Gujarat State was formed on 1 May 1960, covering the Gujarati speaking areas of the erstwhile Bombay State. Gujarat is situated on the west coast of India. It is bordered by Pakistan to the north, by the states of Rajasthan to the north-east, Madhya Pradesh to the east, Maharashtra and the union territories of Dadra and Nagar Haveli to the south-east, and by the Arabian Sea to the west and south-west. Gujarat has an area of 196 024 km, representing around 6% of the total area of the country.
The state is further divided into 226 *talukas*. Gujarat has 18,622 villages and 242 cities/towns. Ahmedabad, Surat, Vadodara and Rajkot are the four urban centers with a million-plus population, and there are six municipal corporations.¹

With a population of 50.7 million in the 2001 census, Gujarat is the tenth most populous state in India, with 5% of the country’s people in 6% of the total area. The decadal growth rate of 22.6% is slightly higher than the national average of 21.5%. Gujarat’s overall economic growth has been among the highest in the country—the state economy had a growth rate of 10.86% during the fifth plan period, against the national average of 7.8%.

Gujarat is one of the most urbanized states in the country, with 37% of the population living in cities (compared to the Indian average of 27%). Interestingly, the towns and cities, large and small, are evenly distributed all over the state, unlike some other states where a large proportion of urban population is concentrated in one metropolis (AM Shah, PJ Patel and L Lobo, 2008). One indication of the level of “development” in the state is the fact that Gujarat is better equipped with mobile phones compared to the rest of India (14 million people—more than a quarter of the population—had one cell phone in 2007) (Jaffrelot, 2008).

According to 2004–2005 estimates by the National Sample Survey Office, about 16.8% of Gujarat’s population is estimated to be below the poverty line (BPL—rural 19.1%, urban 13%). The corresponding figure for the country is 27.5% (rural 28.3%, urban 25.7%).

Gujarat is among the better performing Indian states in terms of demographic indicators. It has a higher literacy rate (69%), higher life expectancy at birth for women and a lower total fertility rate than the national average. The population of backward tribes in the state is 14.8%, and that of scheduled castes is 7.1% (See Table 1.1 for further demographic indicators).

However, there is much disparity between rural and urban areas and among different population groups. There is also gender disparity, with literacy rates for women (59%) much lower than those for men (81%). The state has an exceptionally adverse sex ratio (the number of females per 1000 males), which has decreased significantly from 934 (1991) to 920 (2001). The sex ratio is low even in areas where the literacy rate is higher than the state average.

Gujarat is one of the most industrially advanced states in the country, and has been proactively promoted as an investors’ haven. Since 2003, the state government has been hosting “Vibrant Gujarat”, a biennial global investors’
meet, which aims to promote industry in the state by bringing together “business leaders, investors, corporations, thought leaders, policy and opinion makers”.\(^2\)

The government has also been active in developing the agriculture sector through investments in infrastructure and irrigation networks, resulting in agriculture recording a very high annual growth rate of 9.6%, the highest amongst all Indian states from 2001 to 2008, even as India’s target is a modest 4%.\(^3\)

In recent years the State Government has increased the efficiency of public systems. For instance, the Gujarat State Electricity Board, which was in the red, has been reformed, ensuring widespread power supply in the entire state and making it profitable (Jaffrelot, 2008). The *Jyotigram Yojana*, aimed at providing 24-hour domestic electrification and eight hours of good-quality agricultural electrification, has been successful, leading to tremendous improvement in the quality of daily life. The *Jyotigram Yojana* has paved the way for better functioning of schools, primary health centres and dairy co-ops, and better communication (T. Shah & S.Verma, 2008).

### Table 1.1: Demographic and health indicators of Gujarat and India

<table>
<thead>
<tr>
<th></th>
<th>Gujarat</th>
<th>India</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population (Census 2001) in million</td>
<td>50.6</td>
<td>1027.0</td>
</tr>
<tr>
<td>Decadal Growth Rate (1991-2001)- %</td>
<td>22.6</td>
<td>21.5</td>
</tr>
<tr>
<td>Population density per sq km (2001)</td>
<td>258</td>
<td>324</td>
</tr>
<tr>
<td>Birth rate (Sample Registration System [SRS] 2006)</td>
<td>23.5</td>
<td>23.5</td>
</tr>
<tr>
<td>Death rate (Total) (2006)</td>
<td>7.3</td>
<td>7.5</td>
</tr>
<tr>
<td>Total fertility rate (2005)</td>
<td>2.9</td>
<td>3.2</td>
</tr>
<tr>
<td>Age (years) of effective marriage (2005)</td>
<td>20.3</td>
<td>20.2</td>
</tr>
<tr>
<td>Literacy rate</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male (%)</td>
<td>69.9</td>
<td>65.4</td>
</tr>
<tr>
<td>Females (%)</td>
<td>80.5</td>
<td>75.9</td>
</tr>
<tr>
<td>Sex ratio (no. of females per 1000 males: Census 2001)</td>
<td>920</td>
<td>933</td>
</tr>
<tr>
<td>Proportion of child population to percent of 0-6 years of total population (%)</td>
<td>14.2</td>
<td>15.4</td>
</tr>
<tr>
<td>Life expectancy at birth for females (2005) years</td>
<td>69</td>
<td>66.1</td>
</tr>
<tr>
<td>Infant mortality rate (Total) 2006 per 1000 live births</td>
<td>53</td>
<td>57</td>
</tr>
<tr>
<td>Child mortality rate (2005) per 1000</td>
<td>16</td>
<td>17.3</td>
</tr>
<tr>
<td>Maternal mortality ratio (SRS 2004–2006) per 100 000 live births</td>
<td>160</td>
<td>254</td>
</tr>
</tbody>
</table>

*Source: Ministry of Health and Family Welfare, Family Welfare Statistics in India-2006, Table A-7(2)*

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\(^2\) [http://www.vibrantgujarat.com/](http://www.vibrantgujarat.com/)

\(^3\) *Business Daily*, The Hindu group of publications, Wednesday, May 20, 2009
This section presents the current service delivery system for public health services in Gujarat. It focuses on human resources and organizational structure.

2.1 Public health delivery structure

Gujarat has a three-tier public health care system, following the guidelines of the National Health Policy of 1983. The first tier includes subcentres, Primary Health Centres (PHC) and Community Health Centres (CHC) and provides primary-level care. A subcentre is staffed by an Auxiliary Nurse Midwife (ANM) and a male multipurpose worker (MPW) for each population group of 5000 persons (three to five villages). This is the unit that is closest to the village community and offers a mix of centre-based and field outreach services. The subcentre is expected to provide services for a range of primary health care interventions, but is substantially focused on maternal and child health.

Above the sub center is the PHC, which serves a population of 30 000 persons. A PHC has six beds for inpatient care and is staffed by a Medical Officer (who is an MBBS doctor) and a staff nurse. The PHC is equipped to handle normal deliveries and immunizations. A CHC serves a population of 100 000 persons, is equipped with 30 beds, an operation theatre, an X-ray machine, a labour room and laboratory facilities. It is staffed by a Medical Officer, a specialist and nurses.

The second tier includes taluka and district hospitals, which have 100–300 beds. A district hospital has specialists; some of these facilities are designated as First Referral Units (FRU) and have an obstetrician serving on staff. CHCs, FRUs and district hospitals provide secondary-level care. An FRU covers a population of 500 000.

For tertiary-level care, the state has

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4 This section draws heavily on Mavalankar et al. (2009)

5 According to the Health review, Gujarat: 2007–2008 issued by the government, each CHC in the state was serving a population of 121 000 as against the norm of 100 000 persons (Government of Gujarat, 2008b).
13 teaching hospitals associated with medical colleges. In addition to these there are super-specialty hospitals (Government of Gujarat, 2008b).

In 2007-2008, there were a total of 7274 subcentres, 1073 PHCs, 273 CHCs and 25 district hospitals in the state. According to the Annual Administrative Report of the Government of Gujarat for 2007–2008, 56 government facilities, including district hospitals, subdistrict hospitals and CHCs were functional as FRUs (Government of Gujarat, 2008a). The state had a total of 42 855 doctors, 17 551 nurses, 9585 midwives and 6638 ANMs in 2008 (Government of Gujarat, 2008b).

As indicated in Table 2.1, there is a severe shortfall of human resources at all levels, from specialists to skilled health workers at the health centres. Relevant to MDGs 4 and 5, Gujarat has a shortage of obstetricians, anaesthetists, paediatricians and nurses/midwives in government hospitals. According to 2007-2008 data, only 37% of the CHCs and FRUs are staffed with obstetricians (Government of Gujarat, 2008a). This shortage of trained personnel in public facilities primarily affects poor families, who are more likely to seek government health services due to their lower cost. By contrast, about 2000 obstetricians are available in the private sector (Government of Gujarat, 2008a).

The public health service delivery system is compromised in its functioning for a number of reasons, key among which are a shortage of human resources, inadequate infrastructure and equipment, insufficient supplies of

<table>
<thead>
<tr>
<th>Particulars</th>
<th>Required</th>
<th>In position</th>
<th>Shortfall</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multipurpose worker (Female)/ANM at Subcentres &amp; PHCs</td>
<td>8 347</td>
<td>7 071</td>
<td>1 276</td>
</tr>
<tr>
<td>Health Worker (Male) MPW(M) at Subcentres</td>
<td>7 274</td>
<td>3 347</td>
<td>3 927</td>
</tr>
<tr>
<td>Health Assistant (Female)/Lady Health Visitor (LHV) at PHCs</td>
<td>1 073</td>
<td>267</td>
<td>806</td>
</tr>
<tr>
<td>Health Assistant (Male) at PHCs</td>
<td>1 073</td>
<td>2 421</td>
<td>-</td>
</tr>
<tr>
<td>Doctor at PHCs</td>
<td>1 073</td>
<td>1 034</td>
<td>39</td>
</tr>
<tr>
<td>Obstetricians &amp; Gynaecologists at CHCs</td>
<td>273</td>
<td>6</td>
<td>267</td>
</tr>
<tr>
<td>Physicians at CHCs</td>
<td>273</td>
<td>0</td>
<td>273</td>
</tr>
<tr>
<td>Paediatricians at CHCs</td>
<td>273</td>
<td>6</td>
<td>267</td>
</tr>
<tr>
<td>Total specialists at CHCs</td>
<td>1 092</td>
<td>82</td>
<td>1 010</td>
</tr>
<tr>
<td>Radiographers</td>
<td>273</td>
<td>124</td>
<td>149</td>
</tr>
<tr>
<td>Pharmacist</td>
<td>1 346</td>
<td>814</td>
<td>532</td>
</tr>
<tr>
<td>Laboratory Technicians</td>
<td>1 346</td>
<td>899</td>
<td>447</td>
</tr>
<tr>
<td>Nurse/Midwife</td>
<td>2 984</td>
<td>1 585</td>
<td>1 399</td>
</tr>
</tbody>
</table>

drugs and consumables, and inadequate monitoring and supervision (Mavalankar et al., 2009).

### 2.2 Organizational structure

#### 2.2.1 State-level organizational structure

Maternal and child health services fall under the State Department of Health and Family Welfare (DHFW). The DHFW is headed by a Principal Secretary (Health) and a Secretary for Family Welfare. Figures 2.1 and 2.2 show the organizational structures for maternal health services in Gujarat.

Two maternal health consultants have recently been hired at the state level to strengthen the state’s initiatives towards improving maternal health.

![Organizational structure for maternal and child health services in Gujarat: state level](image)

**Figure 2.1: Organizational structure for maternal and child health services in Gujarat: state level**
2.2.2 District-level organizational structure

Figure 2.2: Organizational structure for maternal and child health services in Gujarat: district level

2.3 Building the evidence base: monitoring systems and indicators

As recommended by the Government of India’s National Rural Health Mission (NRHM), Gujarat has introduced programme management units at block, district and state levels to ensure sound monitoring of public health programmes. Each programme management unit at the district level is staffed by a health management graduate and support staff.

Data is collected from the village level by the ANMs and aggregated at the block, district, regional and state levels. Electronic reports are available to officers at each level to enable regular monitoring and planning.

In a recent study of reproductive child health (RCH) services in two districts in Gujarat, the authors report that the district offices receive regular reports from the PHCs, and the monitoring systems are “well organized”. They also mention that there are regular meetings of the Medical Officers at the PHCs with the district officials to review programmes and activities (Desai & S. Bhavsar, 2007).
3.1 Background to maternal and child health in Gujarat

The present policies for maternal and child health in Gujarat and in India can be traced back to the International Conference on Population and Development (ICPD) held in Cairo in 1994. In line with ICPD perspectives, the National Population Policy 2000, and Gujarat Vision 2010, the GoG released the State Population Policy 2002. The policy aimed to lower both infant and maternal mortality to less than one third of the prevailing levels. The concept of reproductive and child health (RCH) guiding this policy re-emphasized the target-free approach in family planning services, and the importance of providing an integrated package of need-based, client-centered, demand-driven, high-quality RCH services.

