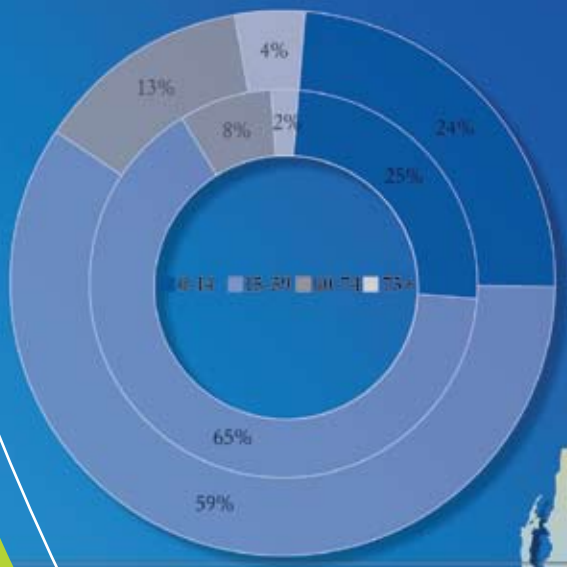
Population Ageing and Health Expenditure:

SRI LANKA 2001-2101



Ravi P. Rannan-Eliya

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Institute for Health Policy

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The Institute expresses its appreciation of the support of the many other agencies that have supported its research work in its first three years, as this study draws heavily on many elements of that work. In particular, this study benefits from the Institute's ongoing work on health accounts, disease costing and ageing, which has been principally funded by the World Health Organisation, World Bank and Ministry of Health. A review of the global literature on health expenditure projection methods that was sponsored by the WHO Kobe Center in 2005 proved timely, as it has helped substantiate the methods used and identify potential areas for improvement. We also note that the methodological foundations of this study draw upon earlier work done by Dr. Rannan-Eliya and colleagues during 2000-2005 on projecting health spending in Sri Lanka, which was funded by a US National Institute of Aging grant to Harvard University, and by a research contract from the Ministry of Health, Sri Lanka.

Prof. Indralal de Silva of Colombo University was responsible for producing the new population projections that are used in this study, and which were published by the Institute in 2007.

Acronyms

CB	Central Bank
CFS	Consumer Finance Survey
GDP	Gross Domestic Product
GP	General Practitioner
MOH	Ministry of Health
NCD	Non-Communicable Disease
NHE	National Health Expenditure
OECD	Organization for Economic Co-operation and Development
OPD	Out-Patient Dispensary
PDOH	Provincial Department of Health
SLHA	Sri Lanka Health Accounts
TEH	Total Expenditure on Health
TFR	Total Fertility Rate
WHO	World Health Organization

Executive Summary

This study develops projections of the cost of the national health system for the period 2005—2101, building on an earlier effort in Sri Lanka. It utilises an actuarial-cost projection methodology, similar to the approach used in official projections prepared in developed economies, such as USA, UK and Hong Kong SAR. The model projects resource requirements for personal medical services as a function of changes in population size and structure, underlying changes in utilisation of medical services, productivity changes, and medical price inflation.

An intrinsic feature of the approach is that it does not focus on specific diseases. Nevertheless, by taking data from the disease-specific health accounts for the country, it is also possible to make some assessment of the implications of the changing age structure of spending for the disease composition of such expenditures.

During 2005-2050, the Sri Lanka population will increase only modestly by 10-15% to 20-23 million, before gradually decreasing in size during the remaining decades of the century. In this scenario, population ageing itself can be expected to add 0.4-0.9% of GDP to overall national health spending by 2050 and again by 2101, but this is likely to be only one part of the overall increases in expenditures.

The analysis undertaken points to the following conclusions regarding underlying cost changes:

1. Under the most likely scenarios, total health spending in Sri Lanka will reach 6-8% of GDP by the time its population's stable age structure begins to stabilize. This level of spending is similar to that of the lower spending OECD economies today, such as Japan and Greece, and indicates that Sri Lanka's health system is already quite cost-efficient.
2. The most significant cost driver of national health expenditures both in the short-term and long-term will be underlying changes in the propensity of individuals to use medical services when ill. Historically, the age-sex adjusted rates of utilisation of medical services have risen by 1-3% per annum. Even if future increases in age-sex adjusted outpatient contact rates moderate to only 1% per annum, this will add 1-2% of GDP to health system resource requirements. Increases in inpatient contact rates are not expected to significantly add to overall costs, since they are presumed to have reached close to their limit. (However, if quality in inpatient services is improved, such expenditures may also increase.)
3. The second most important cost driver is changes in the age and sex structure of the population. Over time, the percentage of women is increasing (women use more medical services than men), and the increase in the elderly population is more than sufficient to balance the reductions in the size of the youngest age groups. Demographic change will add 0.4% of GDP to health system resource requirements by 2025, and 0.4-0.9% of GDP by 2100.
4. The third most important cost-driver is productivity change in the public sector health services. Productivity increases enable a health system to deliver the same volume of health services at lower costs, so they lead to cost reductions. Sri Lanka has historically experienced high rates of non-quality adjusted productivity improvement leading to sustained reductions in unit costs of services delivered. It is difficult to forecast the future trend in productivity change, but if unit cost changes consistent with historical experience of –0.3% per annum in relation to GDP per capita for outpatient services and –2.0% per annum in relation to GDP per capita are achieved, then this will reduce resource requirements in the health system by 0.4 to 0.5% of GDP. However, it is assumed that continuing cost reductions may not be realistic, and that overall unit costs may remain stable, as efficiency gains are used to pay for quality improvements.
5. The cost driver, the impact of which is most difficult to predict and yet can have the largest impact, is price inflation in the private sector. What limited reliable evidence exists for the insured sector indicates that there is significant price inflation in the private sector, but this is not representative of the overall private sector. In the absence of reliable data on these price trends, private sector price

inflation is concluded to have minimal net effect, with the qualification that the actual impact could range from adding 0.1% to 3% of GDP to overall expenditures.

