



BRIGHAM AND
WOMEN'S HOSPITAL

CASES IN GLOBAL HEALTH DELIVERY

GHD-041
OCTOBER 2018

Positive Outlier: Sri Lanka's Health Outcomes over Time

On a small side street in busy Colombo, Sri Lanka, Ravi Rannan-Eliya sat at his desk in the Institute for Health Policy, an independent, nonprofit research center he established in 2005 to analyze and inform public health policy.

Sri Lanka had achieved remarkable progress in the 20th century transforming the country from an island beset by communicable diseases and a lack of health care providers and facilities to a robust health care system with the lowest maternal and infant mortality rates in the region.

But by 2017, noncommunicable diseases were a threat to public health, and the aging population required expensive care for chronic conditions. More and more Sri Lankans were turning to a growing private sector for care, which raised questions about quality and equity of care between the rich and the poor. The Ministry of Health lacked the data to measure and determine how best to restructure care delivery. It often relied on the institute's team of physicians, economists, and statisticians to conduct studies and analysis to fill those gaps. What ideas could Rannan-Eliya offer to evolve care delivery to adapt to the changing demographics?

Overview of the Democratic Socialist Republic of Sri Lanka

Sri Lanka, a 65,000-square-kilometer island southeast of India, had historically been home to two main ethnic groups: a Sinhala-speaking majority and a Tamil-speaking minority. The island was located near valuable trade routes, which made it a target for foreign conquest when Europeans sought power over the Indian Ocean and led to its colonial era starting in the 16th century.

The late 18th century marked the British arrival on the island, which they called Ceylon. After enacting universal suffrage in 1931, the country gained independence from Britain with a vote in 1948. Sri Lanka's 1956 election marked "the first time that any non-European former colony transferred power to an opposition through the ballot box," a policy expert reported.

Julie Rosenberg, Tristan Dreisbach, Claire Donovan, and Rebecca Weintraub prepared this case for the purposes of classroom discussion rather than to illustrate either effective or ineffective health care delivery practice.

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The winning political coalition made Sinhala the official language, fueling tension between the Tamils and Sinhala. Insurgencies on both sides formed amid conflict and deteriorating economic conditions. The Liberation Tigers of Tamil Eelam (LTTE), established in 1972, advocated for a separate Tamil homeland in the northern and eastern parts of the country and was ultimately placed on the US State Department's terror list. In 1983, civil war broke out between the government and insurgency groups.

In 2009, with Sri Lanka's democratic government still in place, the civil war came to an end. A United Nations report¹ released in 2011, accused both sides of war crimes and crimes against humanity; it estimated that as many as 40,000 civilians had died and that 290,000 people were displaced. However, estimates on the number of civilians and militia killed during the nearly three decades of conflict ranged dramatically, to as many as 150,000.² Some estimated that almost a million Sri Lankans were displaced into the 2000s.

Geography, Demographics, and Economy

Sri Lanka had a population of over 22 million people as of 2016. The island was divided into nine provinces and 25 districts, with 331 divisional secretariats. The official capital was Sri Jayawardenepura Kotte, a city neighboring Colombo, the largest city and commercial capital, on the country's southwestern coast (see **Exhibit 1** for a map of Sri Lanka). Sri Lanka had a semi-presidential system in which the president served as head of state and the prime minister served as the head of government, sitting in a unicameral parliament.

Sri Lanka was ethnically and religiously diverse. As of 2012, 74.9% of people were Sinhalese, 11.2% Sri Lankan Tamil (living primarily in the north and east of the country), 9.2% Moors (predominantly Muslim and Tamil-speaking), and 4.2% Indian-origin Tamils (descended from immigrants who arrived in the 1800s and 1900s). The religious breakdown in 2012 was 70.2% Buddhists, 12.6% Hindus, 9.7% Muslims, 6.1% Roman Catholics, and 1.3% other Christians.³

Sri Lanka's 2016 per capita gross national income of USD 3,780 qualified it as a lower-middle-income country as defined by the World Bank.⁴ The service sector, including information technology, financial services, tourism, and telecommunications, accounted for about 60% of the economy. Garments, textiles, and tea made up the majority of total exports.⁵

As of 2010, adult literacy was 91.2%, far above the South Asian regional average of 66.7%, and female literacy was 90.0%.⁶ Women in Sri Lanka enjoyed levels of educational attainment similar to men, and 35.9% of women participated in the workforce as of 2015.⁷

Basic Socioeconomic and Demographic Indicators

INDICATOR		YEAR
UN Human Development Index ranking	73 out of 188	2015
Population (thousands)	21,203	2016
Urban population (%)	18	2016
Population using improved drinking water source (%)	94	2015
Poverty (headcount ratio at USD 1.90 per day, 2011 PPP)	0.7	2016
Gini index	39.8	2016
GDP per capita in PPP (current international dollars)	12,312.9	2016
GDP per capita	3,835.4	2016

(current USD)		
Literacy (total/female/male)	92.6/91.7/ 93.6	2015

The country's population was predominantly (81.6%) rural, where poverty levels were 7.6% in 2013 and 26.7% of the population had schooling beyond grade 10. About 2.1% of the urban population lived below the poverty line, and 38.7% had schooling beyond grade 10. Among the primarily Indian-origin Tamil population living on plantation estates, poverty was 10.9%, and 7.1% had education beyond grade 10.⁸ Between 1970 and 2016, Sri Lanka's percentage of people age 65 and over nearly tripled—from 3.7% to 9.7%.⁹

Historical Development of Sri Lanka's Health Infrastructure

Government investment in health in Sri Lanka began over 2,000 years ago. The spread of Buddhism to the island in the third century BCE fostered the investment. A series of rulers built and supported medical facilities. For much of Sri Lanka's history, traditional South Asian forms of care, including Ayurveda, prevailed.¹⁰

The Portuguese and Dutch established some Western medical facilities on the island in the 1500s and 1600s, primarily for their own citizens and local workers. Under British rule in the 1800s, the government expanded its involvement and developed elements of a modern medical system, especially in major towns and plantation districts.¹¹ In 1819, a 100-bed hospital for the poor was established in Colombo.¹² The first bacteriology laboratory (now the Medical Research Institute) was founded in 1900.¹²

As medical facilities expanded, including some private facilities, the country needed doctors and nurses. Beginning in 1839, Sri Lankan medical students went to Calcutta to study. In 1870, the British governor opened the Colombo Medical College, the island's first medical school, with 25 students. In 1878, the General Hospital, which had employed British nurses, started a local nursing school.^{13,14} In 1887, the United Kingdom allowed Colombo Medical College graduates to register and practice in Britain, a decision that acknowledged the school's quality.¹⁵ In 1892, women were admitted to the Colombo Medical College for the first time.¹⁶

During this period, Sri Lanka made progress in tracking basic health information. A voluntary civil registration system for births and deaths began in 1867, and an 1887 law made this system compulsory.¹⁷

Building the Foundation of the Modern System: Early 20th Century

Investments in medical facilities and human resources for health continued in the early 20th century under British rule. In 1921, the first antenatal clinic opened in Colombo. From the mid-1920s, with the assistance of the Rockefeller Foundation, the country set up a system of health units responsible for disease prevention, health education, and maternal and child welfare for their specific geographical areas. Medical officers headed the units and oversaw public health midwives (PHMs), responsible for door-to-door delivery of maternal and child health services, and public health inspectors (PHIs), whose tasks included communicable disease control and sanitation monitoring. The units also conducted surveys that informed the development of public health interventions.¹⁸

After the island's citizens gained universal suffrage in 1931 (three years after women in Britain and the same year as women in Spain and Portugal gained suffrage), the predominantly rural population pressured politicians to provide health and education services throughout the island. "There was political need in the '30s through the '50s—the voters wanted expansion," Rannan-Eliya said. "So we had rapid scale-up at a

time when it was relatively affordable.” Compulsory free universal education for ages 5–14 was instituted in 1945.¹⁹

Public hospitals charged user fees to those able to pay, but the income threshold was set high enough that most rural Sri Lankans did not have to.¹⁶ As the health system grew, maternal mortality began to drop, from 26.8 per 1,000 live births in 1935 to 16.1 in 1940 (see **Exhibit 2** for maternal mortality over time).¹⁶

Favorable economic conditions, including spending by allied forces when Sri Lanka hosted the South East Asia Command during World War II, afforded the country large cash reserves at the war’s end that supported further growth in social services, including health, education, and food subsidies, and in roads and irrigation. Between the late 1920s and 1947, welfare spending increased from 16% to 56% of the national budget.¹⁶

Post-Independence Sri Lanka

By the time Sri Lanka gained independence in 1948, government policy required health facilities to accept any patient who sought admission.¹¹ In 1951, the government abolished all user fees. The idea was “welfare first, then growth.”²⁰ Welfare, in addition to health, included investment in food subsidies, free education, and subsidized transportation. Public-sector services were offered without consideration for the income or other status of beneficiaries.²¹

Competitive, two-party politics was firmly established by the 1950s, with voters demanding that their elected representatives maximize government infrastructure in their districts. Rural areas demanded the same standards as their urban counterparts (see **Exhibit 3** for number of health facilities and health workers over time).²⁰ Government officials found that demand for care consistently outpaced supply. “People initially thought, ‘we need a new hospital here because the current hospital is full, so we’ll open another one,’” Rannan-Eliya said. “But when they built the new hospital, demand would double, and the new one would be full.”

Faced with demand for continuing expansion despite a slowdown in economic growth, and recognizing that the existing system could not support such growth, the government initiated a comprehensive review of public services by an Australian consultant. The report inspired a set of management and organizational changes to improve performance, including transferring control from civil servants with no medical training to doctors with appropriate training, and decentralizing authority where possible.²² “The fundamental superstructure that was put in place by the late 1950s remains today,” Rannan-Eliya said.

In the late 1950s, a fiscal crisis forced a cut in health investment and a slowdown in infrastructure expansion. “Facilities were crowded, but it was not politically acceptable to turn away patients. There were specific cases where doctors were fired because ... they didn’t admit a patient,” Rannan-Eliya said. For decades, successive governments spent 10–11% of GDP on social expenditures and were committed to developing the country as a social welfare state.²²

In 1959, the Ministry of Health, Nutrition and Indigenous Medicine (MOH) founded an epidemiology unit. It tracked incidence of communicable diseases included on the MOH’s list of notifiable diseases, and vertical campaigns helped address disease outbreaks. From 1946 to 1953, infant mortality fell by 50%, maternal mortality fell by 68%, and life expectancy increased by more than a decade (see **Exhibits 4 and 5** for life expectancy and infant mortality, respectively, over time).²³ “By 1955, we already had more beds per capita, more hospitals per capita, more outpatient visits per capita than the whole of South Asia today,” Rannan-Eliya said. Over half of births in 1958 (around 58%) were attended by trained staff. One-quarter of those births occurred at home.²⁴

Evolving and Adopting New Priorities: 1960s–1990s

By the 1960s, the country's steep population growth—from 5.1 million in 1920 to 9.6 million in 1959—was a concern. In 1965, a family planning program was integrated into the MOH's maternal and child health work, and the ministry established the Family Health Bureau (originally known as the Maternal and Child Health Bureau) in 1968.²⁵ While abortion remained illegal due the influence of the country's Roman Catholic minority, the government offered services such as condoms and oral birth control.

In the 1970s, the leftist government made an unsuccessful attempt to turn the economy inward and increase government control. A new government elected in 1977 began to rapidly liberalize the Sri Lankan economy, leading to growth in the private health sector. Investment in health slowed, and social welfare expenditure as a percentage of GDP dropped from 9.9% in 1971–1975 to 5.5% in 1981–1985. The government encouraged the private sector to invest in health and education.²¹ In 1990, there were more than 40 private hospitals.²⁶ In 1971, the leftist government had reintroduced user fees for health facilities; the 1977 winning party reversed that decision.

The government established the State Pharmaceuticals Corporation of Sri Lanka in 1971 as the sole procurement agency for public institutions. The Medical Supplies Division of the MOH gathered data from health facilities to create yearly drug supply forecasts the State Pharmaceuticals Corporation could use to procure worldwide tenders.

Medical education in Sri Lanka had long been limited to an undergraduate MBBS (Bachelor of Medicine, Bachelor of Surgery) degree. Specialization required postgraduate education in Britain until 1973, when the government approved local postgraduate training and soon established the Post-Graduate Institute of Medicine.¹⁶

Sri Lanka established five more public medical schools in different cities between 1962 and 1992. A private medical college began operating in 1981 but was nationalized in 1989. By 2015, the total intake of students to all medical faculties had risen from 240 in 1977 to 1,145.^{16,27}

Since the 1960s, doctors had been migrating out of Sri Lanka to earn better salaries abroad. Because the state could not afford to raise doctors' pay, it instead allowed public-sector doctors to work in the private sector during their off hours, typically after 4:00 pm, and still earn a government pension. The leftist government that was in power during the early 1970s rescinded this right, leading to increased emigration, and the policy was reversed after 1977. "That policy stopped the migration to a certain extent," said a former deputy director general of planning at the MOH. The decision also benefited the private sector, which had suffered from a shortage of specialists.