In 2005 the second phase of the RCH programme, RCH-2, was launched. The primary objectives of RCH-2 are reducing the total fertility rate, the maternal mortality ratio and the child mortality rate. In the context of maternal health, RCH-2 emphasizes skilled attendance at birth, in addition to the focus on institutional deliveries and availability of emergency obstetric care featured in RCH-1.

Around the time that RCH-2 was launched, the Central Government launched the National Rural Health Mission (NRHM) in recognition of the need to strengthen the public health sector in rural areas. RCH-2 was subsequently subsumed under NRHM, which NRHM further spelled out the activities and programmes to be taken up for reducing maternal and child mortality.

To reduce maternal mortality, the key strategies enumerated in NRHM were:

- Operationalizing 24X7 PHCs for essential obstetric care
- Operationalizing FRUs with facilities for caesarean section, blood storage and referral linkages for emergency obstetric care
• Setting up blood storage units
• Training MBBS doctors in anaesthesia
• Training MBBS doctors in pregnancy care and emergency obstetric care
• Making available safe abortion services at PHCs and FRUs
• Making available neonatal care at 24x7 PHCs
• Making available medical termination of pregnancy (MTP) at up to eight weeks using manual vacuum aspiration (MVA)
• Management of reproductive tract infections (RTIs) and sexually transmitted infections (STIs) at PHCs and CHCs/FRUs
• Comprehensive RTI/STI services: convergence between RCH programme and National Aids Control Programme

For reducing child mortality, NRHM listed the following key strategies:

• Integrated management of newborn and childhood illness (IMNCI)
• Home-based newborn and child care
• Facility-based newborn care
• Infant and young child feeding, including improving early and exclusive breastfeeding and complementary feeding
• Malnutrition treatment centres, especially in areas of acute malnutrition.
• Reduction in morbidity and mortality due to acute respiratory infections (ARIs) and diarrhoeal diseases
• Supplementation with micronutrients: vitamin A and iron
• The School Health Programme is to be launched with health-promoting schools.

NRHM aims to decentralize the functioning of the public health system by instituting structural changes and involving local government institutions in service delivery. In recognition of the multidimensional causality of ill-health, it advocates intersectoral linkages, particularly with programmes that have a bearing on health outcomes of women and children such as the Integrated Child Development Services (ICDS).

To enable better uptake of public health services and to forge stronger linkages between the communities and the public health system, NRHM has created the position of village-level female health activists. An Accredited Social Health Activist (ASHA) is expected to work with communities for social mobilization and improved access to services; including identifying pregnant women and ensuring that they get adequate care during and after pregnancy. The ASHA is supported by the Anganwadi Worker (AWW), the village schoolteacher, members of local community-based organizations such as self-help groups, and the Village Health Committee.
NRHM and RCH-2 provide a supportive context, both in terms of guidelines and funding, for the initiatives taken up by the GoG for reducing maternal and child mortality in the last few years.

### 3.2 Status of infant and child mortality in Gujarat

The infant mortality rate (IMR) is defined as the number of deaths among children below one year of age per 1000 live births in a given year. The child mortality rate (CMR) is defined as the number of deaths among children between the ages of one and five years per 1000 live births in a given year.

**Figure 3.1 Child mortality rates in Gujarat, 2001–2006**

The latest estimate of the CMR in Gujarat for 2006 was 16 per 1000 (Figure 3.1). The rate has declined from 18.5 per 1000 in 2001, but stayed the same between 2004 and 2006. The Indian average CMR for 2006 was 17.3.

The IMR in Gujarat has seen a reduction from 60 in 2001 to 52 per 1000 in 2007 (Figure 3.2). According to the Sample Registration System (SRS) data for 2007, Gujarat ranks 11th from the bottom among the 35 Indian states and union territories with regard to its IMR. The state aims to reduce infant mortality to 30 by 2010.

**Figure 3.2: Infant mortality rate in Gujarat by sex, 2001–2007**

Based on mortality estimates from the Interagency Child Mortality Estimation Group (IACMEG) for 2005, 72% of all under-five deaths in India occur during the first year of life, i.e. among infants. Further, almost two-thirds of all infant deaths occur in the neonatal period (0–28 days), with the remaining third occurring between the second and twelfth months.

As seen in Table 3.1, data from 2006 indicate that the neonatal period is even more critical in Gujarat, where more

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6 Sample Registration System, Office of the Registrar General and Census Commissioner, India

7 This group includes WHO, UNICEF, the World Bank, the UN Population Division, Harvard University, the US Bureau of the Census, and others.
than 70% of infant deaths occur within the first month.

Table 3.1: Infant mortality rates in Gujarat and India

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>% infant deaths 0–28 days</td>
<td>70.8</td>
<td>62.5</td>
</tr>
<tr>
<td>% infant deaths 2–12 months</td>
<td>29.2</td>
<td>37.5</td>
</tr>
<tr>
<td>TOTAL</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

Sources: Gujarat data—Health Review Gujarat 2007–2008; India data: Child Health Profile, India, World Health Organization (WHO)

3.2.1 Rural/urban differences

There is significant difference in the IMR in Gujarat between urban and rural areas, with rural IMR being 60 compared to 36 in urban areas (Figure 3.3). One of the reasons is the lack of accessibility to health services in remote areas and among disadvantaged groups.

The variation in rural and urban IMR may be related to the pattern of institutional deliveries. According to the 2005-2006 National Family Health Survey (NFHS-3), 78% of the total births taking place in urban areas were in institutions, and 83.9% of births were attended by skilled personnel. The corresponding figures for rural areas were 42.2% and 54.6%.

3.2.2 Male/female differences

In Gujarat, the IMR is somewhat higher for females than for males, but the difference between the two appears to be gradually reducing (Figure 3.2 above). In 2007, the IMR for females was 54 compared to 50 for males.8

Figure 3.3: Infant mortality rates in Gujarat by residence, 2001–2007

Source: Health Review, Gujarat: 2007–2008 (Data taken from SRS)
3.3 Causes of child death in India

It is estimated that malnutrition and anaemia are contributory factors in over 50% of the deaths of under-fives in the country.9 Infectious diseases such as diarrhea (20%), pneumonia (19%), and measles (4%) accounted for 43% of the 2.2 million deaths that occurred among under-fives in India in 2005.10

Major causes of infant mortality in India continue to be premature birth and low birth weight, poor intrapartum and newborn care, diarrhoeal diseases, acute respiratory infections and other infections.

Of the one million neonatal deaths in India in 2005, more than one-third (35%) were due to infections (severe infections including pneumonia, neonatal tetanus, and diarrhea). Another 60% were due to preterm births (31%), birth asphyxia (23%), and congenital anomalies (6%)11 (Table 3.2).

The ongoing RCH programme comprehensively integrates interventions to improve child health and was initiated to address each of the major factors contributing to high infant mortality rates and under-five mortality. Components of child health care include:

- Essential newborn care
- Immunization
- Nutrition
- Exclusive breastfeeding for 6 months
- Timely introduction of complementary feeding
- Detection and management of growth faltering

Table 3.2: Most common causes of child mortality in India, 2005

<table>
<thead>
<tr>
<th>Period of childhood</th>
<th>Primary cause</th>
<th>Second most common cause</th>
<th>Third most common cause</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neonatal (0–28 days)</td>
<td>Severe infections (diarrhoea, pneumonia, neonatal tetanus) (35%)</td>
<td>Pre-term birth (31%)</td>
<td>Birth asphyxia (23%)</td>
</tr>
<tr>
<td>Infant (2–12 months)</td>
<td>Premature birth Low birth weight Poor intra-partum and newborn care</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Under 5 (13–59 months)</td>
<td>Under-nutrition anaemia (50%)</td>
<td>Infectious diseases (diarrhoea, pneumonia, measles) (43%)</td>
<td></td>
</tr>
</tbody>
</table>

Source: Child Health Profile, India, WHO.
http://www.who.int/child_adolescent_health/data/media/cah_chp_india.pdf
• Massive-dose Vitamin A supplementation
• Iron supplementation
• Early detection and appropriate management of acute respiratory infections
• Controlling diarrhoea and other infections

3.4 Status of maternal health in Gujarat

Maternal mortality is defined as the death of a woman while pregnant or within 42 days of termination of pregnancy, regardless of the site or duration of pregnancy, from any cause related to or aggravated by the pregnancy or its management. The maternal mortality ratio (MMR) is calculated as the number of such deaths per 100 000 live births.

The latest official estimate of the MMR in Gujarat is 160 per 100 000 live births, against a national average of 254. (An expert group of organizations calculated that these estimates are an undercount, and that the actual ratio is almost 50% higher.) While the ratio for Gujarat is better than several other states in the country, it is far lower than the well-performing states of Kerala (95) and Tamil Nadu (111).

The GoG acknowledges that the MMR of Gujarat has not improved significantly in the last ten years (Government of Gujarat, 2008a). The aim is to reduce MMR in the State to 100 by the year 2010.

3.5 Causes of maternal mortality in Gujarat

State-specific data for Gujarat on the causes of maternal mortality are not available. However, we can assume that the causes for maternal mortality in Gujarat mirror the causes that are common across India.

3.5.1 Immediate causes

Studies have shown that haemorrhage is the single major cause of maternal deaths, especially in rural areas. Haemorrhage, puerperal sepsis, obstructed labour, abortions and toxaemia account for more than three-quarters of maternal deaths in India. Anaemia is the leading cause among the “other causes”, followed by pregnancy with TB/malaria, viral hepatitis and others factors. In Gujarat, 61% of pregnant women were anaemic according to NFSH-3 (2005-06).

Figure 3.4: Causes of maternal death in India

<table>
<thead>
<tr>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Haemorrhage: 37%</td>
</tr>
<tr>
<td>Sepsis: 11%</td>
</tr>
<tr>
<td>Hypertensive disorder: 5%</td>
</tr>
<tr>
<td>Other: 34%</td>
</tr>
<tr>
<td>Obstructed labour: 5%</td>
</tr>
<tr>
<td>Abortion: 8%</td>
</tr>
</tbody>
</table>

Source: Registrar General of India, 2006
3.5.2 Evidence regarding maternal mortality

Research done at the School of Public Health at Columbia University, New York, over the last 15 years has conclusively shown that the best and most cost-effective strategy for reduction in maternal mortality is to have Emergency Obstetric Care (EmOC) services within reach of all pregnant women. While it is often not possible to predict or prevent complications of pregnancy and childbirth, there is generally a gap of several hours between the development of complications and death. Timely EmOC services can therefore significantly reduce maternal death. WHO, The United Nations Population Fund (UNFPA) and the United Nations Children’s Fund (UNICEF) have also now accepted this strategy of promoting EmOC and recommend using the availability and use of EmOC as process indicators for measuring progress towards reducing maternal mortality (Mavalankar, 2001).

Studies done in the states of Andhra Pradesh, Maharashtra, and Rajasthan showed that 52%, 47% and 42% of maternal deaths respectively happened in the home or in transit to a hospital (Mavalankar, 2001). If these had been institutional deliveries, it is likely that a large proportion of these women could have been saved.

Skilled birth attendants and institutional deliveries are important strategies for reducing maternal deaths. A skilled birth attendant is trained to recognize complications, treat them to the extent possible and make timely referrals for advanced emergency care.

Several factors prevent universally available skilled obstetric care in India and in Gujarat. For one, trained doctors, nurses and midwives are in short supply. The situation is further aggravated by the fact that “…India has one of the most privatized medical systems in the world” (Krupp & Madhivanan, 2009). The public health system is severely understaffed. In 2005, when the GoG set to work to lower rates of maternal and infant mortality in the state, there were only seven public sector obstetricians/gynaecologists (Ob/Gyn) for a rural population of almost 32 million. By contrast, there were 700 private Ob/Gyns practicing in Gujarat’s rural areas (Krupp & Madhivanan, 2009).

3.5.3 Process indicators of maternal health

The process indicators for maternal health (Table 3.3) throw additional light on the situation regarding maternal mortality in Gujarat. According to NFHS-3 (data collected in 2005–2006), only 65% of pregnant women in Gujarat received three antenatal check-ups and 36% consumed iron and folic acid supplements (IFA) for 90 days or more.
Institutional deliveries in Gujarat have been increasing over the last several years, from 36% in 1992–1993 to 55% in 2005–2006. According to the most recent NFHS estimates, a further 10% of deliveries are attended by health personnel in the women’s homes. No trained birth attendant was present at 35% of births in Gujarat in 2005–2006.