6. Given the higher rates of cost increase in the private sector and also the higher unit costs of treatment in the private sector, it is found that if the public role in the health system delivery is reduced that costs will increase more. This indicates that maintaining a strong public presence in delivery will help largely mitigate cost increases.
7. Expenditures for non-communicable disease are already the major components of spending in Sri Lanka, and their share is likely to increase in the next few decades, in particular those of cardiovascular disease, diabetes mellitus and chronic respiratory disease. These trends will result in the overall levels (as share of GDP) and pattern of spending in Sri Lanka by 2050 being quite similar to that of OECD countries today.

In contrast with the earlier effort to project health spending in Sri Lanka, this study produces a range of estimates most of which lie in what can be considered reasonable values. In particular, most of the projections result in levels of spending which are comparable to the range seen in most advanced economies today. This consistency with expenditure levels in other countries is probably because this study has benefited from being able to use more recent historical and more accurate time series data, and given the longer time series that were available for trend analysis. This suggests that regularly repeating this type of exercise will tend to result in improvements in the forecast accuracy of such models.

This finding of consistency with levels of spending observed in developed countries is important for another reason. It underlines that Sri Lanka like these other developed countries does have significant options to be able to control the increase in health spending with ageing, and as is already known effective public policy can substantially mitigate future cost increases.

Introduction

Sri Lanka is well advanced in its demographic and epidemiological transition. It was one of the first developing countries to achieve below-replacement level fertility, and its population is set to rapidly age during the course of this century. Inevitably, there will be an upward pressure on healthcare spending from this process of ageing, and concerns naturally arise as how large an impact this will have. In addition, as one of the most demographically advanced countries amongst those that the World Bank classifies into its low income and lower-middle income categories, future trends in Sri Lanka will be of considerable interest to the international community as they may offer pointers to the future challenges that developing countries in general will face with ageing. Moreover, Sri Lanka is well placed to provide such insights, owing to the relatively well-developed health economics research capacity and previous research available in the country.

This study assesses the possible impacts of demographic ageing on national health expenditures and resource requirements in Sri Lanka during the next hundred years, by developing a model of baseline health system expenditures, incorporating identified trends and factors. It also undertakes a preliminary assessment of what impact the ageing of the population may have on the disease composition of future health spending.

The methodology used in this study is that of an actuarial cost projection model. The baseline model projects financial resource needs under the assumptions that there is no change in policy, no change in the quality level of services provided, or any major discontinuities in the evolution of the health system. In doing so, key potential drivers of future costs are identified and incorporated. This study is based on earlier methodological work by Rannan-Eliya et al. (2003), who developed the first set of actuarial health expenditure projections for Sri Lanka. However, this study goes beyond that in several respects. First, it exploits more recent data and analyses, including the full results of the 2001 national population census, which was the first conducted in Sri Lanka for two decades. Second, it benefits from the availability of a much longer time series of national health expenditure estimates (1990-2005), which allows a better-informed assessment of critical trends in the healthcare system. Third, it introduces a new component that models the disease composition of expenditures, as a function of the age structure of spending.

Developing a model of the resources required for health care over the next century is a complex task, and is inherently speculative. As such the projections presented here should be treated not as forecasts of what will actually happen, but more as indications of the directions of health spending in future years and of the importance of key factors and trends, which will drive future spending. The projections should thus be seen as a tool to help assess what are key drivers of future health spending, and to understanding their relative potential importance in order to strengthen and revise existing policies.

The Projection Model

Projection framework

The framework used in these projections is that of an actuarial cost model, where expenditure requirements are modelled as a function of changes in age and sex specific demand for services (Mahal and Berman, 2002). Internationally, the actuarial cost projection method is the most widely used, and has the advantages of considerable robustness and flexibility in a wide range of settings. It has been used most extensively in developed countries, but applications in developing country settings remain limited as health expenditure projections remain infrequent outside the developed countries (Rannan-Eliya and Wijesinghe, 2006).

By incorporating population size and demographic structure directly into the model, this methodological approach permits simulation of the impact of ageing effects on overall health expenditures. At the same time, other factors can also be incorporated and assessed. Recent examples of this approach include the Treasury projections of expenditure requirements for the UK National Health Service (Wanless, 2002), the annual projections of health care spending by the United States government (Heffler et al., 2003), the official projections of the Government of New Zealand (Ministry of Health, 2004), and the 2005 analysis of health care spending trends produced for the Hong Kong SAR Government (Department of Community Medicine and School of Public Health, 2005). The general approach is also described in detail in the ILO volume devoted to the topic of health care finance modeling (Cichon et al., 1999).