Sri Lanka devolved power to the provinces in the late 1980s to increase Tamil involvement in government and reduce inter-ethnic tensions. In 1987, provincial councils were created to take on governance responsibilities, including administrative responsibilities pertaining to health. Under the decentralized model, the ministry provided central funding and controlled national health policy; drug and medical supply procurement; and recruitment, promotion, and assignment of doctors and administrators. Provinces were responsible for the administration of most health facilities. Around 100 hospitals were still managed directly by the Ministry of Health (see **Exhibit 6** for organizational chart).¹⁶

The health unit structure adopted early in the 20th century evolved into a network of 342 Medical Officer of Health (MOH) areas across the country responsible for public health for 60,000–150,000 people (see **Exhibit 7** for a representation of services available in a given area).

In the 1990s and 2000s, because of concerns about inequities in access to specialized care, the MOH's planning unit recategorized all government health facilities. In provinces where there was no medical school,

the largest hospital was expanded to offer all specialties available in a teaching hospital. The ministry also upgraded one secondary-level hospital in each district to a district general hospital.

Hospitals became increasingly efficient in the decades following independence. Rannan-Eliya's institute conducted an analysis of the annual productivity improvement in Sri Lankan public hospitals between 1949 and 1999: Sri Lanka's average, 1.9%, was far higher than the average of 0.8% he found across a sample of 23 countries. Rannan-Eliya believed this productivity increase was due to constant pressure to serve more patients with limited resources, leading doctors and administrators to devise triage systems and other innovations, supported by the management reforms that took place in the late 1950s and early 1960s. Hospital unit costs fell by more than half in real terms from the 1950s through the 1980s and continued to decrease.¹¹

Overcoming War and Adapting to Change: Early 21st Century

On average, every Sri Lankan lived fewer than five kilometers from the nearest government health facility. (In India, the distance could be as much as 200 kilometers.) Roads were well maintained, although they varied by region (flat coast, mountains, jungle) and were better in cities.¹¹

Health workers delivering vaccinations in clinics around the country were well trained and monitored the immunization status of every child. There was a strong public trust in vaccinations, and very high immunization coverage (see **Exhibit 8** for coverage over time). "Throughout our history, people have learned how we have suffered from diseases," said the acting chief epidemiologist. "Mothers in the village ... can read and write. And because of that, whatever message we send, they grasp without difficulty." When a new vaccine was introduced, the unit conducted a three- to four-month advocacy campaign. The acting chief epidemiologist suggested that this was more than necessary because parents tended to bring their children to clinics as soon as they were aware of a needed vaccine, and the PHMs monitored families and encouraged parents to vaccinate their children. In 1993, Sri Lanka became the first South Asian country to eradicate polio, and it saw its last diphtheria case in 1995 (see **Exhibit 9** for prevalence of vaccine-preventable disease in Sri Lanka).

The outbreak of civil war stagnated public-health-sector growth from the 1980s through the 2000s as the government prioritized defense spending. Studies on the conflict-affected northern areas showed higher-than-national-average prevalence of maternal and neonatal mortality, low birth weight, and stillbirths and a decline in use of antenatal care.²⁸ Displaced populations were more susceptible to infectious diseases, including hepatitis A and leishmaniasis. However, health facilities still operated (although some were damaged), and immunization programs continued. "Our immunization program went ahead, even in the war zone," the former deputy director general for planning said, with UNICEF negotiating temporary ceasefires for national immunization campaigns. The government invested in repairing damaged health facilities and upgrading facilities in conflict-affected areas after the war.

The 2004 Indian Ocean tsunami dealt Sri Lanka another blow. "We were not ready," said the former planning official. "We did not have any disaster plan at all." The storm killed over 30,000 Sri Lankans. In 2005, the MOH established a Disaster Preparedness and Response Division to act as the focal point on the health care aspects of emergencies and guided provincial health officials. The division coordinated a rapid public health response to subsequent disasters, including a 2016 flood and landslide.

While government revenue as a percentage of gross domestic product shrank from 27% in 1978 to 13% in 2013,²⁹ the bipartisan consensus on building and maintaining a free universal health system persisted. Access to health care was treated as a fundamental social right.²⁰ "If someone in the government proposed charging for services in the public sector, it would be political suicide," said a professor of demography.

News media covered health issues including disease outbreaks and prevention campaigns. “The media has a very active role in discussing public policy, as well as social and health policy,” said a university professor. The percentage of Sri Lankans using the internet rose from 2% in 2005 to 32% in 2016.³⁰

The People’s Health Movement, a collection of health personnel, non-governmental organizations, trade unions, and politicians, began working in 2000 to include the right to health care in the Sri Lankan constitution. The unfunded movement relied on members to implement campaigns through seminars, posters, leaflets, and petitions. Members also tried to influence government to reduce drug prices and assure that medicines were available in free public sector pharmacies.

Despite the evolution of a modern health system, demand for indigenous medicine continued. There were over 17,500 Ayurveda practitioners working in Sri Lanka, and over 3 million patients received treatment annually at 438 Ayurvedic hospitals and dispensaries as of 2014.³¹

Institute for Health Policy

Born in the United Kingdom and raised in Britain and Sri Lanka, Ravi Rannan-Eliya earned bachelor’s degrees in medicine and political science at the University of Cambridge. His interest in health policy led him to pursue a masters’ in public health from Harvard University. In 1997, he returned to Sri Lanka to establish a health economics research group at the Institute for Policy Studies. In 2005, he created the Institute for Health Policy (IHP) as an independent research center. He recruited several retired MOH officials with knowledge of the health system and connections that could help get the institute’s research to policymakers to join his team. External donors including the UK’s Department for International Development (DfID), the World Health Organization, the Asian Development Bank, UNICEF, and USAID funded most of the institute’s work.

“There was no real place to do systematic health systems work in Sri Lanka,” Rannan-Eliya said. The country’s universities did little large-scale research, and the Ministry of Health lacked the capacity to make informed, data-driven decisions about the future of the system. The institute’s team of physicians, economists, and statisticians aimed to fill those gaps and then get the information to politicians. IHP experts assisted the ministry in finalizing the national Health Master Plan, published in 2007. The ministry also commissioned IHP researchers to establish a national system for tracking health spending. IHP published a detailed health accounts report in 2009 that encompassed both public and private expenditures, and it regularly updated that report.

“The Ministry of Health was hard to reach, though,” Rannan-Eliya noted. “The ministry is very impervious to what goes on outside ... What the system is really bad at is system change.”

The Sri Lankan Health System

Governance and Management

“The system’s success is not due to any individual. There haven’t been many individual leaders who have made substantial changes, and the system functions without such transformative leaders,” Rannan-Eliya explained.

The MOH had sole responsibility for formulating national health policies and strategies. It provided technical advice for local government policies, supported national health programs, communicated with the public about health issues and services through television and radio broadcasts, newspapers, posters, and

billboards, and monitored and evaluated health programs. The ministry stipulated the categories of staff, equipment, and services deliverable for each level and type of institution under its administration.²⁹ Each of the nine provinces had a provincial health ministry that made operational plans based on national policies and strategies.

There were two parallel management structures, one overseeing the curative sector and the other the preventive sector. Curative care referred to patient-care services from small outpatient-only facilities up to tertiary and specialized hospitals. The preventive sector consisted of MOH units that oversaw maternal and child health, including antenatal and postnatal care; immunization; monitoring child development and growth; and school health services. They also oversaw the work of frontline workers—PHMs and PHIs—with support from trained field staff, including public health nursing sisters (the term “sister,” denoting a nurse with management responsibilities, was inherited from the British system). Each MOH area was divided into 25–40 smaller PHM areas, each serving around 3,000 people. Each PHI served a population of around 10,000 people.

The MOH office was usually located in the center of the district, with several satellite clinics, generally one clinic for every three PHM areas. The MOH doctor rotated through the clinics to reach all mothers.

The epidemiology unit advised the ministry on control and prevention of communicable diseases. An advisory committee on communicable diseases, including representatives from the country’s medical school faculties, met regularly to discuss the epidemiological situation and responses, such as the introduction of a new vaccine. Major decisions were made by agreement between the committee and a director-general in the ministry. Each of Sri Lanka’s 26 districts had a specialist regional epidemiologist who coordinated local response and input.

Rules and Compliance

The bureaucratic culture in Sri Lanka prioritized hierarchy and adherence to rules. “When regulations and protocols are put in place, they are followed,” explained a professor who had studied Sri Lanka’s health system. “People are very aware of their place on the hierarchy. Doctors are like little lords in their wards, but they will never cross the matrons (head nurses) in their wards. Those are the ones that deal with patients the most, and the doctor will defer to what the head matron always says.”

“Everything works exactly like it is supposed to,” the professor added. “In India and other South Asian countries, there are many opportunities for leakage, bureaucratic inefficiencies. Sri Lanka is very different. Once the necessary processes have been adhered to, efficiency is not a problem.”

Rannan-Eliya explained further:

You look at the superstructure and it seems very inflexible. Hospitals ... don’t have control over budgets. You don’t have control of your staff. You’re just given resources, and you’re told: “Work.” But what they’re held accountable for is outcomes. And within that constraint, you can do what you want. That makes the system very responsive in many ways.

Hospitals tried new management strategies, triage methods, mobile palliative care units, or other innovations that could help deliver better care with existing resources. Doctors worked effectively with politicians, but avoided becoming too involved with one side or another. As Rannan-Eliya put it, “They work in a very politicized environment, but they understood that their collective interest was best served by remaining non-aligned.”

Human Resources

Medical Training

As of 2017, the eight medical colleges—all government run—offered free tuition. A private medical college that had been established in 2008 was abolished by the government in 2017 after protests criticizing the quality of training.³² Students were selected through a merit-based process with preferential treatment given to those from underprivileged provinces. The acceptance rate for the approximately 1,150 seats was 35% in 2016.²⁷ Many students not selected for medical school in Sri Lanka trained abroad and then returned to practice.³¹ Others opted for nursing. “In high school, I actually wanted to become a medical officer ... but my marks were a little bit low,” said a nurse at the Nuwara-Eliya general hospital. “The next step, I thought, was become a nurse. Then I can serve the people.”

In 2010, the most recent year for which data was available, the Sri Lanka Medical Council registered 1,037 graduates of local medical schools as full doctors (i.e., they had passed a qualifying exam and successfully completed an internship). That same year, the council registered 239 graduates of foreign medical schools after they had passed the local certification exam.³³

The government spent USD 14,300–16,300 for each student completing the five-year MBBS program. Around 2013, the country’s most prestigious medical school began requiring all students visit rural areas, local health authorities, and field-level health workers, including PHMs.

Following the MBBS program, graduates were appointed to posts throughout the country for a one-year internship through a transparent, merit-based process using a standardized exam.³⁴ Students who attended medical school abroad selected their internship post last and had the least-coveted positions.

Some doctors chose to pursue postgraduate study to become board-certified specialists; all doctors undergoing postgraduate study in Sri Lanka were required to go overseas for one year of training, for which the Sri Lankan government provided airfare and a stipend. Such students had to agree to return and work in Sri Lanka for four years for every year spent in overseas training. If they broke that contract, they had to pay the state an amount equivalent to the stipend and any salary they earned for their training abroad.³⁵ There was no formal continuing medical education requirement or recertification once the doctors were in the workforce.

The MOH required new administrators to have a postgraduate qualification in medical administration or community medicine.²⁹ MOH officials had formed a college of medical administrators in the 1990s that offered postgraduate qualifications, including specialist board certification, in health systems, planning, management, and health economics.

Physician Workforce

Many doctors chose to practice outside Sri Lanka, although there was not a good tracking system. Recruiting firms sought Sri Lankan doctors and nurses for jobs in the United Kingdom, United States, and elsewhere. A 2013 survey of first-year and fourth-year students and pre-intern medical graduates at the University of Colombo Faculty of Medicine found that 23.8% intended to migrate to another country, 43.6% intended to stay in Sri Lanka, and 32.6% were not sure.³⁶ A study on postgraduate medical students between 2006 and 2009 showed that 11% chose to remain abroad. The remaining 89% returned Sri Lanka, with most citing the need to be near family and support family members as a primary reason for returning. Job security and stability, including the automatic availability of better positions with seniority, were other factors cited by a majority.³⁵ “We are a product of free education in Sri Lanka, and the public has paid for my education, not my parents,” a doctor at the Castle Street Women’s Hospital said. “So I have a debt to settle with the public. That’s why I came back to Sri Lanka, but still UK hospitals are offering me jobs ... I wanted to come back and serve my people.”

The MOH and the public service commission determined all appointments of doctors working within a province, subject to approval of the provincial government. As of 2015, there were 18,243 doctors working in Sri Lanka's government health care system. This included 1,882 medical, surgical, and diagnostic specialists and 211 specialists in medical administration.³⁷ Doctors generally rotated to different positions in the health system every four years. Promotions and salary increases were determined chiefly by seniority. There were no financial performance incentives. Indika Jagoda, who became director of health information at the MOH in 2017, explained:

The performance review and performance appraisal system is not very good at the moment. Usually, the performance is measured by the achievement of our annual targets. Every year we have to give our next year work plan at the end of the year they see how much we have achieved, but the thing is usually they see the financial progress and the physical progress. But the actual outcome and impact is not assessed.

Hospital directors had limited authority to initiate disciplinary action. They relied on persuasion and in-service training to promote positive behavior.²⁹ "It is very difficult to chase somebody out of the system," said the director of the National Hospital. "There is no individual appraisal as such. I can say, 'You are good at your work', but that's it, and it's not in the institutional memory ... The system doesn't really track this."