The process indicators for maternal health in Gujarat are generally better than the all-India average, except the prevalence of anaemia in pregnant women.

There is a rising trend in institutional deliveries in Gujarat over the last 17 years as recorded in the NFHS and DLHS data (Figure 3.5).

### 3.5.4 Sociodemographic variations in maternal mortality

There is evidence to show that women living in urban areas and those who are literate are better off regarding maternal health compared to their counterparts in rural areas or those with less education. Gujarat is one of the more industrially developed states in the country, yet 63% of its population lives in rural areas and 16.8% falls below the official poverty line. Rural areas are poorly serviced and connected. The literacy rate for women in Gujarat is 58% compared to 80% for men (Census 2001). The sex ratio in the state is 920, lower than the national average of 933. The age of effective marriage is 20 years in Gujarat as it is in India.

### Table 3.3: Process indicators of maternal health in Gujarat and India

<table>
<thead>
<tr>
<th>Source</th>
<th>Date</th>
<th>Indicator</th>
<th>Gujarat %</th>
<th>India %</th>
</tr>
</thead>
<tbody>
<tr>
<td>NFHS-3</td>
<td>2006</td>
<td>Pregnant women (15-49) with anaemia</td>
<td>61</td>
<td>58</td>
</tr>
<tr>
<td>NFHS-3</td>
<td>2006</td>
<td>Mothers who had at least 3 antenatal care visits</td>
<td>65</td>
<td>51</td>
</tr>
<tr>
<td>DLHS-3*</td>
<td>2008</td>
<td>Mothers who had 3 or more antenatal check-ups</td>
<td>56.8</td>
<td></td>
</tr>
<tr>
<td>NFHS-3</td>
<td>2006</td>
<td>Mothers who consumed IFA tablets for at least 90 days</td>
<td>35.7</td>
<td>22</td>
</tr>
<tr>
<td>DLHS-3</td>
<td>2008</td>
<td>Mothers who consumed 100 IFA tablets</td>
<td>50.7</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Institutional births</td>
<td>54.6</td>
<td>41</td>
</tr>
<tr>
<td>DLHS-3</td>
<td>2008</td>
<td>Institutional deliveries</td>
<td>56.5</td>
<td></td>
</tr>
<tr>
<td>DLHS-3</td>
<td>2008</td>
<td>Deliveries conducted by skilled personnel**</td>
<td>64.7</td>
<td>48</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Safe deliveries (institutional or skilled personnel)</td>
<td>62.1</td>
<td></td>
</tr>
<tr>
<td>NFHS-3</td>
<td>2006</td>
<td>Mothers who received postnatal care within 2 days of delivery from skilled personnel</td>
<td>54</td>
<td>36</td>
</tr>
<tr>
<td>DLHS-3</td>
<td>2008</td>
<td>Mothers who received postnatal care within 2 weeks of delivery</td>
<td>59.5</td>
<td></td>
</tr>
</tbody>
</table>

*DLHS: District Level Household & Facility Survey (International Institute for Population Sciences, Mumbai)

***“Skilled personnel” include doctors, nurses, LHV's and ANMs.”
Table 3.4 shows the disparities in the sociodemographic profiles of rural and urban populations and the difference in utilization of health services among the women in these two areas. In addition to lower levels of awareness among rural families, lack of transportation to health facilities is a constraint.

Table 3.4 Rural/urban differences in demographic and maternal health indicators in Gujarat

<table>
<thead>
<tr>
<th>Source</th>
<th>Date</th>
<th>Indicator</th>
<th>Rural (%)</th>
<th>Urban (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Census</td>
<td>2001</td>
<td>Population Percent</td>
<td>62.6</td>
<td>37.4</td>
</tr>
<tr>
<td>Census</td>
<td>2001</td>
<td>Sex ratio [not percentage]</td>
<td>945</td>
<td>880</td>
</tr>
<tr>
<td>Census</td>
<td>2001</td>
<td>Literacy rate</td>
<td>61.29</td>
<td>81.84</td>
</tr>
<tr>
<td>Census</td>
<td>2001</td>
<td>Population BPL</td>
<td>19.1</td>
<td>13</td>
</tr>
<tr>
<td>NFHS-3</td>
<td>2006</td>
<td>Mothers who had at least 3 ante natal care visits</td>
<td>55.8</td>
<td>81.5</td>
</tr>
<tr>
<td>DLHS -3</td>
<td>2008</td>
<td>Mothers who had 3 or more antenatal check-ups</td>
<td>50.0</td>
<td>79.0</td>
</tr>
<tr>
<td>NFHS-3</td>
<td>2006</td>
<td>Mothers who consumed IFA tablets for at least 90 days</td>
<td>28.9</td>
<td>48.3</td>
</tr>
<tr>
<td>DLHS -3</td>
<td>2008</td>
<td>Mothers who consumed 100 IFA tablets</td>
<td>45.4</td>
<td>52.3</td>
</tr>
<tr>
<td>NFHS-3</td>
<td>2006</td>
<td>Births assisted by skilled personnel*</td>
<td>54.6</td>
<td>83.9</td>
</tr>
<tr>
<td>DLHS -3</td>
<td>2008</td>
<td>Safe deliveries (institutional or skilled personnel)</td>
<td>54.5</td>
<td>86.7</td>
</tr>
<tr>
<td>NFHS-3</td>
<td>2006</td>
<td>Institutional births</td>
<td>42.2</td>
<td>78</td>
</tr>
<tr>
<td>DLHS -3</td>
<td>2008</td>
<td>Institutional deliveries</td>
<td>48.1</td>
<td>83.7</td>
</tr>
<tr>
<td>NFHS-3</td>
<td>2006</td>
<td>Mothers who received postnatal care from skilled personnel within 2 days of delivery</td>
<td>43.8</td>
<td>72.7</td>
</tr>
<tr>
<td>DLHS -3</td>
<td>2008</td>
<td>Mothers who received postnatal care within 2 weeks of delivery</td>
<td>52.9</td>
<td>81.1</td>
</tr>
</tbody>
</table>

*Skilled personnel include doctors, nurses, LHVs and ANMs.
NFHS-3 data show a direct relationship between years of schooling and uptake of maternal health services. As seen in Table 3.5, women who have had formal schooling tend to use maternal health services more than those who have never been to school.

The educational and economic status of women influences the use of maternal care. Figures 2 and 3 illustrate that illiterate mothers and mothers from the lowest wealth quintile used basic maternal healthcare much less than their literate or wealthier counterparts and were far less likely to see a doctor. Only 18% of 39,677 illiterate mothers had institutional deliveries compared to 86% of 39,677 mothers with 12 or more years of education; similar differences were observed in the use of skilled care at delivery and use of postnatal care (Vora et al., 2009).

Table 3.5: Relationship between mother's educational level and use of maternal health services

<table>
<thead>
<tr>
<th>Indicator</th>
<th>No education (%)</th>
<th>Ten or more years’ education (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mothers who had 3 antenatal visits</td>
<td>45.5</td>
<td>89.9</td>
</tr>
<tr>
<td>Mothers who consumed IFA for 90 days or more</td>
<td>21.7</td>
<td>56.7</td>
</tr>
<tr>
<td>Birth assisted by skilled personnel</td>
<td>49.5</td>
<td>92.1</td>
</tr>
<tr>
<td>Institutional birth</td>
<td>38.4</td>
<td>83</td>
</tr>
<tr>
<td>Mothers who received postnatal care from health personnel within 2 days of last delivery</td>
<td>36.5</td>
<td>80.5</td>
</tr>
</tbody>
</table>

Source: NFHS-3
In recent years, the GoG has taken up several evidence-based initiatives to reduce maternal and child mortality in the state. The government recognizes that it needs to take a holistic approach to address these issues. It has therefore initiated improvements on multiple fronts. The following figure shows the six broad focus areas taken up by Gujarat for intensive inputs.

There is strong evidence that skilled attendance at birth and especially institutional deliveries are a critical strategy for improving maternal mortality. Similarly, newborns need extra attention in the early period after birth, especially through the first week and the first month, as this is the most critical period for their survival. This is also a crucial time for reinforcing the importance of exclusive breast feeding to new mothers and their families. At the same time, there is the need to improve the general health of pregnant and lactating mothers and children through nutrition and immunizations. For all of these services to be delivered in an efficient manner, the public health system needs to be staffed appropriately and managed well. This requires effective leadership, sound human resource deployment and good monitoring and supervision. In addition, the physical infrastructure of health facilities needs to be maintained satisfactorily. Finally, an improvement in supply needs to be matched with a corresponding increase in demand for these services from the community. The initiatives discussed in section fall under these six focus areas.
4.1 Institutional deliveries and skilled attendance at birth

4.1.1 Chiranjeevi Yojana

The most high-profile scheme of the GoG for improving maternal health has been the Chiranjeevi Yojana (literally the “long life scheme”). The Chiranjeevi Yojana was launched in 2005 on a pilot basis in five of the more backward districts of the state. In September 2007, the scheme was extended to all 26 districts. It targets pregnant women from BPL families and aims to promote institutional deliveries.

The scheme was designed to overcome the severe shortage of trained gynaecologists in the public health system in rural areas. The Gujarat DHFW contracted with private providers who had a postgraduate degree in obstetrics and gynaecology, owned their own nursing home which had a labour room, operation theatre and blood bank, and had access to an anaesthetist’s services.

The scheme is based on the public-private partnership (PPP) model wherein the government and the private sector come together to ensure safe deliveries. Mothers are cared for right through pregnancy through the public health system, and linked to a qualified doctor who supervises the delivery. The government bears all expenses for the delivery as well as for surgical interventions, if required. Expenses of the family member accompanying the mother are also taken care of by the government.

To create awareness about the scheme, the Medical Officer and the ANM at the subcentre inform pregnant mothers about the scheme and motivate them to register for prenatal care and institutional delivery (Bhat et al., 2009). To make it a demand led service, BPL pregnant women are given a voucher to cover the costs of delivery services, medicines and transportation, which they can use with a local obstetrician of their choice.

The government’s initiative is a departure from previous practice in that the government took sole responsibility for the reimbursement of private health-care providers, rather than relying on intermediary parties such as insurers. To plan and implement these arrangements, the state government works with professional agencies such as associations of obstetricians and academic organizations.

The Chiranjeevi Yojana scheme has led to a large increase in institutional deliveries, from 54% three years ago to 87% at present (Table 4.1). More than 90% of the beneficiaries are from the poor and deprived sections of society. From the time the scheme was started in 2005 until March 2008, a total of 37 maternal deaths were
reported among *Chiranjeevi* beneficiaries. The expected number of deaths out of 153,717 deliveries conducted during that period (based on the existing MMR in Gujarat) would have been 265. In other words, 228 mothers’ lives were saved (Government of Gujarat, 2008b).

In 2006, a United Nations Population Fund study of *Chiranjeevi Yojana* reported that the programme had successfully raised the number of births delivered in health facilities, and that private practitioners were mostly enthusiastic about their participation in the initiative.\(^{12}\)

According to a recent study of the *Chiranjeevi* scheme (Bhat et al., 2009), 81% of eligible women delivered under the scheme. The scheme has been successful in terms of targeting the poor: 94% had incomes below Rs.12,000 per annum. Among those who took advantage of the scheme and those who did not, education levels were similar. While the scheme has been successful, Bhat et al. (2009) suggest that it is not entirely free of cost for the beneficiary as originally designed. On average beneficiaries spent Rs.727 (primarily on medicines for the mother and the child, and Rs.72 for transportation, since the scheme gives only Rs.200 for this purpose.

Table 4.1: Deliveries conducted and doctors enrolled under *Chiranjeevi* since inception

<table>
<thead>
<tr>
<th>Year</th>
<th>Deliveries conducted</th>
<th>% LSCS</th>
<th>Doctors enrolled (cumulative)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Normal</td>
<td>417</td>
<td>567</td>
</tr>
<tr>
<td>2005–2006</td>
<td></td>
<td>2,913</td>
<td>3,965</td>
</tr>
<tr>
<td>2006–2007</td>
<td></td>
<td>7,651</td>
<td>7,312</td>
</tr>
<tr>
<td>2007–2008</td>
<td></td>
<td>7,846</td>
<td>5,643</td>
</tr>
<tr>
<td>2008–2009</td>
<td></td>
<td>18,827</td>
<td>17,487</td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td>275,934</td>
<td>18,827</td>
</tr>
</tbody>
</table>

Source: Draft Health Review 2008, DHFW, GoG, with data for 2008–2009 received directly from the DHFW, GoG
“When I joined the Chiranjeevi Scheme in 2007, I used to get one Chiranjeevi delivery per month. Today [September 2009] there are 30 deliveries every month in my hospital through Chiranjeevi. The AHSA workers and ANMs are responsible for motivating pregnant women and their families. In rural areas, the sister’s (ANM) word carries a lot of weight.