The projection model that is presented here projects future healthcare spending as a function of the following cost drivers, which were identified as potentially impacting health care costs:

- Population size
- Age and sex structure of the population
- Changes in the age-sex specific use of personal medical services
- Changes in productivity or the unit costs of delivering public sector medical services
- Changes in the price of private sector medical services
- The chosen level of public expenditures on preventive and collective health, administration and capital formation
- Changes in GDP and the inflation level in the economy

In the model, aggregate health costs are the function of two components: (i) the volume of a service, and (ii) the unit cost or unit price of that service. The cost drivers influence overall costs by their impact on each of these components. The assumptions and scenarios used for each of these cost drivers are discussed in the next chapter.

Projection model

The projection model is developed in Microsoft Excel (Projection model V3.xls). This model accepts as inputs trends in the various cost drivers. Figure 2.1 summarizes how these factors or cost drivers are incorporated into the model to produce a projected total cost. The cost drivers influence the model in two ways:

- Through their effects on the activity rate or utilisation of services – principally those related to changes in demography and health-seeking behaviour.
- Through their effects on the unit cost or price of services – principally those related to productivity change and the public-private mix.

In summary, the model's approach is to:

- Multiply the baseline activity rate for personal medical services by the projected population
- Adjust for changes in activity level or health-seeking behaviour
- Multiply new activity levels by adjusted unit costs or prices
- Add in separately costs of public sector preventive and public and private sector administrative services
- Divide through by overall levels of economic output

In the final stage, costs are expressed as a percentage of GDP.

It should be emphasized that the actuarial model approach used is only applied for estimation of costs of personal medical services. Public sector expenditures for administration, preventive services and for capital formation are added separately as a fixed amount, essentially being prorated either in relation to the projected recurrent expenditures (in case of private sector administrative expenditures) or set as being fixed in relation to GDP (in case of public sector preventive and health promotive expenditures.

For each cost driver, three different forecast trajectories are inbuilt into the model and made available, although facility is also provided for the user to input any other forecast trajectory. Different permutations of these forecasts are combined in order to produce different sets of projections of total health care costs. These illustrate the cost implications of each factor, and identify potential cost scenarios.

Non-personal medical expenditures

As was explained, the actuarial approach is utilised to project forward expenditures for personal medical services only. However, the other elements that constitute national health spending, most by the public sector, are projected forward as fixed shares of GDP or as fixed shares of spending. These expenditure elements generally involve services that benefit the whole population or groups of the population, and thus cannot be imputed to specific age and sex groups.

Expenditures by the public sector for non-personal services are largely a matter of policy choice for the government, since they are not driven directly by consumer demand. Consequently, they cannot be modelled using the actuarial approach which links spending to changes in volume and the unit cost of services.

For the purposes of the baseline projections, it was assumed that these expenditures would increase strictly in line with GDP, i.e., they would continue to account for the same level of GDP. This was based on the consideration that the available evidence suggests that such expenditures in relation to GDP are similar in OECD countries to those in Sri Lanka currently. The assumption also has the affect of gradually reducing over time preventive expenditures as a share of future national health spending to ratios that are quite comparable to those observed in developed economies today.

Two other components of spending must also be included in the model:

(i) Capital expenditures by MOH and provincial councils
(ii) Health expenditures by government agencies other than MOH and PDOHs, which includes local governments, Ministry of Defence, etc.