Public-sector doctor salaries (USD 345–679 monthly for non-specialists and USD 573–784 for specialists and administrators)³⁸ were higher than the national average salary of around USD 200 per month.³⁹ Part-time private-sector work augmented these wages. There was no consensus on such practices, however. "When you do private practice late night, you might come late to the public hospital," the National Hospital director said. "This conflict of interest should not be there. Either it should be public or private." Rannan-Eliya and others noted that sometimes doctors pushed public-sector patients who were able to pay to the private sector to increase their income.

Public-sector doctors and nurses saw many patients per day and often felt rushed.²⁰ Sri Lanka had 0.73 doctors per 1,000 population in 2010, a ratio comparable to India but far below the US ratio of 2.43 per 1,000 and the EU ratio of more than 3.5 per 1,000.⁴⁰ That, combined with the high number of doctor visits per capita (much higher than in India and similar to many developed countries), meant Sri Lankan doctors were stretched thin. Sri Lanka's ratio of hospital staff per bed was 1.4, which was relatively low.²⁹

Nursing Workforce

Nursing staff were the largest component of the public health sector. Nurses provided patient care, administered medications, coordinated paramedical services, and supervised junior nurse and assistant staff members. As of 2015, 42,420 nurses worked in the public sector.³⁷ In 2016 the country had a shortage of 30,000 nurses.⁴¹ The shortage in nurses was expected to grow as the country's population became older and required more care.

Prospective nurses usually underwent a three-year MOH diploma program after secondary school at one of 17 government nursing schools, during which they received a monthly stipend. Beginning in 2005, some public universities offered a four-year bachelor's degree in nursing. The WHO's Global Advisory Group on Nursing and Midwifery, established in 1992, promoted measures to improve nursing education, including the adoption of university-based nursing education. The Sri Lankan government began slowly transitioning to that model.⁴² After training, registered nurses earned USD 212–499 per month in the public sector, depending on grade and seniority.³⁸ Two government institutions offered diploma programs to prepare nurses for management positions. There were also private-sector institutions that offered nursing training, but the MOH did not allow graduates of those institutions to work in the public sector.⁴²

Nursing work was often stressful. The 1990s' funding shortfall led to reduced nursing staffs and mandatory overtime policies, increasing nurse workloads.⁴³ Some high-income countries, including the UK, faced their own nursing shortages and sought Sri Lankan nurses.⁴⁴

Frontline Health Workers

Public health midwives (PHMs) played a central role in delivering health services to people throughout the country since the 1920s. There were 6,041 PHMs (28.8 per 100,000 people) in 2015. PHMs, all of whom were women, completed a one-and-a-half-year training course (during which they received a stipend) prior to being hired and earned USD 200–384 per month, depending on grade and seniority.³⁸ PHMs were posted within the province in which they were trained.⁴⁵ Supervising midwives monitored PHMs, who had to fill out daily and monthly reports on their activities. They had regular in-service training.

PHMs informed communities about immunization, family planning, noncommunicable diseases (NCDs), and health services. They tracked expecting mothers, recorded high-risk pregnancies, monitored maternal and child health, immunized children, directed mothers to prenatal and antenatal clinics, and reported maternal, neonatal, and child deaths to local health authorities and the MOH. They were trained to deliver babies but rarely did so in the 21st century because of the high rate of institutional delivery. PHMs wore easily recognizable uniforms and spent about 10 working days of each month visiting the roughly 600 families in their catchment area. The rest of their time was spent managing clinics, including antenatal, family planning, and NCD clinics.

After childbirth, the PHM was responsible for closely monitoring the mother and child. She was expected to make four visits in the first two months of the child's life, two of which were to occur in the 10 days following delivery. PHMs were also responsible for tracking a child's health until the age of five.⁴⁶ In 2013, PHMs visited 92.2% of registered mothers in the first 10 days postpartum, up from 88.8% in 2007. In 2013, 76.7% of mothers who were identified and registered received at least one visit by a PHM 11–28 days postpartum, up from 71.4% in 2007.⁴⁷

PHMs tracked married couples through the age of 49 and could offer them contraception, including condoms or oral birth control, or refer them to nearby health facilities for more permanent family planning methods. They advised on optimal birth spacing and encouraged measures such as tetanus and rubella vaccinations prior to the first pregnancy. When a woman became pregnant, a PHM added her to a register to track the course of the pregnancy.⁴⁶ PHMs developed long-term relationships with families and often established strong mutual trust.

Public health inspectors (PHIs) were another part of Sri Lanka's frontline health workforce, put in place in 1913, and recognized by the WHO as a best practice in 2013.⁴⁸ The 1,604 PHIs in 2015, all men, wore military-style uniforms and had authority to issue fines for noncompliance with food and sanitation regulations. When a notifiable disease was reported, the local PHI was required to visit the patient's home within seven days to determine whether the patient needed long-term treatment and assess other household members for early signs of illness. A manual detailed the proper response to each disease. If there was a case of tuberculosis, all members of the household were required to provide sputum samples for testing. For dengue, the PHI inspected the area around the home for potential mosquito breeding areas and destroyed them. For foodborne illness like dysentery, the PHI could inspect restaurants where the person ate and take samples for testing. "Sri Lanka is one of the few countries in the world in which each and every communicable disease is investigated at the field level," the acting chief epidemiologist said.

PHIs were also responsible for the school health program, which gave health examinations to children, provided some immunizations, and taught children health-promoting behavior. Their salary range was equivalent to that of PHMs.³⁷

Drug Procurement and Supply

Requested vaccines were transported from the airport to the MOH's epidemiology unit in refrigerated vehicles bimonthly and stored in seven cold rooms and three freezer rooms. The 26 regional Medical Supplies Division stores, each of which had a cold room, distributed supplies to health institutions.⁴⁹ Vaccines were sent monthly in a cold box to MOH units, and from there to over 3,000 health facilities and over 600 hospitals for immunization sessions. There were systems for monitoring temperature, recording stock data, and managing equipment inventory.⁵⁰ The chief epidemiologist automatically received an SMS message if there was an unexpected change in temperature at a vaccine storage facility.

A 2010 WHO analysis reported that demand for drugs exceeded supply by 25–30%; delays in the Medical Supplies Division's forecasting process, a requirement that high-value tenders be cleared by the cabinet, and a tender process that could last for several years contributed to stock-outs. The WHO reported that some orders placed in 2008 were being processed in 2015.

The WHO report found poor coordination between the Medical Supplies Division and State Pharmaceuticals Corporation, leading to discrepancies between procurement and demand. The report also cited stock-outs caused by product withdrawals due to quality-testing failures.⁵¹ The government began implementing the Medicines Supply Management Information System in 2009 to improve forecasting and reduce stock-outs. That system was fully functional in all regional Medical Supplies Division stores by 2015. A 2016 WHO analysis found that the availability of essential medicines was over 89.6% at a sample of public teaching hospitals and 72–79% at primary- and secondary-level health facilities.⁵¹

The private sector accounted for slightly less than half of total medicines distributed as of 2009, but accounted for more than three-quarters of drug expenditures due to higher unit prices than those paid by the government.⁵² The government had at times implemented price controls on drugs, and in 2015 the government established a National Medicines Regulatory Authority to regulate and control drug manufacturing, importation, and pricing. In 2016 the government set a price ceiling on 48 drugs available in pharmacies (including paracetamol, amoxylene, and others used to treat common NCDs), the first such controls since a previous pricing regime ended in 2003.

Doctors were aware of the limited supply of many drugs in the public sector and engaged in informal rationing to ensure access for those who could not afford to buy them. "You tell the rich people, 'Go and buy your own,'" Rannan-Eliya said.

Service Delivery

Most services at government-administered health facilities were free for all patients. A small number of public hospitals had paid wards that offered greater comfort and privacy. Some procedures (such as heart surgery, kidney transplants, and dialysis treatment) or equipment (such as drug-eluting stents) were only available from the public sector for a price or through the private sector (see **Exhibit 10** for more on "difficult to access" services). A "President's Fund," financed by a national lottery, was available to help with expenses for those who demonstrated financial need.⁵³ No referral system was enforced, which meant that patients could present themselves to any public-sector hospital for treatment.

Usage rates for the free government system were highest among the poor, but the public sector took in the majority of patients in Sri Lanka seeking inpatient, primary, and preventive care. The majority of diagnostic procedures occurred in the private sector, where patients paid out of pocket.

Higher-level facilities saw greater demand as mobility and expectations increased. Data from 2009 showed that bed occupancy at teaching hospitals was 74%; provincial general hospitals had 82% occupancy,

while smaller hospitals had 48% occupancy. The bed occupancy of most divisional hospitals was under 50%.¹¹ At least one-third of primary care was delivered at secondary and tertiary hospitals through general outpatient departments. Hospital spending accounted for 70% of the government's recurrent health budget.¹¹

Financing the Health System

In 2014, the total public spending on health was USD 870 million, about USD 42 per capita. The MOH contributed 63% of the total; provincial departments of health, 31%. The rest of the funding came from local governments and other public financing sources.⁵⁴

The central government provided budgetary funding to the MOH. Provincial councils funded services administered by provincial directors of health services: provincial, district, base, and divisional hospitals, primary medical care units, and medical officer of health units. Provincial governments raised only about one-quarter of their budgets through taxation, making them dependent on the national government for transfers. For this reason, all public-sector health facilities were primarily funded by the national government.²⁹ Local governments dealt mainly with preventive and outpatient care; their expenditure was financed primarily from their own revenue, but provincial councils reimbursed around 70% of salary costs.⁵⁴ The members of provincial councils were popularly elected, with a provincial governor appointed by the president holding executive powers.

Health facilities submitted annual resource requests to the MOH's planning office, which worked with the secretary of the ministry to prepare a budget. After consultations with the finance ministry, the budget went to parliament. Politicians attempted to influence the planning process so that hospitals would be built or upgraded in their districts. "This sometimes influences decision making," said the former deputy director general for planning. The President's Fund, directed by the president and a board including other top-ranking officials, spent around USD 9.1 million yearly on medical expenses for poor patients not otherwise covered.

The Private Health Sector

Private-Sector Spending

Private-sector health expenditures accounted for 53% of total health spending in Sri Lanka in 2014 and had been over half of health spending, fluctuating between 53% and 60%, every year since 1990. The majority of 2014 private spending (86%) was out of pocket, and out-of-pocket spending accounted for between 85% and 90% of private spending every year since 1990, the first year for which data was available.

People who could afford private treatment often voluntarily opted out of the public sector (see **Exhibits 11 and 12** for usage of public and private health facilities by income).⁵²

In 2009–2010, 2.4% of average monthly household expenditure went to health spending. (By comparison, 7% of household expenditure in India went toward health in 2010.⁵⁵) Around 40% of out-of-pocket expenditure in 2009–2010 went toward fees for private medical practices, 20% went toward the purchase of pharmacy and medical products, and another 20% went toward payments to private hospitals and nursing homes. Smaller portions went toward laboratory fees, specialist consultation fees, and other expenses.⁵⁶

Private health benefits from employers accounted for 7% of private health expenditures in 2014, a percentage that had been nearly constant since 1990. There was a small private insurance market, which

accounted for 5% of private-sector health spending in 2014, an increase from 1% in 1990.⁵⁴ Expatriates could access the free public-sector system or use the private sector.

The cost of treatment in the private sector was at least three times higher than in the public sector. The average private inpatient expenditure per person was USD 172 in 2006, compared with USD 50 for public-sector inpatients. Outpatient expenditure was about USD 6 per person in the private sector, compared with USD 1.5 in the public sector.³¹ “There is no control on overpricing of services,” said the leader of a self-governance NGO. “There are no regulations on what hospitals can charge for services. The state sector, because of a shortage of medicine and inability to do tests, refers the patients to the private sector. Therefore, the out-of-pocket expenditure for patients who have to buy outside is very high.”

Private-Sector Growth

The private sector had grown since the 1970s due to liberalization, higher wealth, and increased patient demands for comfort and convenience. There was no public reporting process to capture patient satisfaction or outcomes.²⁹ However, a World Bank survey documented a number of complaints about public-sector health care: lack of choice about which doctor to visit, impolite staff and lack of personalized service, long waiting times, improperly maintained facilities, lack of essential facilities such as drugs and diagnostics in certain hospitals, disruptions due to trade union actions, overcrowding, and extended waiting periods for surgeries.³¹

More than half of the country’s 200 private hospitals were located in Colombo. As of 2011, there were an estimated 750 independent private medical laboratories and imaging facilities.⁵² Heart and lung transplants and minimally invasive heart surgeries were available at one private hospital. Another had a gastrointestinal diagnostic and surgical facility and acquired the country’s first endoscopy system with a specialized, high-definition scope.³¹ Private hospitals also had their own ambulances. The richest 20% of Sri Lankans accounted for 45% of private-sector admissions.

There were questions about how the quality of care compared in the private versus public health sectors. “It’s not the clinical content that’s better in the private sector,” Rannan-Eliya said. “We’ve shown that actually the public hospitals are treating people better.” But there was a large difference in customer service. Private-sector patients could choose a specialist, enjoy reduced wait times, have more time with a doctor, and stay in a private room. “When I go to the private sector, I can say anything,” an NGO leader said. “I can ask about drugs or my disease. There’s time.” As of 2011, only 8% of medical practitioners in private hospitals worked full-time. Most nurses in the private sector worked full-time.⁵²

The government passed a law in 2006 that addressed recruitment, training, and quality of care in the private sector.⁵⁶ Private-sector health facilities were required to register with the Private Health Service Regulatory Council, established in 2008, which developed standards and monitored compliance. The council consisted of government health officials and representatives of the private sector. Researchers at Rannan-Eliya’s institute found that the council was largely ineffective and that licensing requirements were not enforced. Ministry officials did not always attend board meetings, he said. “In most of the meetings, the private-sector people would turn up as the majority.” That meant that decisions were likely to favor industry. “It’s more or less laissez-faire,” Rannan-Eliya said.