“The other change I have observed in the last two and a half years is that now none of the women coming to me have severe anaemia, unlike earlier when pregnant women would come with 2% and 3%.

“What is needed is more awareness about the importance of a healthy diet and adequate rest. The family of the pregnant woman needs to recognize that she needs both rest and a good diet to stay healthy and deliver a healthy child.

“Also, the IFA supplement given to through Mamta Abhiyan* could be improved in quality to lead to better results.”

Dr Aashish Jayswal, Chiranjeevi Doctor, Godhra, Panchmahal District

*For an explanation of Mamta Abhiyan, see section 4.3.1 below.
“For my first delivery, I went to my mother’s home. That was two and a half years ago. My first delivery was done at home by a dai. This time I stayed here (near Vejalpur PHC). I had the IFA tablets given on Mamta Diwas.* When my labour pains started, we told the ASHA worker. She called the 108 ambulance and I went to the hospital. I stayed in the hospital for one day, and then came back home.”

Surajben Alpeshbhai Rawal, Nadarkha village in Kalol Taluka, Panchmahal District

*See section 4.3.1 below.

4.1.2 Extended Chiranjeevi Yojana

Chiranjeevi Yojana draws on private obstetricians/gynaecologists for institutional deliveries. In certain remote areas, even private specialists are unavailable. The extended Chiranjeevi Yojana is planned for 54 poorly performing blocks in the state. Under this scheme, Ob/gyns are given a one-time assistance of Rs.740,000 (USD14,800) to conduct at least 300 deliveries among BPL women. This scheme has failed to attract private specialists so far. This underscores the difficulty of providing health services in remote and thinly populated areas due to the unwillingness of doctors to work in such areas.

4.1.3 Emergency transport system

As seen above, institutional deliveries are significantly higher in urban areas. An important reason is the difficulty in transportation faced by the rural population to health centres. To address the need for transportation during medical emergencies, the state government launched a free ambulance service in collaboration with Emergency Management and Research Institute (EMRI) Hyderabad in August 2007. Gujarat was the second state in the country to launch the 108 Emergency Ambulance Services which run a fleet of 400 ambulances in the state, attending over 1800 emergencies every day. The ambulances have wireless connection to a central call centre that can be reached by a single phone number. The response time in rural areas is between 30-45 minutes, depending on the location.

To enable pregnant women to reach hospitals quickly at the time of delivery, each block office prepares a monthly list of expected deliveries and passes it on to the concerned EMRI centre. The Medical Officer at the block level maintains information on the expected due date of each registered pregnant woman in his block. This information is used to prepare
the monthly list of expected deliveries which is given to the emergency transport service. This information is also used to monitor whether the deliveries were conducted in an institution and who was in attendance at the time of the delivery.

Appendix III shows an example of the form that is completed by the paramedic in the 108 ambulance and given to the doctor on arrival at his hospital.

4.1.4 Janani Suraksha Yojana (JSY)

Under the NRHM, the Central Government launched the Janani Suraksha Yojana (JSY—Women’s Protection Scheme) in 2006 to promote institutional deliveries and post-delivery care for poor women, to address maternal and child mortality. Under the scheme, pregnant women from BPL families are given a cash incentive for nutrition (Rs.500) in the last trimester and Rs.200 for transportation for institutional deliveries in government institutions and selected private institutions. State governments have the flexibility of managing the scheme at the local level.

In Gujarat, pregnant women from BPL families benefit from both JSY and the Chiranjeevi Scheme, since both schemes target BPL, scheduled caste and tribal families.

As seen in the experiences reported below in the United Nations Development Programme’s (UNDP) Solution Exchange Forum on Maternal and Child Health, monitoring of JSY is being carried out by both government functionaries and NGOs.

“I am working with the Health and Family Welfare Department, Government of Gujarat as a Project Officer—Child Health and Immunization under NRHM. I have worked closely on JSY during my posting as District & Regional Programme Coordinator. We were also facing problems of late payments of JSY, so we started monitoring the payments made under JSY. We prepared detailed forms for this exercise. We created levels of monitoring right from Medical Officer of the PHC to the state level. All the concerned authorities were told to do 10% verification of JSY cases. Based on the reports received, the districts having poor performance were asked for an explanation of the issue. This exercise helped in improving the timely payments under JSY.”

Mridula Pandey, Health and Family Welfare Department, Gujarat
4.1.5 Incentivizing the public health system

To increase institutional deliveries in public health facilities, staff at PHCs and CHCs are given incentives if they conduct above a certain number of deliveries. For instance, each PHC received Rs.1000 for every delivery after the first 25 deliveries, and each CHC receives Rs.1000 per delivery after the first fifty deliveries per month.

4.1.6 Training of MBBS doctors in CEmOC

The Chiranjeevi Scheme draws on private specialists to address the immediate need of increasing the number of institutional deliveries because of the shortage of specialists in the public health system. The government is simultaneously expanding the pool of skilled persons for safe deliveries in the public sector. The government’s strategy is to train MBBS doctors and try and place them in health facilities in the remote areas, because in such areas even private specialists are scarce.

Initially, even before the launch of the Chiranjeevi Scheme, Gujarat started to train MBBS doctors and staff nurses in basic EmOC in 2003. This was a two-week training programme given at the district hospitals.

In 2005, the state government and the Federation of Obstetric and Gynaecological Societies of India (FOGSI) started an initiative to train MBBS doctors in comprehensive care (CEmOC). This course was designed with inputs from the Johns Hopkins...
Program for International Education in Gynecology and Obstetrics and the Averting Maternal Death and Disability Program at Columbia University (Vora et al., 2009).

Under this initiative, MBBS doctors are trained for basic deliveries and caesarean section deliveries. Gujarat was the first state in the country to train Medical Officers in doing caesarean section deliveries. The trained doctors are placed in an FRU for three years after the training.

In addition to government doctors, doctors from grant-in-aid hospitals are admitted to the training programme. This ensures that the training programmes run to capacity, and the resource pool of trained persons steadily increases.

"The Medical Officer trained in CEmOC becomes a nucleus around which a whole system promoting institutional deliveries begins to emerge. The ASHAs in the service area of the CHC/FRU begin to inform the communities in their respective villages about the presence of a trained doctor at the centre. In several centres, the trained doctors have started training ANMs in their service area, which increases the pool of trained personnel in and around the centre. Even if the doctor decides to leave government service after three years, s/he is a trained resource in the community for institutional deliveries."

Dr Ajesh Desai, Director, State Training Institute for Health and Family Welfare

It is believed that the success of the training of medical officers is largely due to the increase in the management capacity created by appointment of a dedicated qualified official to oversee and manage the training programme. As of June 2009, 50 doctors in Gujarat had been trained in CEmOC.

4.1.7 Training of MBBS doctors in anaesthesia

Providing CEmOC may require the services of an anaesthetist, and as in the case of other specialists, there is a severe shortage of trained anaesthetists in the public health system in rural Gujarat. The GoG started training MBBS doctors for obstetric anaesthesia in four teaching hospitals in the state in 2007. This is an 18-week training programme, and equips doctors to assist in surgeries during deliveries. Gujarat was the first state in the country to offer this training, and as of June 2009, 72 MBBS doctors have received this training.

More doctors have been trained in anaesthesia as compared to CEmOC as there are more training centres for the former.
While it may be expected that the placement of MBBS doctors trained in CEmOC and anaesthesia will lead to an increase in institutional deliveries in public health facilities, no evaluation of the impact of these trainings has been carried out so far.

4.1.8 Blood banking services

Blood transfusion has been identified as one of eight key life-saving functions that should be available in healthcare facilities providing CEmOC. According to the SRS (2003), 38% of all maternal deaths in India are caused due to postpartum haemorrhage. Further, a large proportion of pregnant women in Gujarat are anaemic (61%), and emergency blood transfusion is critical for reducing maternal mortality. In the Indian public health care system, FRUs have been identified as the point facility for providing emergency obstetric care. According to some estimates, if all FRUs were equipped with the required blood supply, maternal deaths could be reduced by 30% (Ramani, Mavalankar & Govil, 2009).

Currently the total recorded blood collection in India meets only 40% of need. Furthermore, blood availability is higher in urban areas compared to rural areas. According to a recent study, Gujarat has 162 blood banks, of which 71 are run by private organizations. The majority of blood collection is done by the blood banks managed by charitable trusts, followed by government blood banks, Indian Red Cross Societies (IRCS), and private blood banks. Charitable trust and IRCS blood banks contribute significantly to voluntary collection of blood in both the states. In Gujarat, government blood banks contribute 13% of the state’s total blood collection.

Lack of voluntary non-remunerated donors of blood is still the main constraint for blood safety in India. Replacement donors (those related to the recipient) still provide the bulk of blood for blood banks.

The voluntary blood donation movement is relatively strong in Gujarat. There was an 89% increase in voluntary blood donation in the state between 1998 and 2005 and the total blood collection went up by 103% over this period.

In Gujarat, training programmes for blood bank personnel are offered to update their skills and knowledge. The training programmes are usually offered once in three months in various regions of the state, and address topics such as the necessity of safe blood, the rational use of blood, and clinical procedures.

Under the Blood Bank Modernization scheme of the National AIDS Control Organization (NACO), by November 2006 the Government of India had provided support to modernize 883 district-level blood banks and 255
major blood banks, and established 82 blood component separation units in the country. In Gujarat, under the programme, there are 15 major blood banks and 42 district-level blood banks.

Recently, the Medical Council of India (National Education Regulatory Board) has approved a postgraduate course in blood banking and immunology haematology/immunology haematology and blood transfusion. Gujarat is one of the five states in the country that offer this course.

4.1.9 Skilled Birth Attendance (SBA) training for ANMs

ANMs have to undergo an 18-month training programme. The Government of India started an initiative to train ANMs for skilled birth attendance in 2005. Gujarat has been one of the first states to start this training based on the national guidelines for skilled birth attendance (SBAs) (Mavalankar et al., 2009). This 15-day, competency-based hands-on training uses models and techniques for adult learning. ANMs are trained to recognize the complications during deliveries, provide immediate treatment and refer the pregnant woman to the FRU. The training is offered in-service and pre-service. (To enable pre-service training, the teachers at ANM schools have been trained in the new SBA protocol so that they can transfer these skills to newly graduating ANMs.) Trained ANMs are provided with equipment and supplies for conducting deliveries. As of March 2008, about 4500 out of almost 7500 ANMs in Gujarat have been trained in SBA. Unfortunately, there has been no systematic monitoring to evaluate whether the trained ANMs have been providing more or better maternal care (Mavalankar et al., 2009).

"This training is very essential for areas like ours, where there are many difficult-to-reach hamlets. It is not possible to reach a vehicle and transport the pregnant woman to a hospital. In such circumstance, if an ANM is trained in SBA, she can conduct a safe delivery. In the more urbanized districts where people can reach hospitals easily, this training may not be as critical."

Dr Prakash Vaghela, Chief District Health Officer (CDHO), Panchmahal

ANM WITH DISPOSABLE DELIVERY KIT
4.1.10 Verbal autopsy for maternal death audit

Registration of maternal deaths and verbal autopsies enable the authorities to document the number of deaths and record the reasons for them. This documentation of the location and causes of maternal death enables a better understanding of the problem and helps to plan for future reduction of maternal deaths.

In September 2006, the GoG started a system of recording maternal deaths with verbal autopsies. The forms are completed by block health officers who conduct verbal autopsies based on information of maternal death from field workers. These forms are sent to the district office where the data is entered into a computer. Software has been developed to record and analyze the data.

There was a delay in putting the system in place because no officer was solely responsible for the registration of maternal deaths and analysis and reporting of the audits. However, this shortcoming was taken care of in January 2009, and since then the activity has moved forward steadily. Six regional workshops were held in May 2009 with district-level officers to review the progress.

On the positive side, there is an increase in awareness among the community and field workers regarding the tragedy of maternal deaths because of the registration of maternal deaths and verbal autopsy. State- and district-level officers are also realizing various socio-economic issues and gaps in the public health system which lead to maternal deaths (Mavalankar et al., 2009).