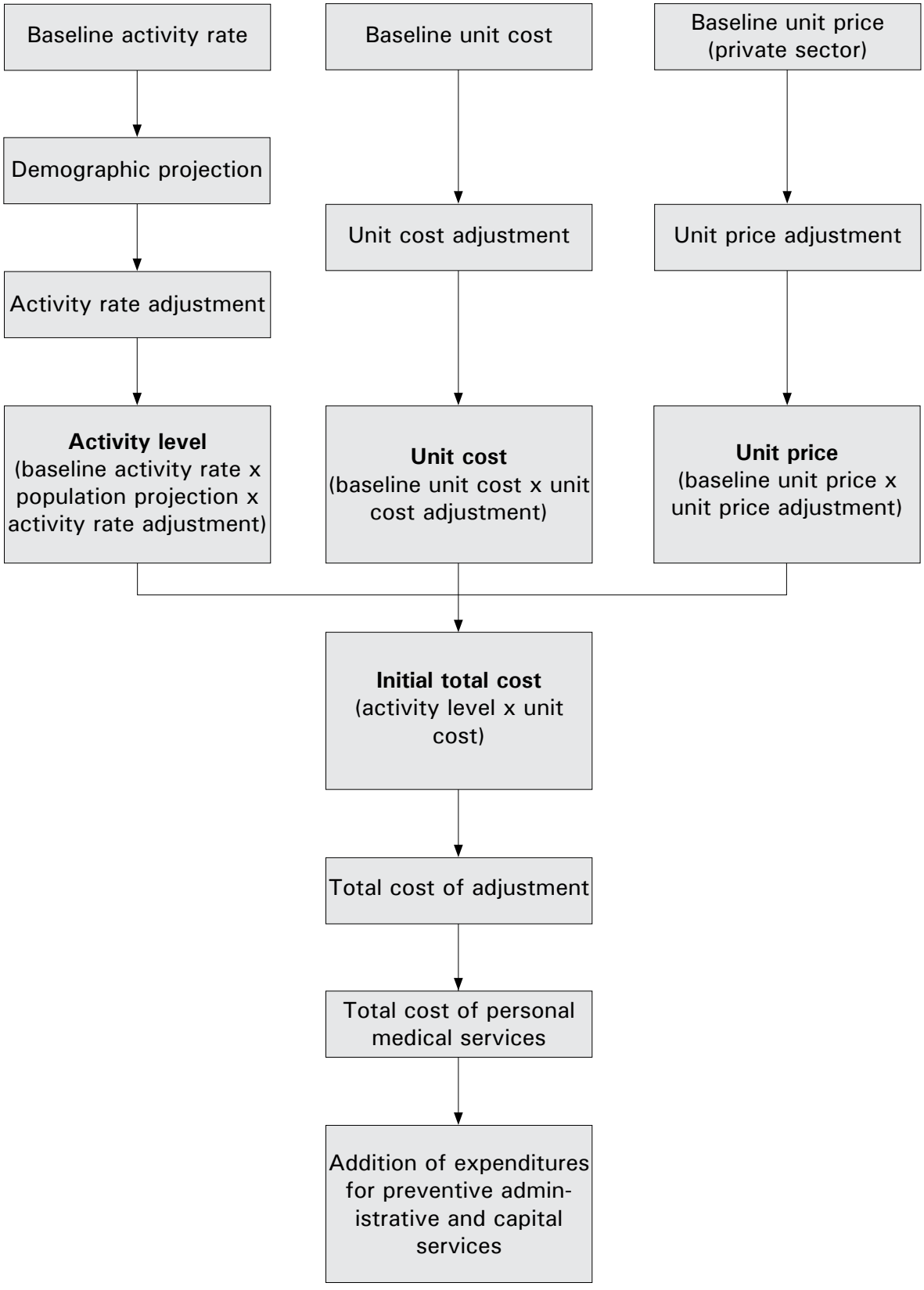
In the case of the first, it is assumed in the model that the current ratio of capital expenditures to recurrent expenditures in the public sector does not change in future. This is reasonable, given that capital expenditures are closely linked to long-run recurrent spending, and since examination of international data does not suggest any specific relationship between the ratio of recurrent to capital spending at different income levels.

In the case of the second component, the model assumes that the current ratio of these expenditures to GDP does not change in future. This is considered reasonable, since it is noted that the available IHP SLHA estimates for these other government agency expenditures during the past decade do not show significant changes in these expenditures as a percentage of GDP. The overall level of these expenditures is also small, so the simple projection of these expenditures as a fixed share of GDP is neither unreasonable nor likely to introduce much error in the overall projections of health system expenditures.

Baseline expenditures

To operationalise the model, it must start from an initial level of spending. This baseline estimate of expenditures is the actual level of spending in 2005.

Figure 2.1: Schematic overview of analysis pathway in projection model



The baseline and historical estimates of spending are taken from the January 2007 revision of the Sri Lanka Health Accounts estimates produced by the Institute for Health Policy (Fernando, Rannan-Eliya, and Jayasundara, Forthcoming). These estimates of health expenditure in Sri Lanka are produced according to the OECD System of Health Accounts (SHA) statistical standard (OECD, 2000), which is the internationally recognized and WHO endorsed standard for international reporting of national health expenditure data (World Health Organization, 2003). The IHP estimates are also the ones which are reported by WHO in its World Health Report for health spending in Sri Lanka (World Health Organization, 2006).

Total national health expenditure in the Sri Lanka Health Accounts (SLHA) estimates is reported as the Total Expenditures on Health (TEH) aggregate. It is this aggregate amount that is projected in this study. Total Expenditures on Health (TEH), as defined by the OECD SHA, includes both personal medical services, and public health services, as well as administrative and capital expenditures. However, it excludes health-related expenditures such as for environmental health for medical education and training.

The January 2007 revision of the IHP SLHA estimates cover the 1990-2005 time period, with the statistics for 2005 being considered provisional, because they rely on unaudited final estimates of actual expenditures by provincial councils. Despite this, the estimates for 2005 can be considered to be reasonably reliable, and they are used as the baseline estimates for the purpose of the projection. The baseline expenditure estimates used are given in Table 2.1.

Healthcare expenditures in Sri Lanka are partitioned into several categories for the purpose of the projections, each being treated separately in the model. These categories are:

(A) Expenditures for inpatient treatment from public sector providers
(B) Expenditures for outpatient treatment from public sector providers
(C) Private sector expenditures for inpatient treatment from private providers
(D) Private sector expenditures for outpatient treatment from private providers
(E) Public and private sector expenditures for preventive and public health
(F) Public sector expenditures for administration of health
(G) Private sector expenditures for administration of health and health insurance

Expenditures for inpatient treatment from public sector providers (A) consists of public sector expenditure for inpatient treatment (including a small amount that is spent on treatment at private and foreign providers), and household expenditure to purchase medicines and other medical goods and services in relation to inpatient episodes at government hospitals. Expenditures for outpatient treatment from public sector providers (B) consist of public sector expenditure for outpatient treatment, and household expenditure to purchase medicines and other medical goods and services in relation to outpatient visits to government healthcare facilities.