Innovation in the Health System

Within the bureaucracy of the public health system, doctors and administrators had autonomy to redesign care delivery. In the 2000s, with hospitals facing overcrowded outpatient units, one hospital

director established a short-stay preliminary care unit for triaging, patient assessment, treatment, and observation. That unit reduced overcrowding in wards by 50%, and the MOH pushed for establishing similar units in other hospitals. Other triaging innovations included the establishment of NCD clinics that provided long-term patient management at several different hospitals. “That happened not as a policy,” Rannan-Eliya said. “That happened as an individual manager-level decision, but it was replicated across the system.” That approach helped reduce the workload of specialist outpatient departments and increased access to NCD treatment. It is now common in Sri Lanka.²⁹

While in the 1990s, even though the MOH advocated behavioral risk reduction for NCDs, doctors began prescribing statins to those at risk of cardiovascular disease regardless. In the early 2000s, purchases of statins from private pharmacies increased rapidly. As usage increased, political pressure grew for the government to procure statins for public health facilities. By 2017, the MOH was the biggest purchaser of statins in South Asia.

The availability of health information in the era of digital access motivated patients to engage with their health providers. “It’s called ‘Google syndrome,’” said a specialist in Colombo. “They come and ask, ‘Why are you not doing this? Why are you not doing that?’ So awareness is improving.” While the private sector obtained several MRI scanners by the 1990s, for example, the MOH resisted the purchase of expensive diagnostic equipment. Pressure on the government began to grow as physicians and patients demanded the public sector provide services equal to the private sector. After a campaign in the late 1990s, including fundraising efforts by National Hospital doctors and a cricket star, the National Hospital obtained the public sector’s first MRI scanner in 2001.⁵⁷ Government officials began approving the purchase of MRI and CAT machines for public facilities throughout the country. The government began investing in additional diagnostic capacity—x-ray machines, gastro viewing, and high-energy radiotherapy treatment machines—at specific facilities in 2014.³¹

Noncommunicable Diseases

Sri Lanka’s noncommunicable disease (NCD) burden grew over time. The percentage of deaths from circulatory system diseases increased from 2.8% in 1945 to 23.8% in 2008; from cancer from 0.6% in 1945 to 7.6% in 2003; and from diabetes mellitus from 0.4% in 1945 to 3.0% in 2003.⁵⁸ The ministries of finance and health played leading roles in an anti-tobacco campaign in the 1990s that reduced smoking. Notably, tobacco products were heavily taxed beginning in 1990 to generate income for the MOH for many years, and graphic warnings were placed on cigarette packaging.⁵⁹

In 1996, the MOH introduced “well woman clinics” to screen women over age 35 for NCDs, including hypertension, diabetes mellitus, and breast and cervical cancers.⁶⁰ The ministry formed a directorate for NCDs in 1999, which conducted a 2006 national risk factor survey and conducted awareness campaigns.⁶¹

As of 2010, 65% of chronic NCD cases in the public sector were treated in specialist clinics in secondary and tertiary facilities. Cancer and acute myocardial infarction were predominantly treated in the public sector, while chronic NCDs such as diabetes, asthma, and other types of ischemic heart disease were more common in the private sector.⁵⁸

With mounting treatment costs, a 2009 government NCD policy emphasized prevention, including community-level NCD screening, stronger NCD care in the health system, promotion of a healthy lifestyle, and a stronger national health information system including disease and risk factor surveillance.⁶² A new cadre of medical officers was created in 2011 to oversee NCD activities at the district level.

In 2011, the MOH established Healthy Lifestyle Centres in primary care institutions. The centers held weekly NCD screenings for people ages 40–65 to detect risk factors and improve access to specialized care

for those at risk of cardiovascular disease.⁶⁰ Primary care health workers were trained to give nutrition and lifestyle counseling, and PHMs began encouraging screening.⁶³

Following a second national risk factor survey in 2015, the MOH introduced a 2016–2020 Multisectoral Action Plan that aimed for: a 25% reduction in premature mortality from NCDs, a 10% reduction in alcohol usage, a 30% reduction in tobacco usage, a halt in the rise of obesity and diabetes, and getting 50% of eligible people drug therapy and counseling to prevent heart attacks and strokes by 2025. The action plan emphasized the importance of advocacy to make NCDs a priority throughout government.⁶⁴

As of 2015, the waitlist for coronary bypass surgery in public-sector hospitals exceeded 5,000 people; patients could more easily access that service in the private sector. Kidney dialysis was not available in the public sector in some parts of the country. Bone marrow transplants were available at only one private hospital. Angioplasty was available in the public sector, but patients were required to purchase the necessary medical equipment.^{65,66} A 2016 WHO report found that divisional hospitals lacked diagnostic capacity such as x-ray and laboratory services, and many lacked the capacity for basic NCD management, such as blood cholesterol and fasting blood sugar tests.⁶⁷ Ischemic heart disease was the leading cause of hospital deaths in 2015, accounting for 14% of total hospital deaths, and for around 10% of lost disability-adjusted life years in 2016. Diabetes accounted for 6.51% of total disability-adjusted life years in 2016.³⁷

In 2017, the NCD unit in the MOH was elevated and placed under the authority of a deputy director general. The unit worked with schools to measure student body mass index, promote healthy lifestyles, and encourage participation in sports. Cancer screening, including pap smears and oral and breast cancer screenings, were implemented in Healthy Lifestyle Centres. Around 700 Healthy Lifestyle Centres operated around the country, but participation was low, especially among males. As of 2017, only 12% of the target population had been screened.

Implementing 5S

Sri Lanka did not have a mechanism for measuring and monitoring quality of health care, and some hospital administrators worried about substandard care in public health facilities. “I saw that people were dying and getting into problems,” said Wimal Karandagoda, a doctor who managed hospitals and worked in the MOH through the 1980s and 1990s. “Not because clinicians weren’t available, but because things were not happening in a more organized way in order to support clinical care.” Karandagoda began searching for ways to improve performance. “There were some safety issues when providing clinical care—a lot of infections.” In 2000, he became the top administrator at the Castle Street Women’s Hospital in Colombo, where he began to address the problems he had observed. “They didn’t have adequate labor rooms, the wards were dilapidated, and staff attitudes were not so good,” he said. Trash bins overflowed, attracting dogs and insects. “There was no proper monitoring mechanism taking place in the hospital. I thought that we should transform that hospital step by step.”

Karandagoda integrated a new management approach. He was inspired by a Japanese concept known as “5S,” which he had first heard about from the Japan-Sri Lanka Technical and Cultural Association, an organization funded by the Japanese government that promoted the use of 5S in government factories and private companies. 5S stressed the efficient organization of the workspace and workflow through worker collaboration and analysis.

Karandagoda prepared a two-year action plan to develop new policies and procedures and train staff how to improve quality and efficiency of care. He focused on midlevel management staff. “Middle managers are powerful, so if you change their behavior and empower them, they are the change agents from top to bottom and from bottom to top.” He identified 10 key areas for improvement, including waste management,

the sterile supply system, the linen supply system, improving the quality of work environment, staff training, record keeping, and monitoring and evaluation.

He began training managers internally and sent some to a two-day government-sponsored management training program. Karandagoda then created teams of 10–12 staff members from each ward to identify problems in their ward and create their own solutions.

Karandagoda initially had no additional resources to spend on the project and sought low-cost ways to achieve his goals. He established a centralized supply system for sterile dressings and instruments, initially asking staff to bring in newspapers from home to wrap instruments for sterilization, because he did not have money to buy proper paper packets. Inspired by a color-coded transit system he observed on trip to Thailand, he implemented a color-coded waste management system at the hospital that separated types of waste and eliminated unsightly and unsanitary piles of trash. He later received funding from the WHO to expand the program, including the creation of a staff-training center.

Karandagoda led a five-person monitoring team that developed performance indicators and conducted monthly assessments of the hospital. Once the new system was in place, the hospital quickly showed improvements in several indicators, including infection, stillbirth, and maternal mortality rates (See **Exhibit 13** for results of 5S implementation).⁶⁸

Karandagoda invited hospital staff from around the country to visit the Castle Street hospital, and made trips to share his experiences with other administrators. The MOH provided logistical support. Several administrators implemented similar programs and showed positive results, including cost reductions. In 2003, the ministry declared the Castle Street hospital the focal point for a new quality assurance program. The Japan International Cooperation Agency and the World Bank funded quality improvement projects in 14 additional hospitals between 2005 and 2010. Hospitals throughout Sri Lanka began implementing new infection control, linen supply, and sterile material supply systems and addressed water quality and electrical wiring problems.⁶⁹

The World Bank funded a secretariat that produced guidelines for quality and safety around the country. In 2012, the MOH elevated the secretariat to become the national Directorate of Quality and Safety, which oversaw over 100 hospitals. The ministry mandated establishment of quality and safety units in every secondary and tertiary hospital in 2012 and 2013.²⁹ The directorate distributed quality and safety guidelines to health facilities, introduced clinical quality and safety indicators, developed adverse event reporting forms and readmission forms, and introduced a clinical audit. The directorate collected information on ward performance, patient and employee satisfaction surveys, water quality, frequency of cleaning, and other data. As of 2017, the directorate provided some capacity-building funding for hospitals but did not set performance goals (see **Exhibit 14** on quality and safety guidelines).

Data Collection and Reporting

Incidence data on notifiable diseases that PHIs reported was shared publicly on the epidemiology unit's website. The unit sent weekly updates to curative and preventive health facilities across the country.

Sri Lanka's hospitals and clinics reported to the national ministry regularly, including the quarterly Indoor Morbidity and Mortality Schedule, which provided information on patient turnover, diagnoses, diseases, births, mortality, and operations.²⁹

In 2009, the MOH conducted a survey to assess its health information systems and identified weaknesses in its information policy, personnel, infrastructure, and data management. A major problem was that most records were in paper format, which made data collection and analysis difficult and caused longer patient wait times than would be the case with an electronic system.

The first paperless outpatient ward was established in 2009 at Trincomalee hospital with funding from Austria and Switzerland. "It made the process much more efficient, and it was the first time that [sophisticated] outpatient data was available," said Jagoda, who was an administrator of the hospital at the time. Electronic records could also reduce patient wait times and improve treatment by facilitating access to a patient's medical history.

While Jagoda wanted to expand the electronic record system, the donor-funded project at Trincomalee was too expensive to replicate. Instead, Jagoda used funding from the national Information Communication and Technology Agency to develop an open-source database. In 2015, the government decided to implement the electronic records system in 300 hospitals over three years.

Due to delays in the procurement process and other challenges, by September 2017, the project had been piloted in only 10 hospitals. Many older doctors were not skilled at using computers and required training to prepare them for using electronic records. Some offices were reluctant to share data with the ministry's health information directorate. Jagoda believed that would change as the value of data became more apparent.

Data Analysis and Application

Despite strides in data collection, data utility was limited. "We have a huge amount of data but there is no way of bringing it together, analyzing that data into information, and turning information into intelligence, then into action," Jagoda said. "That part we are lacking." A former MOH planning official further explained, "One of the weaknesses we had at the ministry was using evidence to make decisions."

Not many had been trained in the field. "Research is pretty limited," Rannan-Eliya noted. Sri Lanka's universities "are not really set up to do research, and they certainly can't do large research." As one Sri Lankan administrator pointed out, "Postgraduate medical students in Australia choose thesis topics based on current needs in the country. In Sri Lanka, we look for a project, look for grants, come up with a proposal, and do the research. Our thesis then sits in the Postgraduate Institute of Medicine Library."

A specialist in obstetrics and gynecology said that he had to conduct research despite the lack of incentives for doctors to do so. "Nothing will happen if you don't do research," he said. "No one has any time for it."

Health Outcomes

By 2017, Sri Lanka's mortality patterns had come to resemble those of a developed country. Few people died from infectious diseases, and institutional delivery, infant mortality, stunting, and other health indicators remained significantly better than the average for other lower-middle-income countries (see **Exhibits 5, 15, 16, and 17** for indicators). By 1993, the total fertility rate was below replacement level.²⁰

A 2014 report showed that Sri Lankans sought an average of more than five physician consultations per year, higher than numbers seen in New Zealand, Malaysia, and Thailand.³¹ By 2017, that average had risen to between six and seven visits per year. By comparison, the average was 4.0 in the United States and 6.9 across the 32 countries in the Organization for Economic Cooperation and Development as of 2015.⁷⁰

There were 1,105 curative institutions offering patient care, including 631 hospitals with 80,581 beds, in the government sector in 2015. Nearly all facilities provided outpatient care, maternal and child health services, and family planning. Sixteen were teaching hospitals with 19,696 beds.³⁷ The average number of beds per 1,000 people was 3.8, though it varied by district from 2.4 to 8.1. Less densely-populated areas tended to have more beds per capita.³⁷ The National Hospital in Colombo had 3,400 beds and a workforce of 9,000, making it the largest in South Asia. Small primary care hospitals each served a population of around 6,000 people (see **Exhibit 18** defining size and scope of different health institutions).