4.1.11 Policy changes

Until about the middle of 2008, public health facilities conducted free deliveries only for a woman’s first two children. After that, the family had to pay for the delivery of the child. To encourage institutional deliveries, a Government Resolution was passed in 2008, instructing all public facilities to conduct all deliveries free of cost.

"Based on my experience in the field, I have definitely observed a reduction of maternal and neonatal deaths in Gujarat. In Mahesana district, for example, a total of 12,000 deliveries occurred between April 1 and July 31, 2009. Of these, only six were home deliveries. It is not just one factor that is responsible for this; it is multiple factors. These include aggressive awareness raising campaigns in the community, training of ANMs and improved facilities like free transportation services for deliveries."

Dr K.B. Patel, Regional Deputy Director, North Gujarat Region
Figure 4.2 shows the impact of these initiatives on the institutional deliveries in the state between 2005 and 2008.

**4.2 Initiatives to improve newborn care**

In India, post-neonatal mortality has declined much faster than neonatal mortality in the last decade. This is mainly due to increased focus on post-neonatal care such as immunization, management of diarrhoea and ARIs, etc. However, neonatal care remains the most neglected area, with only 42% of women receiving such care within two months of delivery, and a negligible number of women being visited in the vulnerable first week after delivery (Vora et al., 2009).

The GoG has promoted several initiatives in the last few years to reduce child and infant mortality. These focus on providing antenatal care, skilled attendance at birth and postnatal care and immunization and nutrition for pregnant and lactating mothers and infants. These are discussed below.

- **IMNCI**
- **Bal Sakha Yojana I and II**
- **Strengthening newborn care in government facilities and medical colleges**
- Upgrading skills of doctors in newborn emergency care
- Introducing mother and child friendly hospitals

![Figure 4.2: Trend in institutional deliveries in Gujarat](image)

4.2.1 Integrated management of newborn and childhood illnesses (IMNCI)

The IMNCI programme’s key component is home-based care for newborns and low-birthweight babies during the most vulnerable period of their lives, i.e. the first 28 days. The programme aims at training doctors, nurses and village-level health care functionaries to provide postnatal care and monitor newborns. Village-level health workers are trained to treat newborns and recognize distress signs. The training is module-based, with audiovisual and practical components.

Valsad district in Gujarat was among the first 5 pilot districts in the country to implement the initiative in 2005. The programme extended to 18 districts in the State in 2006. (WHO report Guj mtg 2008). Training for personnel in the remaining eight districts will be completed in 2009–2010.

In addition to the in-service training, IMNCI training has now been extended to the pre-service period and is part of the training given to doctors, nurses and health workers. Training in these tools and methods equips these students with necessary skills for newborn and child care when they start their practice (Government of Gujarat, 2008a).

As of August 2008, 28 000 health personnel, including Medical Officers, health workers and supervisors, AWWs and ICDS supervisors have received this training. Gujarat is the leading state in terms of the numbers of personnel that have received this training, and this has led to a marked increase in the skills and capacities of local workers.

The State Health Department followed an innovative approach of bringing in experts from medical colleges and positioning them as key health administrators overseeing IMNCI training in the state. Dr Amarjit Singh, Commissioner of Health and Secretary Family Welfare, GoG, explained, “We accepted that the level of understanding about what was killing children was poor within the administrative system. We also accepted that those who understood the key issues underlying neonatal and child survival in general were in the medical colleges. So the next step was to seek out those who have stature in medical colleges and get them into the system where they can have a greater impact. This was a new thing because teachers had not been made health administrators earlier.” The department has also involved private medical colleges in conducting these trainings.

In 2009 the State appointed six regional officers for IMNCI to ensure that the services run smoothly.

According to Dr Dholakia (Joint Director, MCH, GoG), there are two challenges
in satisfactory implementation of IMNCI. The first is adequate supplies and logistics to ensure that the trained personnel visit the newborn and provide the required care. The second is adequate supervision of the field workers. The focus now is on ensuring that supplies are available at all places and on training supervisors who can monitor the work on the ground.

"The best part about doing check-ups using the IMNCI protocol is that nothing has to be memorized. All the information is given in the IMNCI booklet, which we carry with us."

FHS, Vejalpur PHC, Panchmahal District

4.2.2 Bal Sakha Scheme I and II

The Bal Sakha Schemes I and II were launched in Gujarat in early 2009, and focus on newborn care for BPL families. The scheme was introduced in response to the shortage of paediatricians in the public health system, especially in rural areas. Currently there are only 16 paediatricians in the public health system; the number in the private sector is estimated to be about 750. Under the Bal Sakha scheme, Chiranjeevi doctors are encouraged to keep the mother and newborn for two days post-delivery in the hospital and have a paediatrician visit the newborn twice within the first 48 hours. The two-day period is used to monitor the mother and newborn child and also to emphasize the importance of exclusive breastfeeding in the first six months. As with the Chiranjeevi scheme, private paediatricians are being signed on for the scheme.

Under Bal Sakha I Scheme, infants born under the Chiranjeevi Scheme are visited by a paediatrician at the hospital where the baby is delivered. If required, the newborn is taken to the clinic of the paediatrician for treatment. The scheme also pays for transportation of critically ill newborns to medical college hospitals.

The Bal Sakha II Scheme is for infants from BPL families not born under the Chiranjeevi Scheme. The benefits of Bal Sakha I are available to them. In addition, an incentive is paid to the ANM/AHSA/ICDS worker who refers the infant to the paediatrician.

As of July 2009, 11 305 infants had been visited by 226 paediatricians enrolled in the scheme.

It is not always easy to keep the mother and newborn in the facility for 48 hours after the delivery, as the family often wishes to leave the hospital and go home. It is hoped that over time this trend will change.
4.2.3 Upgrading skills of MBBS doctors and nurses in emergency newborn care

To compensate for the lack of specialist paediatricians in public health facilities and in remote rural areas, a programme for training Medical Officers in emergency newborn care has been designed and initiated in the state. This four-month training is the first of its kind in the country (Government of Gujarat, 2008a), with three months in the medical college and one month practical training in a district hospital. The first group of eight MBBS doctors completed training in July 2009, and a second group of ten doctors will begin their training in September 2009.

A similar training for nurses in neonatal care is in the planning stages.

4.2.4 Introducing mother and child friendly hospitals

The GoG wants to encourage all hospitals in the state to keep the mother and newborn child in hospital for 48 hours after the delivery, to provide inputs on newborn care and to monitor the mother and child during this critical period. The government launched an initiative in February 2009 to certify hospitals which follow this protocol as “Mother and Child Friendly Hospitals”. The certification team will include FOGSI, the Pediatric Association and the State Government. Gandhinagar District Hospital is likely to be the first hospital to receive this certification.

“It is not easy to persuade a woman to stay in the hospital for 48 hours after a normal delivery. She wants to get back to her house because there is a cow or a buffalo to look after. Also she may have an older child and so wants to get back home. Her family has to be persuaded for her to stay for two days after her delivery.”

Nidhi Verma, District Programme Coordinator, Panchmahal District

4.3 Antenatal and Postnatal care, Nutrition, Growth Monitoring and Immunization

In addition to institutional deliveries and newborn care in the hospital, ensuring complete antenatal care and improving the health status of women and children is critical for reducing maternal and child mortality. Gujarat has introduced important initiatives for promoting the health of these groups.

4.3.1 Mamta Abhiyan

In 2006, the Government launched Mamta Abhiyan, a comprehensive package providing preventive, promotive, curative and referral services under the Reproductive and Child Health Programme. Gujarat has made this into a
comprehensive programme focusing on antenatal and postnatal care and infant and child health using a centre-based approach. In several villages, centres existed previously for immunization and were known to the community. These existing centres are now being used to deliver a larger set of services.

The innovation lies in using the recognition and credibility of the ICDS anganwadi centre in the village for providing a range of services.

The Mamta Abhiyan is carried out through four primary activities:

- **Mamta Divas** (Village Health and Nutrition Day)
- **Mamta Mulakat** (Postnatal care visit)
- **Mamta Sandharb** (Referral services)
- **Mamta Nondh** (Records and reports)

This programme integrates the services of the Health Department and the Women and Child Development Department, which are provided by village-level workers from both departments.

**Mamta Divas (Village Health and Nutrition Day for antenatal care and child health)**

*Mamta* Day is held on each Wednesday of the week in each village of the state. The activities on this day include registration and health check-ups of pregnant women and children including weight monitoring, immunizations, distribution of IFA and calcium supplements and counselling. The service team includes the ANM, the local AWW and helper, the ASHA worker and trained midwife. Other village-level workers may also be present on this day at the site. The health department ensures that no other meetings or events are planned for this day of the week.

*The main objective of Mamta Divas is to strengthen routine immunization, reduce infant mortality as well as malnutrition among children through effective delivery of Health & Nutrition services on the same day and under the same roof. On the Mamta Divas, a mother and child friendly environment is created at the anganwadi, exhibition panels on maternal and child health are displayed, to educate the community about newborn caring practices, health and hygiene. (Government of Gujarat, 2008a).*

**Mamta Mulakat (postnatal care visit)**

*Mamta* Visits are made by the ANM to a new mother and infant on the first, third and seventh day after childbirth. In the case of institutional deliveries, the first visit is made after the mother and child return home. The ANM monitors the mother and infant and counsels the mother and her family on breast feeding and hygiene.
**Mamta Sandharb (Referral service)**

A minimum of one Mamta Referral Centre has been developed in each block, where services of a paediatrician are available on a fixed day each week. ANMs refer mothers to these services if they observe the need during home visits, Mamta Days or Mamta Visits.

**Mamta Nondh (Records and reports)**

Each pregnant woman is registered with the public health system and issued a Mamta Card. This card is used to record the data about the progress of her pregnancy, intake of micronutrients and immunizations of her child.

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**4.3.2 Adolescent girls anaemia control programme**

Adolescents (10–19 years) in India constitute 22% of the country’s population. The health of adolescent girls has a bearing on maternal and infant health and is therefore of relevance to the discussion here.

Until recently, adolescents were being reached through school programmes in coordination with the Department of Education. They were given information on issues of hygiene and reproductive health, etc. and invited for visits to the health facilities. This was not found to be very effective, and was also unsuccessful in reaching adolescents who were not in school.
To reach the adolescent population more effectively, especially the adolescent girl population, the Government has launched the Mamta Taruni Abhiyan to address the health needs of adolescent girls. The Mamta Taruni Abhiyan targets preventive and promotional health services at adolescent girls. The programme has been designed to deliver health and nutrition services using a fixed-day, fixed-site model with a peer educator. The primary activities under the programme include weight monitoring, IFA supplementation, treatment of RTIs and STIs information, education and communication, and behavioural change communication. The programme will be held on Mamta Divas at the aanganwadi centre and is expected to begin later in 2009.

4.3.3 Nutrition and growth monitoring

Nutrition cell

The state has instituted a State Nutrition Cell and established nutrition support units in six regions at Medical Colleges for technical oversight.

Twelve Child Development and Nutrition Centres are being set up in tribal blocks to treat and rehabilitate children with grade III/IV malnutrition (Government of Gujarat, 2008a). Each centre will have a ten-bed facility for the malnourished child and her mother to stay for eight to ten days.

Refresher training on nutrition to ICDS workers

The existing ICDS programme is responsible for providing supplementary nutrition to pregnant and lactating women, adolescent girls and children aged six months to six years. To increase the effectiveness of village-level functionaries in their role for promoting health and nutrition among the target group, this cadre is being trained in the fundamentals and importance of nutrition. The ICDS and health programmes will focus on underweight women and children.

Fortified foods

Gujarat was one of the first states in the country to introduce fortified flour and edible oil in 2005. Under the Bal Bhog Scheme, the state distributes take home pre-cooked energy- and protein-rich food fortified with IFA along with vitamins A and C under the Micronutrient Programme for pregnant and lactating women, adolescent girls and children aged six months to six years. Iodized salt is provided to all pregnant women.

4.3.4 Immunization strengthening

In 1985, India launched the Universal Immunization Programme (UIP) targeting all infants with the primary immunization schedule and all pregnant women with tetanus toxoid.
immunization. Under the UIP, six vaccines are used to protect children and pregnant mothers against tuberculosis, diphtheria, pertussis, polio, measles and tetanus. The UIP requires a reliable cold chain system for storing and transporting vaccines.

According to NFHS-3 data, there was a slight decrease in the proportion of fully immunized children in 2005 compared to previous years (Table 4.2).