Private sector expenditures for inpatient treatment from private providers (C) consist of all private sector expenditure for such care (from households, private insurance, etc.), as well as household purchases of medicines and other medical goods and services in relation to such care. Similarly, private sector expenditures for outpatient treatment from private providers (D) consist of all relevant private sector expenditures, including household purchases of medicines and other medical goods and services in relation to such care.

As was noted, household and other private expenditures to purchase medicines and other medical goods and services are all allocated to inpatient or outpatient care, and to public and private spending, since in general such spending is closely associated with either inpatient or outpatient treatment. Such spending consists of all expenditures for medical goods dispensed to outpatients (SHA functional categories HC.4 and HC.5). Currently, there are no data available to make a reliable apportionment of these expenditures to inpatient and outpatient treatment. However, taking into account the results of some recent, unpublished surveys

commissioned by the Ministry of Health, which examined the burden of out-of-pocket spending on medicines, the following arbitrary partitioning of spending to each category was developed:

(i) Category A (public sector inpatient) –5%
(ii) Category B (public sector outpatient) –20%
(iii) Category C (private sector inpatient) –5%
(iv) Category D (private sector outpatient) –70%

As was explained, preventive and administrative expenditures by the public sector are modelled as a fixed share of GDP. These shares were derived from the IHP SLHA estimates, and the baseline levels in 2005 that are used are given in Table 2.2. Capital expenditures (SHA functional category HCR.1) are treated as being linked to expenditure for personal medical care and preventive and promotive health, and incorporated for the purposes of this projection into categories A to E. This assumes that the ratio of capital to recurrent expenditures will in effect remain the same in future, with the projection model being driven by the changes in the levels of recurrent expenditures. Public and private capital expenditures are separately prorated over categories A, B, C, D and E for the baseline year, and included under those categories in the model.

Table 2.1: Baseline health expenditures for 2005 used in projections

Category		Rs. million	As % of TEH	As % GDP
A	Public sector inpatient	28,100	28.30%	1.19%
B	Public sector outpatient	17,600	17.70%	0.74%
C	Private sector inpatient	11,700	11.80%	0.49%
D	Private sector outpatient	33,700	33.90%	1.42%
E	Preventive/public health	5,690	5.70%	0.24%
F	Public administration	2,150	2.20%	0.09%
G	Private administration	350	0.40%	0.01%
	Total Expenditure on Health	**99,283**	**100%**	**4.20%**

Table 2.2: Baseline public sector expenditures for non-personal medical services assumed in model projections

Item of expenditure	Percentage of GDP as fixed in model	Expenditure in 2005 as assumed for model (Rs. million)
Public sector preventive activities	0.24%	5,690
Public sector administration	0.09%	2,150
Private sector administration	**0.02%**	**350**

Drivers of Healthcare Costs

Demography

Sri Lanka's population is ageing, which means that the percentage of the population who is elderly is increasing. This process will continue rapidly in future decades. It implies that both the number of elderly and the percentage of elderly will increase, even though the size of the population will stabilize by 2030. Older people on average use more services, so this has direct impact on the volume of services demanded. Changes in the size and the age and sex structure of the Sri Lankan population must be incorporated into the projection model.

The future size and age structure of the population is largely determined by past and future fertility patterns, and to a lesser extent by mortality and migration trends. The age structure and population sizes used in the model are based on population projections for Sri Lanka, commissioned by the Institute for Health Policy from Dr. Indralal de Silva, Professor of Demography at Colombo University (De Silva, 2007). These incorporate the most recent data on population structure and trends collected in the national population census of 2001 and the Demographic and Health Survey 2000 (Department of Census and Statistics, 2002), as well as making use of the most recent death certification data for years 2000–2004 collected by the Registrar General. In construction of these new projections, a new set of life tables for Sri Lanka was also compiled, making use of the newly available census and mortality data from the period 2000–2004.

The population projections used were developed using the commonly used cohort component method, and cover the period 2001–2101. Three population projections were produced: standard, high and low. The standard projection represents what in the view of De Silva was considered the most likely scenario. However, past experience is that demographic projections tend to underestimate future life expectancy improvement and TFR decline. For this reason, the low projection might also be considered equally plausible. These projections all project a lower future population than previously published projections. In the standard projection, the national population will reach 21 million in 2015, and then peak at 21.9 million in 2031, before gradually declining to 16 million by 2101 (Table 3.1).

Table 3.2 summarizes the total fertility rate (TFR) and life expectancy assumptions underlying the three projections. Table 3.3 summarizes the changes in age structure of population in the three different projections.

Health in old age

Although the population is becoming older, this may not necessarily mean that the adult population will become less healthy. In recent years, there has been increasing evidence in developed countries that the elderly in many of these countries are actually healthier and less disabled than their counterparts in previous decades (Jacobzone et al., 1998). This is consistent with the hypothesis of morbidity compression (Fries, 1980), which suggests that increased life expectancy will be accompanied by increasing years spent in good health, with age-related illness delayed till increasingly higher ages. A key implication of this is that if morbidity compression is significant, then in the long run per capital health expenditures in an stable older population may be no higher than in the corresponding stable younger population.

Recent projections for New Zealand provide an illustration of how trends in age-sex specific disability rates can be introduced into an actuarial cost projection (Ministry of Health, 2004). However, there is no evidence on whether morbidity compression or changes in elderly disability rates are occurring in developing countries, owing to scarcity of potential data (Rannan-Eliya and Wijesinghe, 2006). Nevertheless, analysis of recent trends in age-sex specific trends in disability in Sri Lanka and available household survey data suggest that morbidity compression is not currently occurring in Sri Lanka, and if anything morbidity in the elderly age groups may be increasing. This remains an important issue for research and further investigation.