In a sample of 14 secondary and tertiary hospitals, the number of patients served increased between 1997 and 2009, but occupancy rates fell as average length of stay decreased and the turnover rate increased. The rise in efficiency did not decrease the quality of care, which remained high. A comparison of 18 quality indicators between Sri Lankan hospitals and US hospitals showed Sri Lanka outperforming the US.²⁹

Sri Lanka's public hospitals were delivering inpatient and outpatient services at a lower cost per capita than countries with similar levels of development. In 2009, the bed turnover rate (ratio of annual patient discharges to beds), an indicator of resource efficiency in hospitals, was 91 in MOH-administered secondary and tertiary hospitals, much higher than the OECD average of 41.5. Occupancy rates in Sri Lankan public hospitals were comparable to OECD countries, and average length of stay, another indicator of efficiency, was 2.9 days in Sri Lanka, significantly lower than in OECD countries.²⁹

Dengue outbreaks in 2009 and 2017 demonstrated that the country was still vulnerable to outbreaks despite a well-functioning oversight and control infrastructure. The 2009 outbreak produced 25,000 infections and 249 deaths, while over 180,000 suspected cases were reported to the epidemiology unit in 2017, and at least 390 people died. The influx of patients in 2017 pushed public hospitals over capacity during the summer months, with patients forced to share beds and wait in the hallways. The disease spread quickly in flooded urban areas with poor sanitation, and the number of cases overloaded the system.⁷¹⁻⁷³

Disparities in Health Outcomes

Some geographical differences in health outcomes were evident, with infant mortality in 2013 ranging from 6.1 per 1,000 in the southern district of Galle to 13.9 per 1,000 in Jaffna, a densely populated Sri Lankan Tamil-majority district in the north. Under five mortality showed similar trends: Kilinochchi, another Sri Lankan Tamil-majority district in the north, had the country's highest rate—16.8 per 1,000 live births—compared with the national average of 9.9. The four worst-performing districts were three Sri Lankan Tamil-majority northern districts (Jaffna, Kilinochchi, and Mannar) and Nuwara-Eliya, an Indian Tamil-majority district where many people lived and worked on plantation estates.⁴⁷

"[The plantation communities] don't have access to employment," an NGO leader said. "They have been a disadvantaged group for a long time. They have been dependent on government social welfare." Transportation to health facilities was difficult because of winding mountain roads. People were accustomed to dealing with pain and often only presented to a doctor with advanced symptoms. They lived in overcrowded, underventilated homes and burned wood for warmth and cooking. People came to the hospital with late-stage tuberculosis, chronic obstructed pulmonary disease, joint pain, and orthopedic injuries.

"In the estate (plantation) sector, even pregnant mothers do not come regularly to the clinic on the date prescribed," said Jagoda, who administered a hospital in a plantation area. If they missed time during the month, even one day, their pay could be cut significantly. "Whatever we do in central-level policies, those strategies may look very nice [on paper], but ultimately when you implement it at the grassroots level, it is totally different," Jagoda said.

Looking Forward

While the Sri Lankan government health system had produced health outcomes far above what was expected, in 2017 Rannan-Eliya and others had lingering concerns. The free system was “not exactly free,” according to an economist. Patients could go to any public facility for treatment, but limited availability of drugs or the need to wait for certain procedures pushed people to pay for services elsewhere. “The sustainability of this is a vital question.”

Sustaining the system required trade-offs that raised questions about equity. “We’ve rationed consumer quality,” Rannan-Eliya said. “We get the better-off people to voluntarily walk to the private sector ... It works, but it creates a huge number of very unhappy people. There’s constant pressure for this problem to be fixed, but nothing’s ever happened.”

The health system was caring for a growing population with chronic NCDs. “We can’t sustain all of this at 2% of GDP [allocated to health spending],” Rannan-Eliya noted.⁵⁴ Government spending on health increased from USD 237 million in 2000 to USD 870 million in 2013, a number roughly the same in terms of percentage of GDP.⁵⁴

MOH administrators had some ideas for how to make the system more efficient. One tactic government officials discussed was to create a public network of family practitioners who could act as gatekeepers to other public facilities. “We need a family doctor accountable for the health of a local population,” said one MOH official. She was developing a primary care reform project that would connect clusters of family practice doctors with specialized providers. There was little public debate on primary care reform.

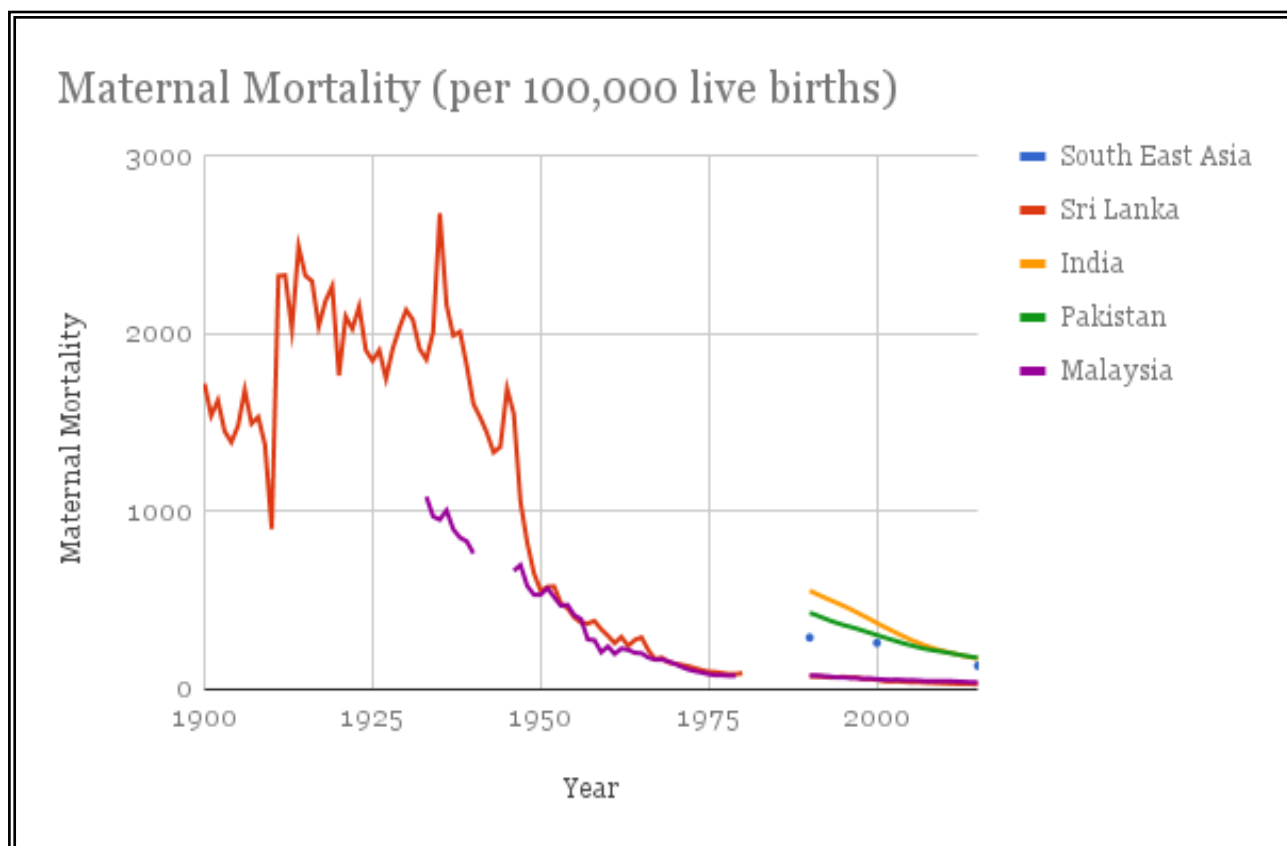
As Rannan-Eliya observed the system from his post at the Institute for Health Policy, his biggest wish was to increase funding. He was wary of attempts to change the way Sri Lanka’s government health services were delivered without first addressing the issue of inadequate funding. Rannan-Eliya used the analogy of an outdated car that still performed well: “It works; why fix it? So we built a very good Mercedes back in the ‘50s, ‘60s, right? And it still works. The driver doesn’t need to know how to make a car. He just needs to know how to drive it. So that’s what they’re good at ... If they wanted to change the design? No, that’s very hard.”

What could Rannan-Eliya and the Institute do to help shape the direction for the future? What new metrics were needed to measure and communicate progress? How could Sri Lanka adapt its service delivery to the epidemiological changes to sustain the positive outcomes?

Exhibit 1 Sri Lanka, Political and Topographic Map



Source: Perry Castañeda Map Collection. http://www.lib.utexas.edu/maps/sri_lanka.html.

Exhibit 2 *Maternal Mortality in Sri Lanka and Selected Sites in Southeast Asia*


Sources: Global, regional, and national levels of maternal mortality, 1990–2015: a systematic analysis for the Global Burden of Disease Study 2015. *The Lancet*, Volume 388, Issue 10053, 8–14 October 2016, Pages 1775–1812. <http://www.sciencedirect.com/science/article/pii/S0140673616314702>.

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[https://www.gapminder.org/tools/#_state_time_value=2013&delay:172;&entities_show_geo_\\$in@=lka;;;&marker_axis/_y_which=maternal/_mortality/_ratio/_per/_100000/_live/_births;;;&hart-type=linechart](https://www.gapminder.org/tools/#_state_time_value=2013&delay:172;&entities_show_geo_$in@=lka;;;&marker_axis/_y_which=maternal/_mortality/_ratio/_per/_100000/_live/_births;;;&hart-type=linechart).

WHO, UNICEF, UNFPA, World Bank Group, and United Nations Population Division Maternal Mortality Estimation Inter-Agency Group. Maternal Mortality in 1990-2015. Pakistan.

http://www.who.int/gho/maternal_health/countries/pak.pdf.

World Bank. Maternal mortality ratio (modeled estimate, per 100,000 live births).

<https://data.worldbank.org/indicator/SH.STA.MMRT?locations=LK>.

Exhibit 3 *Expansion of MCH Services, 1941–1998*

Years	Estimated Population (thousands)	Number of Hospitals *	Number of Maternal Homes†	Number of Midwives‡	Number of Health Centers
1941	6,178	129	12	347	N/A
1945	6,650	153	34	542	503
1950	7,678	263	99	1,053	701
1954	8,385	270	104	1,854	NA
1970	12,516	N/A	128	2,680	1,122
1980	14,738	357	100	3,350	1,344
1986	16,117	389	88	4,652	1,778
1989	16,806	400	83	5,030	1,880
1993	17,405	410	78	6,533	1,905**
1996	18,336	426	60	6,745	1,915**
1998	18774	452	69	7007	1950**

*Includes teaching, provincial, base, district, peripheral units, and rural hospitals, all of which have maternity unit facilities for deliveries.

† Includes central dispensaries and maternal homes.

‡ Includes both institutional midwives and field midwives.

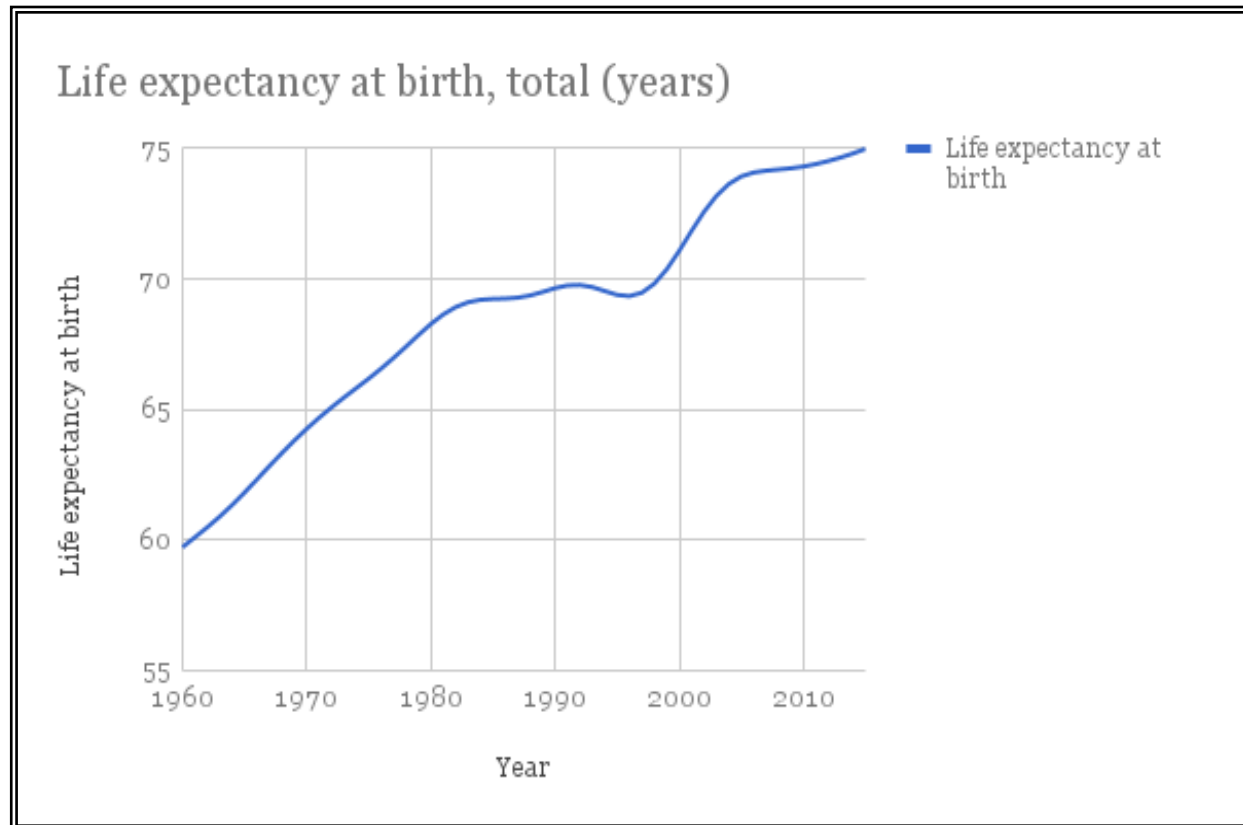
** Estimated.