The Government of Gujarat has stepped up its immunization programme and taken a number of initiatives to extend full immunization coverage to all children. The following data from the government reflects the efforts taken.

**Vaccine preventable disease surveillance**

In the last two years the State has streamlined its vaccine preventable disease (VPD) surveillance systems. There is district-wise reporting of VPDs and weekly monitoring of the data that comes in.

**Cold chain handlers training**

The data from the VPDS led to the intensification of cold chain handlers training in the state. Gujarat has taken a lead in training its team members with support from UNICEF.

**Adverse event following immunization (AEFI)**

The first state-level workshop on AEFI was held in March 2008. An AEFI Committee has been formed in every district. Three-day trainings in AEFI are being given FHSs and ANMs.

**Routine immunization monitoring system (RIMS)**

Until recently, data on immunization were limited to coverage under the immunization programme. Recently, the Government of India started using RIMS to record more comprehensive data. The data are collected at district level from PHCs /Reporting Units in the standard predesigned UIP format and entered on five broad categories: (A) immunization

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<tr>
<td>50</td>
<td>53</td>
<td>54</td>
<td>45.2</td>
<td>54.9</td>
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*Source: NFHS*
and vitamin A, (B) vaccine supply, (C) VPD surveillance, (D) status of cold chain equipment, and (E) AEFI. These data are used for planning and forecasting requirements and monitoring vaccine supply and availability.

The RIMS has been instituted in all states of India. According to the Commissioner, DANM, GoG, Gujarat is the only state where all 26 districts report using RIMS.

**Linkages with private providers**

Recognizing that a large proportion of persons go to private providers, the government has linked up with them and stationed one ANM at each private clinic. All parents who visit private practitioners are motivated to complete the immunizations for their children (Table 4.3). There have been two notable achievements marking the success of the immunization programme. First, there has been no reported case of polio in the state since March 2007. Second, in June 2008 Gujarat was validated as having eliminated maternal and neonatal tetanus.

**Table 4.3: Percentage of Children Fully Immunized in Gujarat, 2006–2009**

<table>
<thead>
<tr>
<th>Year</th>
<th>Full immunization</th>
<th>BCG, measles dropout</th>
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<tr>
<td>2006–2007</td>
<td>89.5</td>
<td>7</td>
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<tr>
<td>2007–2008</td>
<td>86.4</td>
<td>4.6</td>
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<tr>
<td>2008–2009</td>
<td>79.2</td>
<td>10.3</td>
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Source: DHFW, GoG

“Reaching our target of full immunization is a problem especially in tribal areas. A large proportion of the population migrates out for employment. They are away for several months at a time.”

ANM, Vejalpur PHC, Panchmahal district

4.4 Human resources and management systems

Successful outcomes of the initiatives taken by the GoG depend upon sound management of the health system and adequate and suitable human resources. The leadership recognizes this and has instituted steps to strengthen management systems in four broad areas. These are:

- Human resource strengthening
- Decentralization
- Community participation
- Management Information Systems in hospitals

4.4.1 Human resource strengthening

To strengthen the human resources in the public health system, the state is enhancing the technical and managerial capacity of existing personnel and using innovative ways to address the shortage of skilled personnel.
**Capacity building in technical and managerial skills**

There is increasing recognition of the importance of human resources for ensuring positive health outcomes such as improved maternal mortality (Krupp & Madhivanan, 2009). Regular capacity building of health workers and doctors is carried out and extensive training is being given to doctors in public health. At any time, 50 doctors are under training (World Health Organization, 2009).

Institutes such as the Indian Institute of Management Ahmedabad, Mudra Institute of Communications, Ahmedabad and Indian Institute of Health Management Research are being used for training in disciplines such as management and communications. To upgrade managerial skills in public health, the Indian Institute of Public Health was launched in collaboration with the Public Health Foundation of India (World Health Organization, 2009).

**Walk-in recruitment**

There is a chronic shortage of medical officers and specialists in the public health system. To address this shortage, the GoG has developed an innovative method for recruiting staff. Candidates interested in joining the state public health system can walk into the Regional Director’s office with the required documents and certificates. If they satisfy the criteria, they are hired on the spot.

**Building the specialist pool**

Thirty per cent of postgraduate seats in government-run medical colleges are reserved for doctors working in remote and rural areas. This reservation acts as an incentive for MBBS.

**Increasing training programmes for nurses and ANMs**

Under NRHM it is recommended that two ANMs be place in each subcentre. Given the shortage of trained ANMs, the state launched 12 additional schools for ANMs in 2009.

According to Dr Prakash Vaghela, CDHO Panchmahal district, the state can look forward to an increased number of trained ANMs in the near future. This is possible because of the state’s initiative to launch more training programmes and corresponding efforts by the districts to quickly identify suitable candidates for training.

The government is planning to launch a one-year special course on midwifery to be offered in nursing colleges. It has been designed and approved by the Nursing Council.
"Having ASHA workers has made a big difference in our work. Earlier we had one ANM who was responsible for a population of 5000 persons. Now she is supported by an ASHA worker for each population group of 1000 persons. The ASHA plays a critical role in registration of pregnant women and helping pregnant women get to a hospital at the time of delivery. She lives in the village and is always available."

Dr Prakash Vaghela, CDHO, Panchmahal District

4.4.2 Decentralization

Gujarat is a large state, with an area of 196,024 square km. Successful implementation of the public health system requires that the districts and block offices have a fair degree of autonomy. To this end, the state has introduced initiatives to give greater authority to local offices, recognizing that local officers and staff are in the best position to know local priorities and use for resources. “The medical officer can bring about a sea change, if they are supported satisfactorily,” according to Dr Vaidya, CDHO, Ahmedabad district. He has taken the initiative to provide free weekly transportation to the PHC for antenatal check-ups. This facility has been made available for rural residents living in distant and poorly connected talukas.

“The new village health and sanitation committees are given an annual fund of Rs.10,000 to be used for health related activities in the village. The Female Health Worker and the village teacher are signatories for utilizing this fund. In the beginning the ANM was very nervous about being a signatory. She had not handled public monies before this and was afraid about the type of enquiries that might occur, the auditing of the money, etc. However, they were motivated and encouraged by their supervisors to take on this responsibility. The funds have been used for repairing the aanganwadi, getting furniture for the subcentre, emergency transportation or purchase of powder for chlorination.”

Dr N.N. Damod, Block Health Officer, Panchmahal District

District and block Programme Management Units

As a step towards decentralization, the State Programme Management Unit (SPMU) was set up in 2005–2006 to provide technical support to the public health system. The SPMU is staffed by trained managers. Each district has a District Programme Management Unit headed by a District Programme Coordinator, who is a trained manager.
Dr P. Vaghela, CDHO, Panchmahal District comments, “The setting-up of Programme Management Units has helped us in many ways. The quality of our data has improved significantly, and we are able to validate and verify the data that comes from the PHCs. We are now able to use this data for monitoring and planning purposes, and for conducting training of our teams.”

**District Health Societies**

In 2006, District Health Societies (DHS) were instituted to plan district-level activities, make budgetary allocations and monitor the progress on stated objectives. Each DHS is chaired by the District Collector (the chief government administrative officer of the district), and the six-monthly meetings are attended by the District Collector, the CDHO and the block-level health officers.

*In Panchmahal District, the District Health Society decided to use some funds from the Rashtriya Sam Vikas Yojana to procure weekly services of a gynaecologist and a paediatrician at the Vejalpur PHC.*

**Block health offices**

Each district has around 60 PHCs which are supervised by the District Health Office; often the PHCs are located at a great distance from the Office, and satisfactory review and supervision of the PHC becomes difficult. To provide better support to the PHCs, the GoG created Block Health Offices, which assist the District Health Office in planning and review of PHC activities and flow of data from the field to the district, and generally improve the communication flow between the community and the District Health Office. This initiative has been implemented on a pilot basis in Surat.

**4.4.3 Community participation**

**Rogi Kalyan Samiti (Patient Welfare Societies)**

A *Rogi Kalyan Samiti* (RKS) is a local voluntary civic body that oversees the functioning of the health facility and devises strategies to improve its functioning. The RKS is made up of 11 to 15 local elected leaders and community representatives. RKSs have been established in 916 PHCs, 273 CHCs and 23 District Hospitals.

Each RKS is funded by the state. For example, an RKS at a PHC receives Rs.10,000 per annum for each revenue village that falls under the PHC. In addition, the RKS can raise funds through user fees and donations. The RKS utilizes these funds as it deems fit.
The flexibility of RKS funds means they can be used for a variety of purposes to enable better health services. For example, in the Aakhaj PHC in Mehsana, the discretionary funds are used to bring in a gynaecologist and a paediatrician once a week. The specialist doctors are paid Rs.1000 or Rs.1500 per visit. The funds are also used to provide free transportation from the village to the block level health facility, to hold health camps (such as IUD camps held on the day of our visit on August 17, 2009) and to provide nutritious food to pregnant women and lactating mothers.

An evaluation of the performance of NRHM in Gujarat reported that the State has “...attempted to promote a flexible decentralized participatory structure with reasonable levels of efficiency” (Srinivasan et al., 2007).

4.4.4 Management information systems

Health Management Information Systems (HMIS) are being implemented in all hospitals with support from Tata Consultancy Services (TCS), a noted software development organization. This has enabled the creation of a database with details of each patient who registers at a government hospital. The data can be accessed and updated on subsequent visits by the patient, which enables the doctor to review the patient’s history and provide appropriate treatment. This system has resulted in reduced waiting time for patients and improved continuity of care. This initiative was awarded the e-governance award by the Computer Society of India in 2007 and the SKOCH Challenger award in 2008.

4.4.5 Safe motherhood monitoring system

An initiative to monitor maternal deaths was begun in July 2009 on a pilot basis in three districts (Vadodara, Sabarkantha and Mehsana). Under this system, each pregnant woman is listed in an online database by name and location. Her progress during the course of her pregnancy is monitored and the information is entered in the database for transparency and easier supervision. Other districts such as Panchmahal have also adopted this monitoring system.

4.5 Physical infrastructure: quality improvement and accreditation

Gujarat was the first state in the country to introduce National Accreditation Board for Hospitals and Healthcare Providers (NABH) standards in public hospitals, including CHCs and PHCs. Between 2003 and 2007, CHCs and PHCs were evaluated and brought up to standard for RCH services. Quality improvement in the PHCs and CHCs aims at achieving Indian Public Health Standards (IPHS) and focuses mainly on reproductive health care.
In district hospitals and medical college hospitals, the emphasis is on the total quality management system, in accordance with NABH and National Accreditation Board for Testing and Calibration Laboratories (NABL) standards.

In July 2007, a memorandum of understanding (MOU) was signed between the GoG and the Quality Council of India (QCI) to begin the process of accreditation of public health facilities in Gujarat. This process was launched in eight district hospitals and one medical college in Phase I. In Phase II, all five medical college hospitals, eight district hospitals, two dental college hospitals, two mental health college hospitals and one paraplegic hospital were taken up under the scheme. In 2007, the state also initiated the process of getting accreditation for its laboratories by the NABL. The laboratories of six medical colleges in the state have initiated the certification process.

The state department empanelled NABH and NABL consultants in coordination with QCI New Delhi to assist in this task. A set of strategies was adopted for quality improvement. These included:

- Appointment of assistant hospital administrators for government hospitals/medical colleges in a phased manner
- Development of quality steering committee for the state at all levels
- Nomination of district quality assurance officers
- Objective-oriented roles and responsibilities for all committees and groups as defined by Quality Steering Committee
  - NABH lead assessor training of 32 administrators, clinicians and staff nurses at state level
  - NABL internal audit training of 25 heads of the departments of medical college laboratories

At the Vibrant Gujarat Summit in 2009, the state signed MOUs with QCI for accreditation of further CHCs and PHCs. It is planned that all government hospitals will be accredited by the end of 2009 (Government of Gujarat, 2008a). All accredited hospitals are being linked with state-of-the-art HMIS. The department expects to have completed the accreditation process for all public health facilities in the state by 2012.

District Quality Assurance Officers have been appointed to maintain the improved quality of the health facilities. The best-performing medical officers from the PHCs and CHCs have been identified and selected for these positions. The Quality Assurance Officers have also been trained as assessors for NABH.

Health facilities at all levels are being upgraded, strengthened and improved with the help of the Project Implementation Unit set up for this purpose. For instance, starting in 2006, each PHC has been equipped with a computer which is used to maintain all the data of the population covered by the PHC. To facilitate timely maintenance of health infrastructure, medical officers
have the authority to commission civil improvement and repair works of up to Rs.25 000 per annum.