Given this conflicting and limited evidence on

Table 3.1: Projected Population, 2001 to 2101 – Standard, High and Low Projections (in thousands)

Year	High	Standard	Low
2001	18,734	18,734	18,734
2005	19,567	19,522	19,378
2011	20,774	20,558	20,221
2021	22,162	21,580	20,897
2031	22,888	21,882	20,776
2041	23,282	21,712	20,102
2051	23,278	21,104	18,991
2061	23,035	20,145	17,476
2071	22,707	19,030	15,777
2081	22,461	17,944	14,139
2091	22,282	16,909	12,632
2101	22,216	16,012	11,292

Source : De Silva (2007)

Table 3.2: Assumptions used in Population Projections, 2001-2101

Projection and variable	2001-2006	2026-2031	2051-2056	2096-2101
Standard Projection				
Total Fertility Rate (TFR)	1.98	1.49	1.70	1.80
Male Life Expectancy	68.67	71.20	73.70	77.87
Female Life Expectancy	76.81	78.67	80.98	84.90
Low Projection				
Total Fertility Rate (TFR)	1.86	1.30	1.46	1.45
Male Life Expectancy	67.60	69.60	71.90	75.80
Female Life Expectancy	76.05	77.38	79.30	82.20
High Projection				
Total Fertility Rate (TFR)	2.10	1.69	1.95	2.15
Male Life Expectancy	69.60	72.80	75.60	80.00
Female Life Expectancy	77.46	79.75	82.40	86.46

Source : De Silva (2007)

Table 3.3: Size of age groups in population projections, 2001-2101 (% of total)

Age group	2001	2005	2021	2051	2101
Standard Projection					
0-4 years	8.5	8.1	5.8	4.7	5.0
50-64 years	10.9	12.2	14.9	17.4	15.5
65+ years	6.3	6.8	11.5	22.0	26.6
Low Projection					
0-4 years	8.5	7.6	5.4	4.1	3.8
50-64 years	12.3	13.9	17.8	22.5	20.4
65 years +	6.3	6.9	11.5	23.2	29.7
High Projection					
0-4 years	8.5	8.3	6.4	5.5	6.3
50-64 years	12.3	13.7	17.0	19.0	16.9
65 years +	6.3	6.9	11.4	21.2	23.5

Source : De Silva (2007)

future trends in morbidity within the elderly population of Sri Lanka, these projections assume that there will be no changes in age-sex specific health and disability status in the Sri Lankan population in future decades. The study therefore does not attempt to assess the potential impact of improving or worsening health in older age groups, or healthy ageing, on future health care costs.

Health-seeking behaviour

The age-structure and trends in healthy life expectancy will impact demand for health care services, but they are not the only factors. Demand can also change because of underlying changes in health seeking behaviour. In the UK projections, Wanless (2002) explicitly modelled this by allowing for a range of scenarios in which the number of healthcare visits per person changed at different rates depending on how social trends unfolded and the impact of potential government policies.

Sri Lanka is in fact a good example of such changes in behaviour, which have seen Sri Lankans becoming more and more conscious of ill-health over time, and more ready to use medical services when ill (Caldwell et al., 1989; Rannan-Eliya, 2004). Empirical evidence for this includes the observation that age-sex-specific rates of utilisation of medical services have increased substantially in Sri Lanka since the 1920s, even whilst population health status has been improving (Table 3.4). Rates continued to rise in recent decades, as evidenced by successive national surveys (Central Bank of Sri Lanka, 1999; Rannan-Eliya, Eriyagama, and de Silva, 2003).

In the previous set of projections (Rannan-Eliya, Eriyagama, and de Silva, 2003), it was thought likely that per capita utilisation rates would continue to increase at recent historical rates. This was based on the continuing increases in rates that could be inferred from the successive rounds of the Central Bank Consumer Finance Surveys up to 1996/97. The Central Bank Consumer Finance Survey is a nationally representative household socioeconomic survey, containing a health module, which asks whether respondents have been sick and used medical care in the past two weeks. The survey is conducted every five to ten years.

The 1996/97 round of the Central Bank Consumer Finance Survey combined with other data indicated that the average outpatient utilisation rate was in the region of 4.5 physician visits per capita per annum in the late 1990s, which was high in comparison with other lower-income developing countries, but still less than in many high-income economies with levels of health status more comparable to that of Sri Lanka. For example, utilisation rates in many of the healthiest advanced Asian economies (Japan, Taiwan, Hong Kong SAR) have reached more than 10 physician visits per capita per year, and show no signs of stabilizing, and in most of northern Europe per capita physician contact rates are in excess of 6 to 8 per annum (Table 3.4).

Given that rates in Sri Lanka in comparison to this second group of more-developed countries were still not that high, scenarios were posited in the 2003 projections in which rates continued to increase at high rates. This was thought reasonable given that analysis of the data from the Central Bank surveys showed a definite increase in per capita utilisation rates in the period ending in 1996/97, as illustrated in Figure 3.1.