Source: Compiled by case writers from: Malini de Silva JK, Wickramasuriya K. Maternal and Child Family Planning Services in Sri Lanka. 9 October 2015. Bureau of Health Education. Sri Lankan Ministry of Health and Indigenous Medicine.

http://www.healthedu.gov.lk/web/index.php?option=com_content&view=article&id=88:maternal-and-child-and-family-planning-services-in-sri-lanka&catid=17:special-article&lang=en.

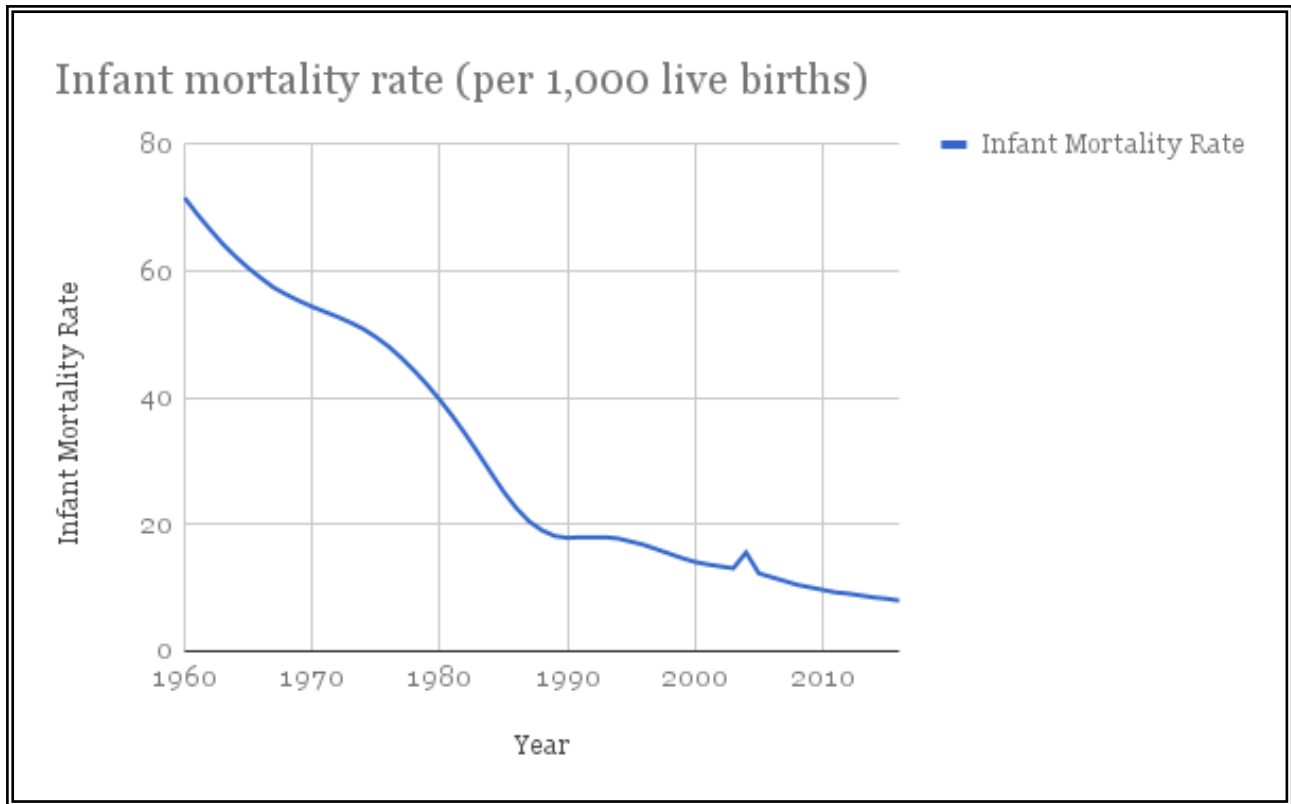
Population, total. World Bank Data.

<https://data.worldbank.org/indicator/SP.POP.TOTL?end=2016&locations=LK&start=2015>.

Exhibit 4 *Life Expectancy in Sri Lanka, 1960–2015*

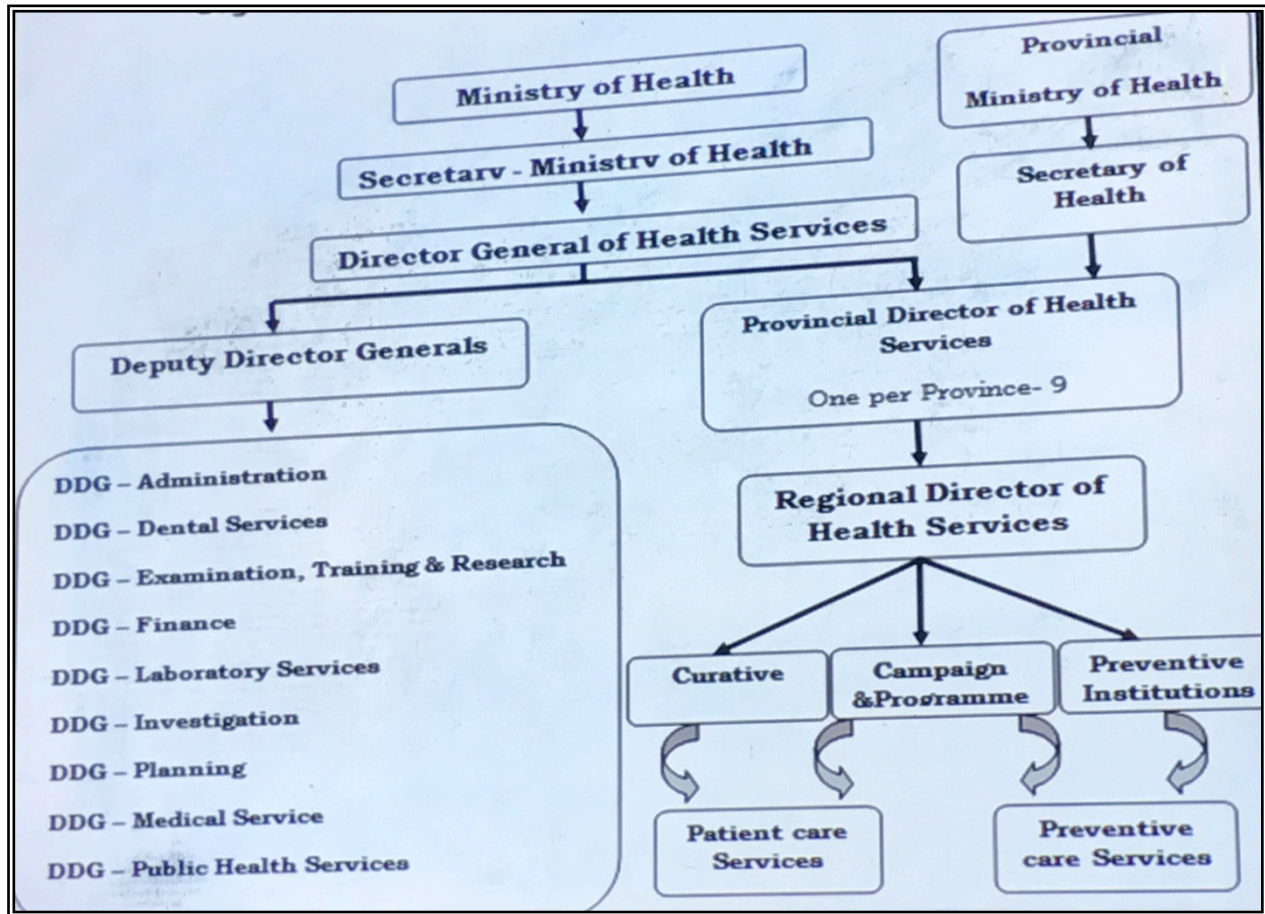
Source: World Bank Data. <https://data.worldbank.org/indicator/SP.DYN.LE00.IN?locations=LK>.

Exhibit 5 *Infant Mortality Rate (per 1,000 live births)*



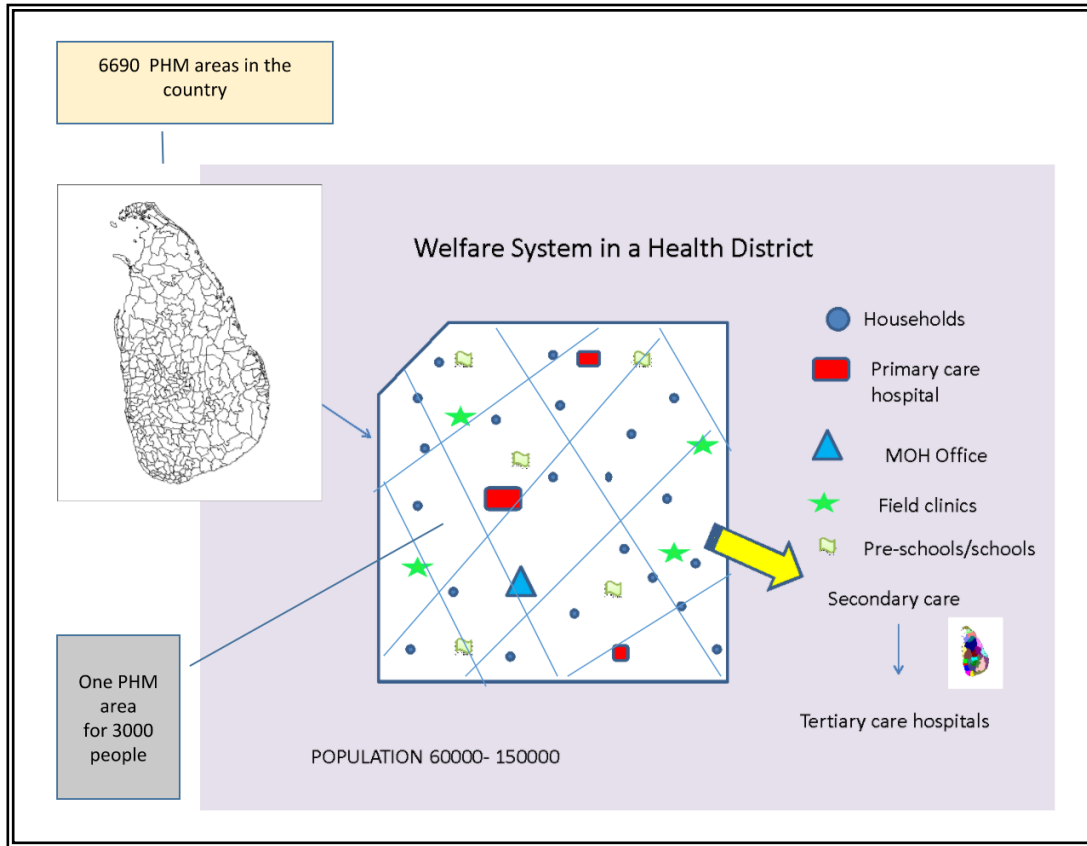
Source: World Bank Data. <https://data.worldbank.org/indicator/SP.DYN.IMRT.IN?locations=LK>.

Exhibit 6 Ministry of Health Organizational Overview, Line and Provincial Ministry



Source: Sri Lankan Ministry of Health.

Exhibit 7 *Services in a Public Health Midwife Area*



Source: Sri Lankan Ministry of Health.

Exhibit 8 *National Immunization Coverage, 1980–2015*

Source: WHO and UNICEF estimates of national immunization coverage, July 2016.
<http://www.searo.who.int/immunization/data/srilanka.pdf>.

Exhibit 9 *Reported Cases of Vaccine-Preventable Diseases, 2006–2015*

Year	Polio	Diphtheria	Pertussis	Neonatal Tetanus (% of All Tetanus)	Measles	Rubella	Mumps	Japanese Encephalitis	Congenital Rubella Syndrome
2006	0	0	0	2 (5%)	0	2	ND	29	2
2007	0	0	0	0	44	5	1,153	45	0
2008	0	0	9	1 (3%)	33	79	778	118	0
2009	0	0	31	0	21	143	660	72	3
2010	0	0	2	1 (9%)	79	68	897	27	8
2011	0	0	23	0	60	416	1,129	30	3
2012	0	0	61	0	51	54	3,558	60	12
2013	0	0	67	0	2,107	24	1,274	70	4
2014	0	0	38	0	1,686	10	383	21	4
2015	0	0	107	0	1,568	9	338	17	0

Note: “ND” indicates no data.

