</td>
</tr>
<tr>
<td>1.5–2.5</td>
<td>B</td>
<td>2</td>
</tr>
<tr>
<td>2.5–3.5</td>
<td>B</td>
<td>3</td>
</tr>
<tr>
<td>3.5–4.5</td>
<td>B</td>
<td>4</td>
</tr>
</tbody>
</table>

Note: 1 lakh = 100 000

### Table 13: Staffing norms for urban primary health centres

<table>
<thead>
<tr>
<th>Staff</th>
<th>Type A</th>
<th>Type B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medical officer</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Staff nurse</td>
<td>Nil</td>
<td>1</td>
</tr>
<tr>
<td>Health visitor</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Multipurpose health worker</td>
<td>1 per 20 000 population</td>
<td>1 per 20 000 population</td>
</tr>
<tr>
<td>Pharmacist</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Female nursing assistant</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Lab assistant/attendant</td>
<td>Nil</td>
<td>1</td>
</tr>
<tr>
<td>Sanitary worker</td>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>
- the norms for the staffing pattern of the different types of centres are shown in Table 13;
- the existing staff for health programmes in government, both under Medical Services and Public Health branches and under urban local bodies and corporations, will be utilized as a common programme unit;
- surplus staff will either be phased out in due course or redeployed within the health unit as far as practical. Also, establishment of urban PHCs can be staggered depending upon redeployment and phase-out plans;
- staffing of the PHCs will be done through redeployment or through creation of new posts over time as posts elsewhere are eliminated.
Guidelines for operationalization

The national guidelines for operationalizing First Referral Units (FRUs) stipulated that a health facility must be capable of three crucial functions in order to be declared an FRU. These functions are:

- emergency obstetric care including surgical interventions, such as caesarean sections, and other medical interventions;
- newborn care;
- a blood storage facility available 24 hours a day.

In the process of applying these criteria, it was realized that many FRUs at the district and sub-district levels in Tamil Nadu were, in fact, not functional FRUs, and their services were of sub-optimal quality. Hence, Tamil Nadu took the initiative to critically review the functionality of FRUs and to strengthen them as CEmOC and newborn care centres to meet the three critical criteria.

Tamil Nadu strategy

First and foremost, the geographical distribution of FRUs in every district was examined. As an illustrative case study, Pudukottai District was chosen. See Fig. 24. The purpose was to select the facilities that should be upgraded so that functional FRUs/CEmOC and newborn care centres would be readily accessible to the population in their catchment areas. The availability of FRUs/CEmOC and newborn care centres and their functionality are the key elements in promoting accessibility, coverage, and quality. With this in mind, the health facilities were mapped using a geographic information system (GIS) tool. See Fig. 25 and Fig. 26 for mapping of the catchment areas of two FRUs—Arantangi and Pudukottai—to be strengthened as CEmOC and newborn care centres.

The criteria used for determining the selection and strengthening of FRUs/CEmOC and newborn care centres were:

1. the density and distribution of maternal deaths and infant deaths.
2. distance from other health facilities to the FRU/CEmOC and newborn care centres in the catchment area (see Fig. 27).
3. the concentration of private-sector health facilities.
4. the distribution of the population below the poverty line (see Fig. 28).

At first, FRUs/CEmOC and newborn care centres that could be reached within an hour were strengthened. Later, additional FRUs/CEmOC and newborn care centres were strengthened to reduce the maximum travel time to half an hour.

Service norms, human resource norms, space norms, equipment norms, capacity-building norms, quality assurance norms, and public awareness norms for FRUs/CEmOC and newborn care centres and their functionality are the key elements in promoting accessibility, coverage, and quality. With this in mind, the health facilities were mapped using a geographic information system (GIS) tool. See Fig. 25 and Fig. 26 for mapping of the catchment areas of two FRUs—Arantangi and Pudukottai—to be strengthened as CEmOC and newborn care centres.

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care centres were discussed and established to assure quality of care.

The distribution of human resources—specialists such as obstetricians and gynaecologists, paediatricians, anaesthetists, and surgeons—was studied. The study revealed a mal-distribution of obstetrics and gynaecology specialists and paediatricians. They were concentrated in health facilities other than those designated FRUs, such as employees state insurance (ESI) hospitals and dispensaries, sub-district hospitals with few beds, and primary health centres. In the case of anaesthetists, there was a shortage in all health facilities at all levels in the government sector, while there was a concentration in the private sector.

Available human resources were initially redeployed to CEmOC and newborn care centres to meet the norms for specialists. Simultaneously, the process of hiring private-sector anaesthetists was initiated, to meet the needs of CEmOC and newborn care centres.

An effort is currently on to address the shortage of anaesthetists by providing six months of training in anaesthesia skills to MBBS doctors in the government sector. In 2008, 84 MBBS doctors received such training.