However, that judgment needs to be revised in light of the data from the most recent round of the Central Bank Consumer Finance Survey in 2003/2004. Across a range of assumptions about the reporting bias in this survey, these data suggest that the increases in per capita outpatient utilisation may have levelled off in the early part of this decade, although inpatient utilisation rates have continued to increase.

Table 3.5 presents the per capita utilisation rates implied by different rounds of the Central Bank Consumer Finance Survey. The unadjusted rates are those that derived directly from the survey results. The adjusted rates have been derived by adjusting each round's survey results for potential reporting bias, by cross-referencing to reliable administrative data on the number of visits to government health facilities. As can be seen,

Table 3.4: Annual contacts per capita with modern providers in Sri Lanka during 1930-2000, compared with selected countries today

Country	GNP per capita in $PPP (1996)	Time period	Outpatient visits per capita	Inpatient visits per 100 capita
Sri Lanka				
Sri Lanka	~800	1930	1	4
Sri Lanka	~1,000	1948	2	9
Sri Lanka	1,260	1970	3	17
Sri Lanka	2,290	1997	4	20
Sri Lanka	3,000	2005	5	22
Developing economies				
Zambia	860	1995	1	-
Bangladesh	1,010	1996	1	2
Tamil Nadu, India	1,580	1997	3	14
Egypt	2,860	1996	4	3
Indonesia	3,310	1993	-	1
Thailand	6,700	1993	2	8
Malaysia	10,390	1993	-	4
Developed economies				
Taiwan, China	~15,000	1998	15	12
United Kingdom	19,960	1993	6	13
Japan	23,420	1993/6	16	9
Hong Kong SAR, China	24,260	1996	10	13
USA	28,020	1991/6	6	12
Germany	21,110	1991	7	21

Source : De Silva (2007)

Figure 3.1: Average annual change in male and female outpatient utilisation rates (visits in 14 days) in Central Bank CFS surveys, 1981/82 - 1996/97

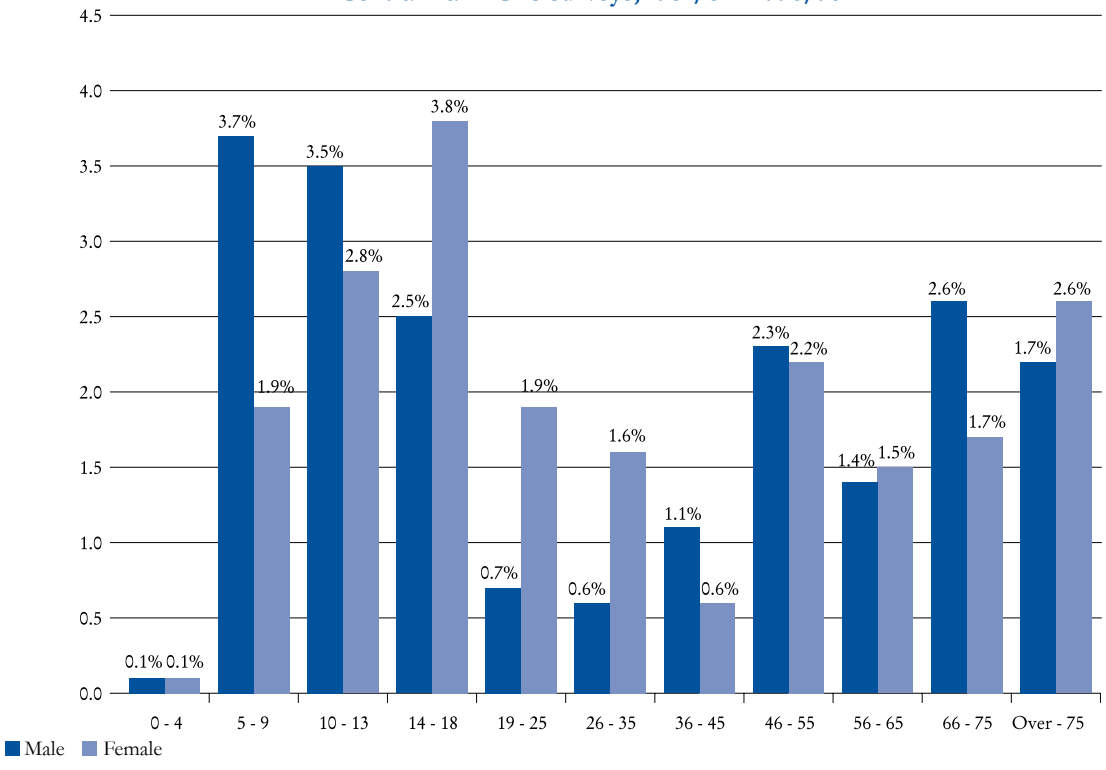


Table 3.5: Trends in healthcare utilisation rates according to Central Bank Consumer Finance Surveys, 1978/79 – 2003/04

	Survey Round				
Visits per capita per annum	**1978/79**	**1981/1982**	**1986/87**	**1996/97**	**2003/04**
Unadjusted					
Outpatient	1.91	2.31	2.62	2.99	2.97
Inpatient	0.09	0.16	0.19	0.22	0.27
Adjusted					
Outpatient	4.77	5.13	5.14	4.42	5.20
Inpatient	0.16	0.16	0.18	0.21	0.22

Source: Computed from published reports of the Central Bank Consumer Finance Survey, and computations from the data sets for the last two rounds.

depending on whether this adjustment is carried out, the data are equivocal as to whether per capita outpatient utilisation rates increased or not between 1996 and 2004, but consistent in implying that there was some increase in per capita inpatient utilisation rates.