Source: WHO/UNICEF. <http://www.searo.who.int/immunization/data/srilanka.pdf>.

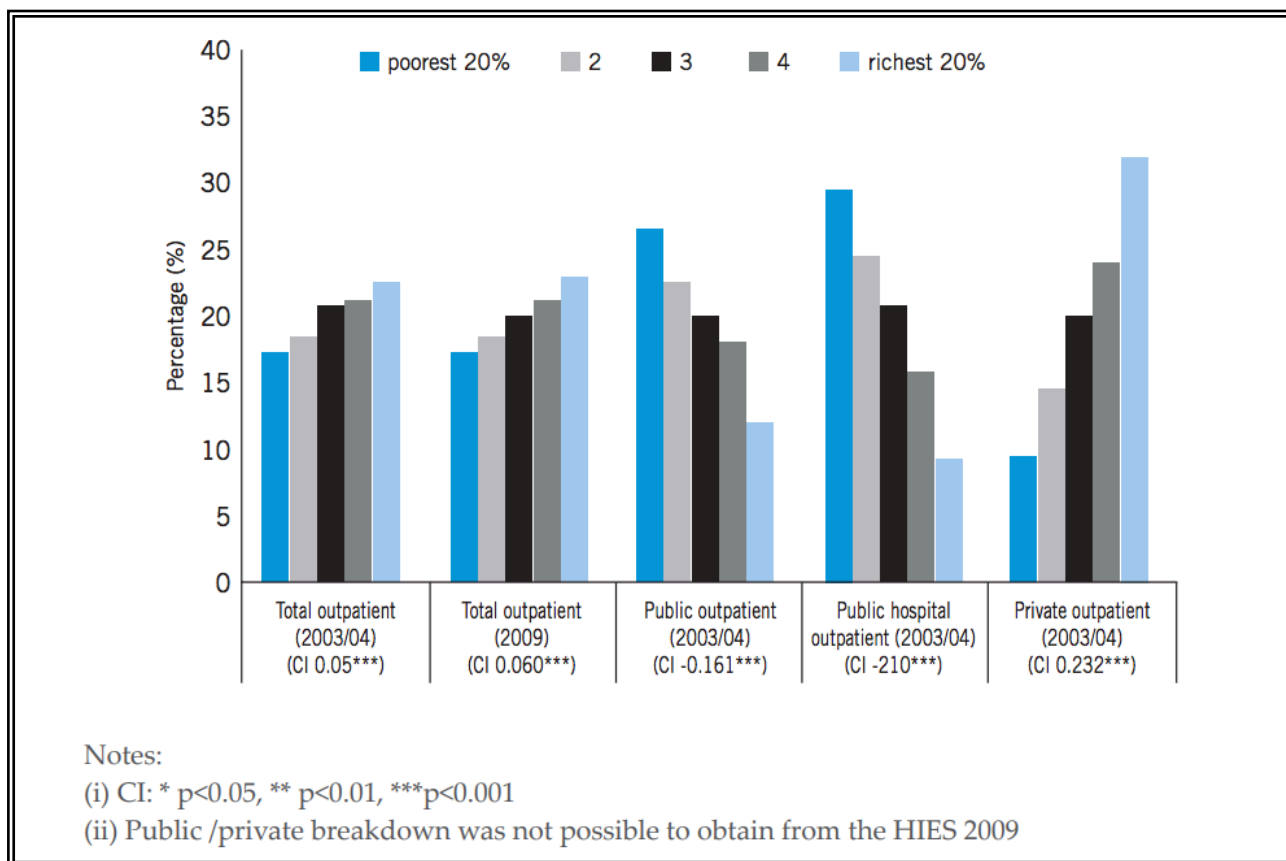
Exhibit 10 *Services Considered “Difficult to Access” in the Public Health Sector, 2015*

Service	Reason for access issues	Available in private sector?
Coronary-artery bypass surgery	Waitlist exceeds 5,000 people	Yes
Dialysis for chronic kidney disease	Lack of availability in many public-sector regions	Yes, especially in urban areas
Bone marrow transplant	Not available in public sector	Yes, although only private hospital is in Colombo
Stenting	Patients must purchase the expensive stents from pharmacies	Yes
Angioplasty	Patients must purchase specialty surgical tools from pharmacies/medical-supply stores	Yes
Organ transplant	Extended waitlist for donor preoperative assessment	Assessments available quickly through private laboratories

Source: Kumar, R. Preserving “free health” under Sri Lanka’s privatisation policy. *Sri Lanka Sunday Times*. February 8, 2015. <http://www.sundaytimes.lk/150208/business-times/preserving-free-health-under-sri-lankas-privatisation-policy-134353.html>.

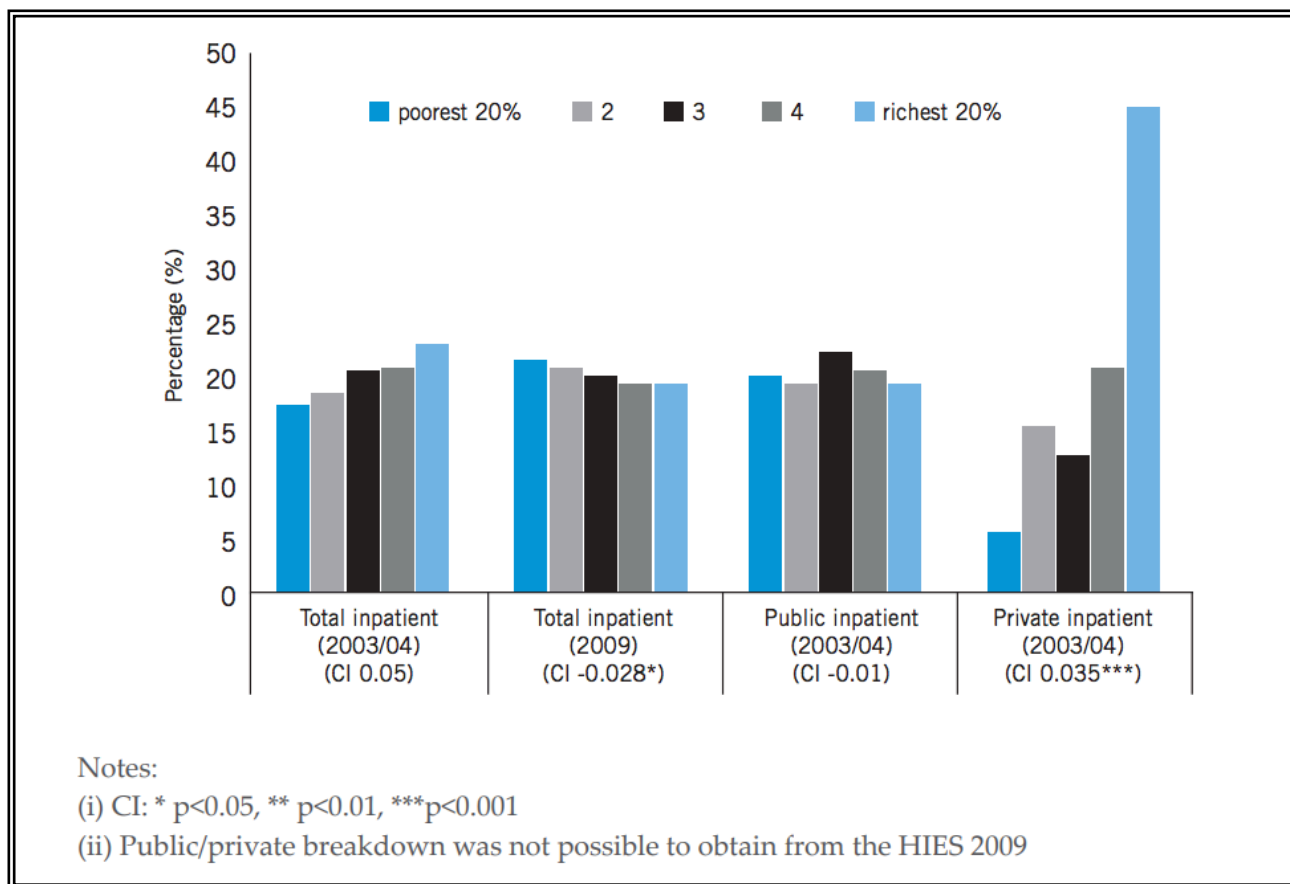
Kumar, R. Unequal access to healthcare in Sri Lanka? *Sri Lanka Sunday Times*. September 27, 2015. <https://www.pressreader.com/sri-lanka/sunday-times-sri-lanka/20150927/282218009596399>.

Exhibit 11 Utilization of Outpatient Care (Total, Public, Public Hospital, and Private) by Socioeconomic Group, 2003/2004 and 2009



Source: Huntington D, Hort K. *Public Hospital Governance in Asia and the Pacific*. Geneva: World Health Organization; 2015.
http://apps.who.int/iris/bitstream/handle/10665/208218/9789290617112_eng.pdf;jsessionid=B6D1D3ED6EC4A38DBD8CC4BDAC6167AD?sequence=1

Exhibit 12 Utilization of Inpatient Care (Total, Public, and Private) by Socioeconomic Group, 2003/2004 and 2009



Source: Huntington D, Hort K. *Public Hospital Governance in Asia and the Pacific*. Geneva: World Health Organization; 2015.
http://apps.who.int/iris/bitstream/handle/10665/208218/9789290617112_eng.pdf;jsessionid=B6D1D3ED6EC4A38DBD8CC4BDAC6167AD?sequence=1

Exhibit 13 *Examples of Hospital Improvements Under 5S*

Hospital	Examples
Castle Street Women's Hospital and Ampara District General Hospital	<ul style="list-style-type: none"> • There had been limited supplies of clean linen and sterile supplies at Castle Street. The hospital set up a central supplier division and established a central linen supplier division and central sterile supplier division. This assured an adequate supply of items on a regular basis and removed responsibility for supply logistics from the workload of other hospital staff. • Both Castle Street and Ampara established a system for infection control and surveillance. An infection control officer was responsible for maintaining an information system and producing infection control reports for an infection control committee. • The post-Caesarean section infection rate at Castle Street declined by 52% and the neonatal infection rate decreased by 58% between 2000 and 2002. The stillbirth rate dropped from 10.3 per 1,000 live births to 6.9, and maternal mortality, from 1.90 per 1,000 live births to 0.24 between 2000 and 2002. • Ampara reduced the neonatal mortality rates from 0.78% in 2000 to 0.37% in 2006. • At Castle Street, new signage was installed, each piece of equipment was given an inventory number and a label, and each item had a "home" where it was to be stored. Essential processes were identified and standardized. Standardized procedures at Castle Street included screening of antenatal mothers.
Kurunegala Teaching Hospital	<ul style="list-style-type: none"> • Patients had to wait a long time for medicines to be dispensed. To solve the problem, one dispensary counter was transformed into three and common drugs were prepackaged separately. Fast-moving drugs were stored within easy reach of dispensers and pharmacists. • Dispensing time was reduced to less than one minute per person.
Madampe Divisional Hospital	<ul style="list-style-type: none"> • Established a hospital development committee including the hospital director, elected officials, and community leaders. The committee recorded the infrastructure needs of the hospital and gathered support from various sources. Resulting projects included fixing a neglected and dangerous electrical wiring system, renovating toilets, and refurbishing the shabby hospital facade.
Chilaw General Hospital	<ul style="list-style-type: none"> • The dental unit complained that a poor-quality water supply damaged dental instruments and equipment. The quality management unit secured assistance for a new water softening facility.

Sources: "Resource Book II: 5S-TQM," JICA. http://open_jicareport.jica.go.jp/pdf/11864253_08.pdf; Withanachci N et al., A performance improvement programme at a public hospital in Sri Lanka: an introduction. *J Health Organ Manag.* 2004;18(4-5):361-369. <https://www.ncbi.nlm.nih.gov/pubmed/15536762>.

Exhibit 14 Sample Clinical Guidelines from the Directorate and Quality and Safety

II. Services involving Patient Contacts		Measurable Elements
Areas of Concern	Standards	
9 Inpatient care services		
9.1 General Ward	<p>9.1.1 An updated summary of the statistics displayed in the ward</p> <p>9.1.1.1</p> <p>9.1.2 Inpatients attended appropriately on admission to wards</p> <p>9.1.3 An emergency tray systematically arranged and functioning</p> <p>9.1.4 Nursing stations arranged to respond to emergency occasions</p> <p>9.1.5 A separate examination area available</p> <p>9.1.6 BHTs properly written</p>	<p>- The statistical summaries of the last year, the last month and yesterday are displayed in the ward and updated on:</p> <ul style="list-style-type: none"> ➢ Number of beds ➢ Number of admissions ➢ Number of discharges ➢ Bed occupancy rate ➢ Number of transfers (in and out) ➢ Number of deliveries (Post-natal wards only) <p>- Stamping on BHTs of patients who require urgent medical attention is done at OPD.</p> <p>- The general status and vital signs are measured and recorded on admission to wards for all the patients.</p> <p>- Patients with "HO to See Stat" are consulted by doctors within reasonable time.</p> <p>- Allocation of nurses to patients is clearly indicated in the ward.</p> <p>- An emergency tray is available with essential supplies, equipments, solutions and drugs.</p> <p>- A check list for the emergency tray items is available and checked at least once a day.</p> <p>- A responsible officer is indicated for the maintenance of the emergency tray.</p> <p>A sample emergency tray item checklist is attached in "ANNEX 3: Emergency Tray Checklist (Sample)".</p> <p>- Nurses can observe acute patients and those who require close monitoring from the nursing station all the time.</p> <p>- Patients are easily accessible from the nursing station in emergency occasions.</p> <p>- An examination bed is available.</p> <p>- The examination area is screened for privacy.</p> <p>- Date and time are written at every entry to BHTs.</p> <p>- BHTs are page-numbered.</p> <p>- All the entries to BHTs are clearly written.</p> <p>- Drug charts and fluid balance charts are made up to date on BHTs.</p> <p>- Complete diagnosis is written on the BHTs upon discharge of patients.</p>

Source: Sri Lanka Ministry of Health. National Guidelines for Improvement of Quality and Safety of Healthcare Institutions (for Line Ministry and Provincial Hospitals). 1st edition. September 2010. JICA. https://www.jica.go.jp/activities/issues/health/5S-KAIZEN-TQM-02/ku57pq00001pi3y4-att/sri_01.pdf.