4.5.1 24 X 7 PHCs

Bringing the infrastructure up to required standards is the smaller challenge; the larger one is to meet the human resource requirements for these facilities. To promote improved health services, including basic emergency obstetric care and institutional deliveries, the state is in the process of upgrading its PHCs. The objective is that all PHCs function 24 hours a day, seven days a week. This requires not just infrastructure but also human resources to staff the PHC. Under NRHM guidelines, each 24X7 PHC should have three staff nurses to provide round-the-clock service. Gujarat is in the process of upgrading 253 of its PHCs into 24X7 facilities that meet IPHS standards (Government of Gujarat, 2008b). In July 2009, the PHC at Naswadi taluka of Vadodara district was the first PHC in the country to be accredited under NABH guidelines. However, there is a severe shortage of staff nurses to fill the positions needed to make PHCs functional 24X7 (Srinivasan et al., 2007).
5
PROMOTING UPTAKE

The success of government initiatives depend upon the uptake of these services among the target communities. The supply of services by the state government needs to be matched with a demand from the communities. In this section we describe two initiatives taken by the government to promote awareness and use a delivery mechanism that is effective in reaching the target communities. We also discuss the creation of village-level functionaries to promote the uptake of public health services.

5.1 Nirogi Bal Varsh (Child Health Year)

To highlight the importance of child health, the GoG marked the year 2008-2009 as the Child Health Year (Nirogi Bal Varsh). The focus of activities was on reduction of child mortality through increasing institutional deliveries, taking care of neonates, reducing malnutrition among mothers and children, and increasing enrolment and retention in schools. As the CDHO of Ahmedabad district, Dr Vaidya, said, “The State Government has taken on maternal and child health as a top priority. The objective of celebrating 2008 as the Nirogi Bal Varsh was to highlight the issue and give a jumpstart to a whole host of activities which are to continue on a regular basis.”

Some key components of the Nirogi Bal Varsh were:

- Care of the mother
- Right of the girl child to be born
- Unmet need for family planning
- Addressing malnutrition
- Care of the neonates
- School health
- Care of special children
- Clean drinking water and sanitation

The activities of Nirogi Bal Varsh relied on interdepartmental coordination in the government for successful implementation. Some key departments delivering services for this campaign were the Department of Women and
As an incentive to local governments, the state government awarded recognition and a cash award to village panchayats (councils) that met the following criteria in the course of the year:

- Complete birth and death records
- 75% or more children 3 years and younger healthy and not malnourished
- 80% or more pregnant women and children under five registered under Mamta Abhiyan
- 80% or more institutional deliveries
- 60% couples with two or more children accessed family planning services/using contraception
- 85% or more children under one year with complete immunizations
- All children 6–14 years of age in school with zero dropout rate,
- All anganwadi centres, health centres and primary schools have iodized salt, clean drinking water and clean toilets
- Newborn sex ratio of 925 or above
- No child marriage in the village.

5.2 Beti Bachao Abhiyan (Save the Girl Child campaign)

According to the Indian Census of 2001, there was a drastic fall in the sex ratio in Gujarat from 10 years previously, and especially in the child sex ratio. The overall sex ratio dropped from 934 to 920 per 1000 males, while the child sex ratio fell from 928 to 883.

In response to this finding, the state launched a “Save the Girl Child Campaign” (Beti Bachao Abhiyan) and ordered stricter enforcement of the Prenatal Diagnostic Technique (PNDT) Act. Forty-three most adversely affected talukas (with a sex ratio below 850 in the 0–6) were identified for focused attention.

The Beti Bachao Abhiyan campaign was initiated on the occasion of International Women’s Day in 2005. Under the campaign, there was widespread awareness-raising about the equality of girl children and the problem of gender imbalance. A series of activities was organized to create awareness among different stakeholders and community members.

The PNDT Act prohibits sex selection before and after conception. It also regulates prenatal diagnostic techniques for detection of genetic abnormalities,
restricting their use to registered institutions and registering all clinics possessing ultrasound machines. The government stepped up enforcement of the Act and appointed District Appropriate Authorities in all districts to oversee its strict implementation.

To check misuse of the technology, the government also set up a State Inspection and Monitoring Committee to undertake field visits, monitor the implementation of the Act and initiate action against unregistered institutions and those violating the law.

As many as 137 ultrasound machines have been confiscated by the government, and legal action initiated against 89 defaulting practitioners and clinics. A high-level conference was organized with the higher judiciary to create greater awareness of the Act’s requirements.

Advocacy workshops have also been organized by professional bodies and NGOs to sensitize medical practitioners about the legal aspects of the PNDT Act and the need for strictly adhering to the law. The High Court of Gujarat and Gujarat State Judicial Academy have contributed to this effort.

**Translation of text in poster:**

Stop female foeticide—save the girl child...

The girl child also has a right to be born.

In Indian culture, women’s strength is considered divine.

Do not commit the sin of killing the girl child.
We held meetings with the local religious leaders (Dharma Gurus) to bring them on board for the Beti Bacho Andolan. These leaders are powerful voices in the community and their word carries a lot of weight in the community. We thought we should try and convey the issue to them so that they could carry it into the community. We also held plays on the theme of the girl child using the traditional theatre form of bhavai.

District Police Commissioner, Panchmahal District

Figure 5.1 shows the improvement in sex ratio at birth registration between 2001 and 2007.

Figure 5.1: Sex ratio in Gujarat

Source: Annual Administrative Report, Commissionerate of Health, Medical Services and Medical Education, GoG, 2007–2008
Since 2005, the GoG has taken several initiatives taken for achieving MDGs 4 and 5. Some, like the Chiranjeevi and Bal Sakha schemes, have been new initiatives. In other instances, the state has taken a lead in implementing initiatives promoted under the NRHM. The new initiatives have been complemented by the strengthening of existing systems. However, there are few formal evaluations of these recent initiatives. The government’s own management information systems indicate that these initiatives have been successful in reducing maternal mortality, increasing institutional deliveries and increasing the proportion of children who are fully immunized.

The initiatives taken by the Government are multi-pronged. The attempt is to strengthen the public health delivery system, and in the meantime to use resources in the private domain. The initiatives aim at improving direct medical care, preventive health care and also the socio-economic and cultural determinants of poor health, especially among women. The health interventions therefore focus on rural areas which are poorly serviced and contain a higher proportion of poor families. The schemes are especially targeted at BPL families and tribal families. The initiatives also aim to address gender disparities through campaigns like “Save the Girl Child”.

Two factors that have contributed significantly to the effective implementation of the initiatives are the intersectoral linkages that have been developed, and the leadership and political support these have received. We discuss each of these below.

6.1 Intersectoral linkages

6.1.1 Linkages between government departments

Two government departments directly associated with maternal and child health are the Department of Health and Family Welfare (DHFW) and the Department of
Women and Child Development (DWCD). DHFW aims to ensure universal access to quality health care. All programmes of the DHFW are channelled through the three-tier system of primary, secondary and tertiary care, described in Section 2.1 above.

DWCD is the repository of national programmes for the holistic development of women and children. These include the Integrated Child Development Services (ICDS), which provides supplementary nutrition for pregnant and lactating mothers and children under six and a variety of other programmes for social and economic development of women through collectivization, welfare and support services, employment related trainings and gender sensitization. DWCD appoints an AWW and an Anganwadi helper in each village of a stipulated size.

The DHFW and DWCD have overlapping objectives and the functionaries of the two work closely together at the community level.

The AWWs and helpers from the ICDS programme work closely with the ANMs and other health workers for preventive and primary health care at the village level. To ensure smooth functioning of workers from the two departments, the state has instituted a common chain of command at the PHC level for effective monitoring and supervision.

The various activities under the Nirogi Bal Varsh also depend upon linkages and cooperation between various state departments.

In some districts, such as the all-tribal Narbada district, the health department has linked up with the tribal welfare department. The latter funded the purchase of nine vehicles which are kept available in interior locations to transport pregnant women to health facilities for delivery. This scheme was started in 2007, and according to anecdotal evidence, there has been a 25% increase in institutional deliveries.

The Adolescent Anemia Control Programme is carried out jointly by the DHFW and the Education Department.

6.1.2 Engagement with local bodies/voluntary agencies/NGOs

The GoG works closely with local organizations to strengthen health services.

Public-private partnerships for managing health facilities

The CHC in Unhja (Mehsana district) is managed by a committee of retired residents in the area. The Jeera Processers’ Association in the region supplements the state’s funding for running the CHC. These additional funds have been used to purchase medicines, pay for specialist services, and for improving the services in the eye department.
In the Aakhaj PHC in Mehsana district, the land has been obtained and construction undertaken with funds from the panchayat. The government bears the running expenses of the PHC. The local sarpanch takes an active interest in the running of the PHC.

There are other examples of local businesses like milk cooperatives or marketing yard committees becoming involved in the running of PHCs and CHCs. They support both the management of the facilities and some funding requirements.

In some instances, the state government has entered into public private partnerships to achieve effective health care delivery. The Shamlaji PHC in Sabarkantha is one successful example of such a public-private partnership.

**Linkages with NGOs for service delivery**

In certain prosperous districts the local residents have the resources to contribute towards health services. However, the GoG has also made effective linkages with NGOs for delivery of maternal and child health services where needed. Deepak Foundation works in the tribal areas of Vadodara district. In 2004, the Foundation began promoting institutional deliveries among the tribal population. In each village, a female health worker was identified and given responsibility for referring pregnant women to institutions for institutional deliveries. Emergency transportation services were begun in four talukas using vehicles provided...
by the State Health Department. The village health worker accompanies the pregnant woman to the hospital. The Foundation also set up a help desk at Baroda Medical College Hospital to guide the women coming in for deliveries and other services. Currently the Foundation is implementing an anaemia control programme in coordination with the state government.

At Jabugam CHC (Jetpur Pavi), EmOC services have been provided since 2006 using the PPP model. The CHC is located on the outskirts of the town of Bodeli and was not being used by the local communities. Deepak Foundation constructed facilities for EmOC in this CHC and retained specialists to carry out deliveries. In a facility which saw hardly any OPD patients, the increase in institutional deliveries has been notable. In 2008–2009 the CHC conducted 1700 deliveries; in 2010 the number is expected to exceed 2000.

Gujarat has an active civil society and the state’s health department has engaged with civil society organizations to ensure that its services reach the poorest and remotest areas in the State. The state government’s Health Department and seven NGOs promoted an association of traditional birth attendants (TBAs), which was launched in April 2005. Together with Jan Swasthya Abhiyan (JSA), a collective of NGOs in the state that are active in the field of health, the government is trying to develop a mechanism whereby civil society can participate in ensuring that health services reach all (Government of Gujarat, 2008a).
6.2 Political support and leadership

According to the State Health Commissioner, the initiatives for achieving MDGs 4 and 5 have widespread political support, starting with the Chief Minister of the state. Elected state representatives also follow this example and exhibit their support at various forums. For example, local MLAs (elected members of the State Legislative Assembly) in Ahmedabad district came to inaugurate trainings for ASHAs and discussed issues such as the importance of early breast feeding, institutional deliveries, antenatal care and polio drops. They also participate in the activities of Mamta Diwas. Such support from the political leadership plays an important role in motivating the team members implementing the programmes.

Gujarat has successfully instituted innovative programmes such as the Chiranjeevi Scheme and the Emergency Ambulance Service. These schemes were debated extensively by senior politicians and bureaucrats before they were begun. According to Dr Ajesh Desai, a positive consequence of these discussions was an increased level of awareness about these issues among the state’s leadership. This has also led to increased recognition of the need for social sector funding in the state.

Gujarat has been proactive in implementing initiatives recommended under NRHM and has added its own innovations.

The leadership in the state and its Health Department has played a critical role in energizing the public health system. The success of Gujarat is in part driven by the commitment of the Health Commissioner, who has an education in public health and has occupied his position for the last four years (Vora et al., 2009). The senior team comprises qualified persons who are willing to take risks. Personnel at all levels are given power along with responsibility and the space to take decisions.

6.3 Factors that have contributed to the successes in Gujarat

Undoubtedly the leadership provided by the state’s chief executive and the Department of Health and Family Welfare has been the driver for the recent initiatives. The State has been innovative in adopting strategies that work around the constraints of the public health system. There is recognition of the importance of good management practices, and persons and systems have been aligned accordingly.

The umbrella of NRHM has also facilitated many positive changes in the public health delivery system. There is increased
availability of funds. In addition, there is an emphasis on decentralization and engagement of client communities. The empowerment of grassroots-level workers like the ANMs has made a big difference. The district health societies have enabled decision making at district level. In addition, the shortage of human resources can be partially addressed through hiring staff such as ANMs on contract, without waiting for the more lengthy bureaucratic process of a formal appointment. There is a lot of emphasis on capacity building at all levels, and on ongoing monitoring of programmes.