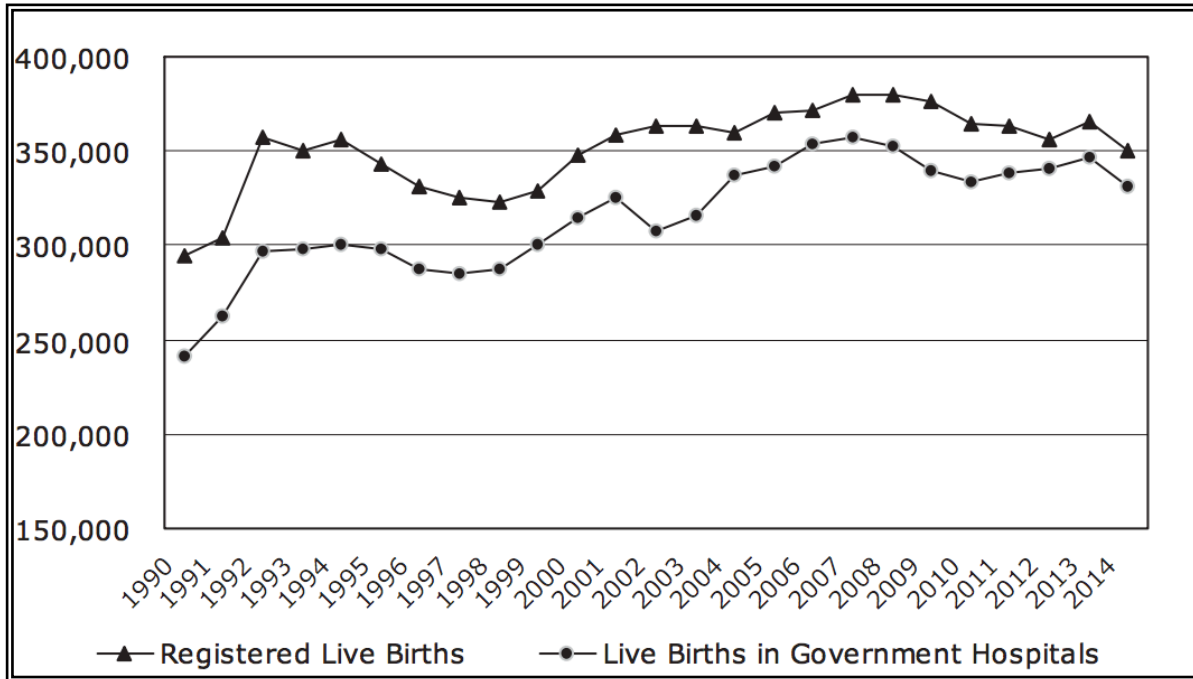
Exhibit 15a *Institutional Delivery Over Time, 1939–1995*

YEAR	% ASSISTED DELIVERIES IN THE HOME	% DELIVERIES IN GOVERNMENT INSTITUTIONS	MMR
1939	19	8	1,824
1940	21	6	1,607
1945	27	22	1,694
1950	25	33	555
1955	25	41	405
1960	19	55	302
1965	15	62	239
1970	9	66	145
1975	—	67	102
1980	—	76	65
1985	—	75	51
1990	4	71	—
1995	2	87	24

— Not available.

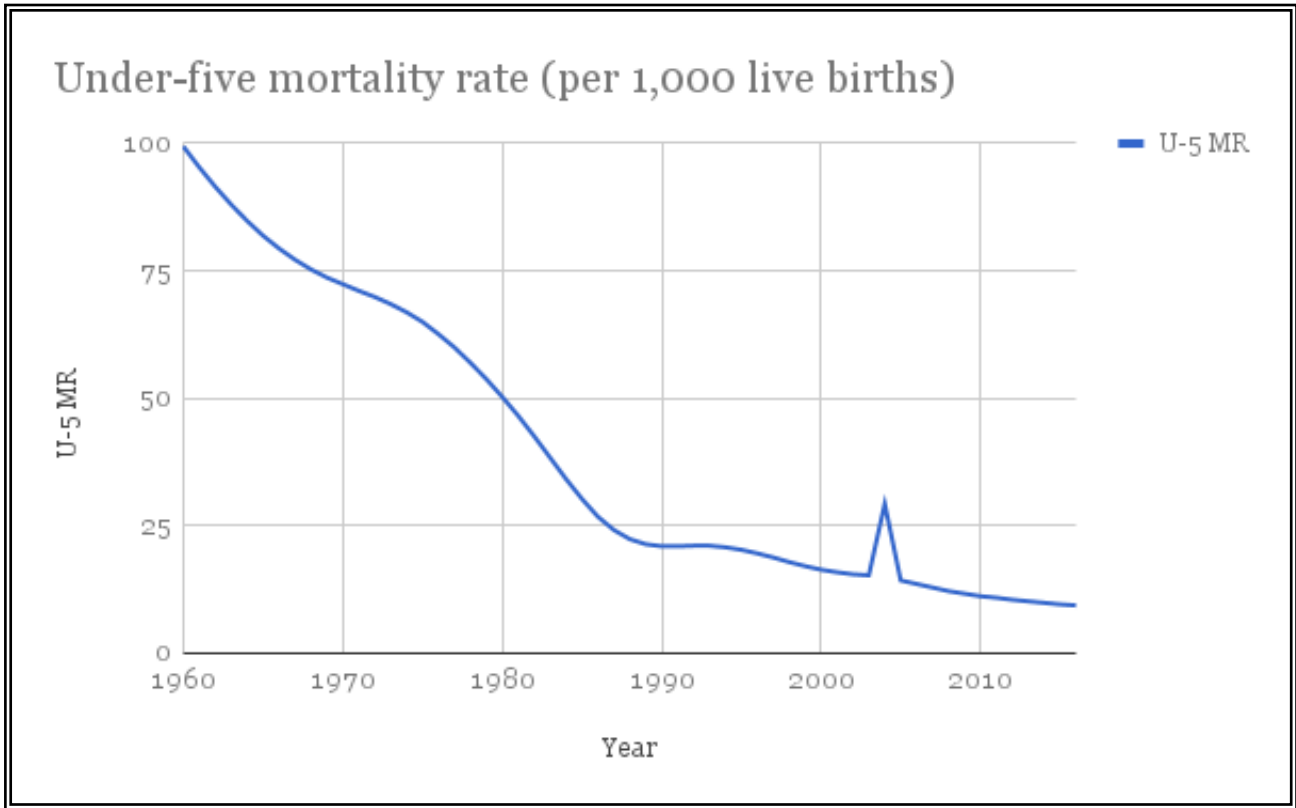
Source: Pathmanathan I et al. Investing in maternal health: Learning from Malaysia and Sri Lanka. World Bank. Human Development Network: Health, Nutrition, and Population Series. Report No. 25901. <http://siteresources.worldbank.org/INTPRH/Resources/376374-1278599377733/InvestinginMaternalHealthLearningfromMalaysiaandSriLanka.pdf>.

Exhibit 15b Registered Births vs. Hospital Births, 1990–2014

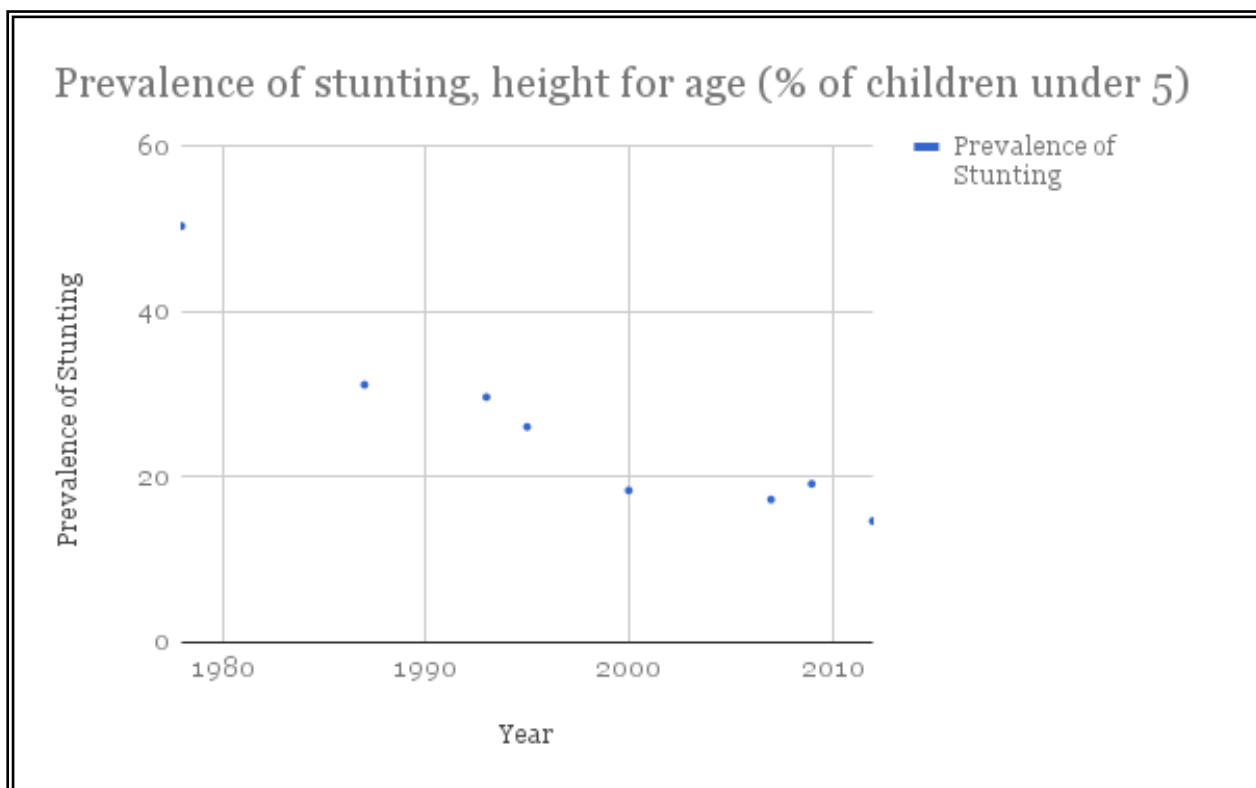


Source: Sri Lanka Annual Health Bulletin 2014.
<http://www.health.gov.lk/enWeb/publication/AHB2014/AHB2014.pdf>.

Exhibit 16 *Under-Five Mortality Rate (per 1,000 Live Births)*



Source: World Bank Data. <https://data.worldbank.org/indicator/SH.DYN.MORT?locations=LK>.

Exhibit 17 *Prevalence of Stunting in Sri Lanka, 1986–2012*

Source: World Bank Data.

<https://data.worldbank.org/indicator/SH.STA.STNT.ZS?end=2012&locations=LK&start=1978&view=chart>.

Exhibit 18 *Breakdown of Types of Institutions and Services Available at Primary, Secondary, and Tertiary Levels*

Level of Facility	Facility Type (and Number)	Services Offered	Staff
Primary	Primary medical care units with outdoor and clinical facilities (474), primary medical care units with maternity homes (14), divisional hospitals (482), MOH offices (341)	Health prevention and promotion, treatment of minor conditions, antenatal care, child welfare centers, special clinics for leprosy and filiarisis, domiciliary care, home medical services	Nurses, midwives, registered assistant medical practitioners
Secondary	District base hospitals (71), district general hospitals (20)	Diagnosis and treatment; facilities with basic specialties: general medicine, general surgery, pediatrics, obstetrics, gynecology, radiology; laboratory facilities	Physicians (including basic specialties), nurses, midwives, pharmacists, laboratory technicians
Tertiary	National Hospital (1), teaching hospitals (16), provincial general hospitals (3), other hospitals (25)	Specialized management, rehabilitation, specialized services such as cardiology, endoscopic surgery, laboratories, radiological facilities, blood transfusion services, operating theaters, and anesthetic facilities	Physicians (including specialty), nurses, midwives, pharmacists, laboratory technicians

Source: Compiled by case writers.

Appendix *Common Acronyms and Other Abbreviations*

IHP	Institute for Health Policy
MBBS	Bachelor of Medicine, Bachelor of Surgery
MOH	Ministry of Health
NCD	noncommunicable disease
PHI	Public health inspector
PHM	Public health midwife
UNICEF	United Nations Children's Fund
USD	United States Dollar
WHO	World Health Organization

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