Linkages with other government departments, civic bodies and NGOs have made it possible to maximize resources and build ownership of the programmes among a wider constituency.

6.4 Challenges

The primary challenge the system faces is a shortage of trained human resources for delivery of public health services. Although the reduction in the MMR is a key health policy objective, Gujarat does not have a separate director in charge of maternal health (Mavalankar et al., 2009). In addition, the state lacks adequate human resources, organizational and supervisory structures and systems.

Obtaining adequate staff for health care facilities continues to be difficult, and some sanctioned positions do not get filled (Desai & Bhavsar, 2007). This is especially a problem in health care facilities in remote and sparsely populated areas. There has been a decrease in doctors and nurses living near PHCs, and a sharp drop in the numbers of deliveries conducted at PHCs (Mavalankar & Vora, 2008).

The shortage of technical staff, especially MBBS doctors and trained nurses, puts additional burdens on the existing doctors and paramedical staff and constrains their ability to carry out their routine duties satisfactorily. When the researchers asked the staff of four PHCs about their level of work satisfaction, they found that staff from well-staffed PHCs expressed greater levels of satisfaction than those where the staffing was inadequate (Desai & Bhavsar, 2007).

One challenge is that specialists are reluctant to work in rural FRUs, as these areas lack the basic amenities of urban living. Doctors trained by the government are required to serve for three years in a public facility. However, once this term is completed it can be difficult to keep them in the government system; their entry into private practice after the mandatory government service cannot be ruled out. The leadership feels that this is not entirely negative. While the trained doctor may not be in a public health facility, she/he will continue to practice in the rural sector and thus continue to provide safe deliveries.
Training of medical officers in CEmOC and anaesthesia is constrained by the shortage of MOs in rural areas. According to Dr Ajesh Desai, there are not enough doctors in the public health system that can benefit from this training.

Another challenge is to ensure that field workers are not overloaded with multiple tasks. Each village has a cadre of workers such as ASHAs for delivery of MCH services. There is the risk that additional responsibilities may be given to these workers that are technically outside their purview, e.g. water testing. Overloading these workers can dilute their efforts vis-à-vis their primary responsibilities for MCH.

In addition to strengthening the public health systems, there is a need to address the root causes of maternal and child mortality and morbidity such as poverty and the lack of education and general development in the region.

An important reason for the rapid strides being made in the initiatives for maternal and child health is the personal commitment and motivation of the leadership in the state and the Department of Health and Family Welfare. Undoubtedly this vision has reached all levels of the department, and led to a motivated team. For these efforts to continue, it is important that leadership remains motivated and committed.
Appendix - I

Chiranjeevi Scheme

Under the Chiranjeevi Scheme, obstetricians are paid Rs.179 500 for a package of 100 deliveries (Rs.1795 per delivery). This package includes normal and complicated deliveries as well as caesarean section operations. The beneficiary does not pay any type of charges related to delivery, medicine, anaesthesia, laboratory investigations or the operation. The package also includes Rs.200 for transportation of the pregnant woman and Rs.50 for the TBA or other person escorting her. If the enrolled private gynaecologist offers his/her services at a government hospital, Rs.65 900 (Rs.659 per delivery) is receivable for 100 deliveries (normal and/or complicated) performed. Payment to the doctors is made through the District Project Management Unit in each district.

Selection criteria for private Ob/Gyns for enrolment in the PPP scheme

- Doctor must have postgraduate qualification in Ob/Gyn
- Must have his/her own hospital—preferably minimum of 15 beds
- Must have labour room and operating room
- Must be able to access blood in emergency situation
- Must be able to arrange for anaesthetists and do emergency surgery
- Facility should preferably be accredited for sterilization procedures for FP by the government.
- Norm would be to select 2–3 private Ob/Gyns per subdistrict. All available and willing Ob/Gyns were contacted.
Appendix - II

Guidelines for Bal Sakha Schemes

Bal Sakha Scheme 1

- **Chiranjeevi** doctors will contact private paediatricians to provide services to newborns in their hospitals/nursing homes.
- The mother and newborn baby will stay in the **Chiranjeevi** doctor’s nursing home for a minimum of 48 hours after the delivery for postnatal care.
- They will be given preventive care such as Vitamin K injections, BCG vaccine and polio drops and guidance on breast feeding, kangaroo care of the infant, etc.
- The **Chiranjeevi** doctors will maintain a register of data on all cases, using a prescribed format. These records should be available to any officials from the Department of Health and Family Welfare.
- The **Chiranjeevi** doctors will make their hospitals into “mother and child friendly hospitals” in accordance with government guidelines and become accredited as such.
- After discharge from the nursing home, the family will be given the contact information of the paediatrician who examined the newborn. The paediatrician must also record all the newborn care provided to the infant during its first 30 days.
- A **Chiranjeevi** doctor will receive Rs.30 000 additional monies per 100 cases for keeping the mother and child for 48 hours after the delivery.
- A private paediatrician will receive Rs.30 000 for providing neonatal care to 100 newborns, including admitting them to her/his hospital if necessary. The paediatrician should conduct investigations and provide the treatment required to the newborns.
- A private paediatrician will receive Rs. 5000 per newborn for providing treatment to the newborn, including admitting them to her/his hospital if necessary. (Assuming 20% of newborns will need this care.)
- A **Chiranjeevi** doctor will receive actual transportation costs incurred for transporting a child from a **Chiranjeevi** doctor’s hospital to the paediatrician’s hospital. (Assuming 20% of newborns will need this care.)
A Chiranjeevi doctor or private paediatrician will receive actual transportation costs incurred for transporting a newborn to a medical college hospital. (Assuming 20% of newborns will need this care.)

Bal Sakha Scheme 2 (For infants not born in Chiranjeevi/government hospitals)

- Rs. 20,000 for 100 newborns for consultation with a private paediatrician.
- Transportation costs of Rs.200 for transporting a newborn from a rural area to a paediatrician’s hospital. (Assuming 20% of newborns will need this care.)
- Incentive of Rs.50 to the ASHA/Health worker/AWW for accompanying a sick newborn to a paediatrician.
- Treatment costs of Rs.5000 per newborn that needs to be admitted to the paediatrician’s hospital.
- Transportation costs of Rs.1000 for transporting a newborn to a medical college hospital. (Assuming 20% of newborns will need this care.)
Form completed by paramedic in the 108 ambulance en route to obstetrician’s hospital for delivery

<table>
<thead>
<tr>
<th>Vital Signs</th>
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<th>Enroute Minutes</th>
<th>Handing over at hospital Minutes</th>
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<tr>
<td>Skin</td>
<td>p</td>
<td>p</td>
<td>p</td>
</tr>
<tr>
<td></td>
<td>Colour (Pink/Dusky/Cyanotic)</td>
<td>96/min</td>
<td>95/min</td>
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<td></td>
<td>Temp (Warm/Hot/Cool/Cold)</td>
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<tr>
<td></td>
<td>Condition (Normal/Diaphoretic/Moist/Dry)</td>
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<tr>
<td></td>
<td>Capillary refill (&lt;2.2-4.4)</td>
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<td>2</td>
</tr>
<tr>
<td>Temperature</td>
<td>p</td>
<td>p</td>
<td>p</td>
</tr>
<tr>
<td>Pulse</td>
<td>p</td>
<td>p</td>
<td>p</td>
</tr>
<tr>
<td></td>
<td>Rate/Min</td>
<td>96/min</td>
<td>95/min</td>
</tr>
<tr>
<td></td>
<td>Rhythm (Regular/Irregular)</td>
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<td>2</td>
</tr>
<tr>
<td></td>
<td>Volume (Normal/Threaded)</td>
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<tr>
<td>B.P.</td>
<td>110/70</td>
<td>110/70</td>
<td>110/70</td>
</tr>
<tr>
<td>Respiration</td>
<td>p</td>
<td>p</td>
<td>p</td>
</tr>
<tr>
<td></td>
<td>Rate/Min</td>
<td>18/min</td>
<td>18/min</td>
</tr>
<tr>
<td></td>
<td>Right Air Entry (Yes/No)</td>
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<td>y</td>
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<tr>
<td></td>
<td>Left Air Entry (Yes/No)</td>
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<td>y</td>
</tr>
<tr>
<td></td>
<td>Adventitious sounds (Crep/Rhonchi)</td>
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<td>-</td>
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### APPENDIX III (contd.)

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<th>100%</th>
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</tr>
<tr>
<td>Right</td>
<td>N</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>Size</td>
<td>(Normal/Constricted/Dilated)</td>
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<td></td>
</tr>
<tr>
<td>Reaction to light (Brisk/Sluggish/Non reacting)</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Left</td>
<td>N</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>Size</td>
<td>(Normal/Constricted/Dilated)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reaction to light (Brisk/Sluggish/Non reacting)</td>
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<tr>
<td>G.C.S.</td>
<td>E</td>
<td>V</td>
<td>M</td>
</tr>
<tr>
<td>Blood glucose (mg/dl)</td>
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Pregnancy : %
Abnormal Bleeding : Y/N
APGAR Score : A P R Total
Time of Birth
Sex M/F

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<thead>
<tr>
<th>Pre Hospital Care</th>
<th>Event during transport</th>
<th>ERCP Name &amp; Advice</th>
<th>Medicines Used</th>
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<td>Bag mask</td>
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<tr>
<td>C Collar</td>
<td>OPA/NPA</td>
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</tr>
<tr>
<td>CPR</td>
<td>Ryles Tube</td>
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<tr>
<td>ECG</td>
<td>Spinning</td>
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<td></td>
</tr>
<tr>
<td>ETT</td>
<td>Suction</td>
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<tr>
<td>ETI</td>
<td>Telemetry</td>
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<tr>
<td>IV Fluids</td>
<td>Ventilator</td>
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<td></td>
</tr>
<tr>
<td>Oxygen</td>
<td>Wound care</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Others</td>
<td>Own medication</td>
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</tr>
</tbody>
</table>

Handed over Medical & disposables attached to patient. Medico legally significant material. EMRI equipment and others

1. .......................................................... 2. .......................................................... 3. ..........................................................
4. .......................................................... 5. .......................................................... 6. ..........................................................

Received above mentioned articles: Name & Signature: .......................................................... Contact No.

EMT ID No: 10637 Name SAMIR MALID A Signature: ..........................................................

Destination Hospital Name: Arne Hospital
Comment of the Receiving Hospital: Gwthqa

MLC No: ..........................................................

Signature ..........................................................
Designation ..........................................................
Hospital Seal ..........................................................
Date/Time: 24/12/2012 Patient/Attendant LTI/Signature: ..........................................................
Appendix - IV

Persons interviewed for this report
(Interviews took place between June and September 2009)

Department of Health and Family Welfare, Gandhinagar
Dr Amarjit Singh, Commissioner, Health and Family Welfare
Dr Vikasben Desai, Additional Director (Family Welfare)
Dr S.R. Patel, Consultant, Maternal health (for maternal health initiatives)
Dr Ranavat, Consultant, Maternal health
Dr N.B. Dholakia, Joint Director, MCH
Dr Ajesh Desai, Director, Gujarat State Institute of Health and Family Welfare
Dr J.L. Meena, State Quality Assurance Officer
Dr Kamlesh Parmar, Immunization Officer, DHFW

Ahmedabad District
Dr Vaidya, CDHO, Ahmedabad District
Dr Parmar, District RCH Officer, Ahmedabad District

Mehsana District
Dr Harshad Vaidya, Chiranjeevi doctor
Rogi Kalyan Samiti, Santokba PHC, Aakhaj, Mehsana District
Trustees, S.J. Patel Sarvajanik Hospital, Paliad, Mehsana District
Superintendent, District Hospital, Mehsana

Godhra District
Dr Prakash Vaghela, CDHO, Panchmahal District
Dr N.N. Damod, Block level health officer
Ms Nidhi Verma, Programme Management Unit
Dr Aashish Jayswal, Chiranjeevi doctor, FHW
Dr Mukesh Goswami, Medical Officer, Vejalpur PHC
Kesarben, Female Health Worker, Subcentre Chalali
Hetalben Atulkumar, AHSA worker
Jashodaben Dilipbhai, AHSA worker
Kesarben Ramubhai, AHSA worker
Surajben Alpeshbhai Rawal, Chiranjeevi beneficiary
Kantaben Channubhai, Chiranjeevi beneficiary
REFERENCES