Nevertheless, it should be emphasized that in general, rates of medical care utilisation are already very high in Sri Lanka in comparison with countries at its income level. It remains reasonable to assume that as per capita GDP increases in Sri Lanka, there is a high probability that rates of medical care utilisation will climb to levels comparable to those in the developed economies with the highest rates of utilisation today, such as Japan, Hong Kong and Germany.

It is also necessary to take into account the potential interaction between inpatient and outpatient utilisation rates. The major reason that Sri Lanka has such a high inpatient admission rate is probably that its outpatient primary care services are over-burdened, resulting in risk-averse doctors in hospital outpatient clinics admitting any patients they have diagnostic doubts about. There is some recognition of this, and increasing pressure and demands for the government to develop a more modernized primary care system.

Given these trends, three potential scenarios have been incorporated into the projection model.

In the first "slow increase" scenario, all age-sex specific per capita outpatient utilisation rates are assumed to continue to increase at a gradual rate of 0.5% each year, which is less than the underlying trend observed between 1978 and 2004, whilst the inpatient utilisation rate is assumed to remain unchanged.

In the middle or "optimistic" scenario, it is envisaged that primary care provision improves and reduces the demand for inpatient care, thus leading to continuous significant increases in the rates of outpatient care utilisation, but gradual reduction in the age-specific rates of admission. In this scenario, all age-specific outpatient utilisation rates increase at an annual rate of 0.75%, which is still less than the underlying trend between 1978 and 2004, and age-specific inpatient admission rates decrease at an annual rate of 0.25%.

In the third "rapid increase" scenario, the outpatient utilisation rates are assumed to continue to increase at the rate of 1.0% each year, whilst the inpatient utilisation rates also increase by 0.5% each year until 2020, when they stabilize. This scenario takes into account that by 2020 the inpatient utilisation rates would be similar to the highest national rates observed today in the world, but that the outpatient utilisation rates would remain still substantially lower than currently seen in several Asian economies today, such as Japan, Hong Kong SAR and Taiwan.

In order to implement these scenarios, the model must incorporate age-sex specific differences in utilisation into its baseline estimates. In order to derive the age-sex pattern of utilisation in the base year, the Central Bank Consumer Finance Survey of 2003/2004 is used to derive the relative rates of utilisation in each demographic group, whilst the absolute rates of utilisation are set by adjusting the rates to be consistent with those indicated by administrative and provider survey data on visits to public and private sector healthcare facilities.

During 2003, the per capita utilisation rates at government and private health sector facilities were as

given in Table 3.6. These aggregate rates were used in estimating the age-specific rates based on the data available in the Central Bank Consumer Finance Survey for 2003/2004. The final aggregate utilisation rates that were then used in the various projection scenarios are given in Table 3.7, and the variation in utilisation rates by age and sex in the baseline year of 2005 are given in Table 3.8.

Table 3.6: Rates of utilisation of public and private healthcare facilities, Sri Lanka 2003

	Outpatient visits	Inpatient admissions	Outpatient visits per capita per annum	Inpatient visits per capita per annum
Ministry of Health	44 million	4.01 million	2.29	0.21
Private sector	Not available	0.15 million	–	0.01
Both sectors	100 million*	4.26 million	5.21*	0.22

Source: Annual Health Bulletin 2003 (Department of Health Services, 2007), and Institute for Health Policy Census of Private Hospitals 2006.
Note: Estimates marked with asterisk (*) derived by combining the information on the share of visits that are to public sector facilities as reported in the Central Bank Consumer Finance Survey with the secondary data on visits to government healthcare facilities.

Table 3.7: Model scenarios: Annual percentage change in medical services utilisation rates and projected rates (visits per capita per annum)

Scenario	Annual rate of change	2005	2050	2101
Outpatient utilisation				
Slow increase	0.50%	5.2	6.5	8.4
Optimistic	0.75%	5.2	7.3	10.7
Rapid increase	1.00%	5.2	8.1	13.5
Inpatient utilisation				
Slow increase	0.00%	0.22	0.22	0.22
Optimistic	-0.25%	0.22	0.22	0.22
Rapid increase	0.50% to 2020	0.22	0.23	0.23

Note: The projected rates of utilisation are computed assuming the age structure of the population does not change.

Table 3.8: Healthcare utilisation rates by age assumed in 2005 baseline year of projections (visits per capita per annum)

Age group	Outpatient		Inpatient	
(Years)	Female	Male	Female	Male
0-4	8.4	8.9	0.36	0.24
5-9	5.5	6.0	0.08	0.17
10-14	3.3	3.2	0.08	0.11
15-19	3.1	2.7	0.09	0.09
20-24	3.3	2.8	0.15	0.13
25-29	3.7	3.3	0.23	0.12
30-34	4.2	4.0	0.21	0.20
35-39	4.8	4.8	0.18	0.28
40-44	5.5	5.1	0.22	0.28
45-49	6.3	5.5	0.25	0.27
50-54	7.1	5.8	0.32	0.30
55-59	8.0	6.1	0.38	0.34
60-64	8.3	7.5	0.34	0.43
65-69	8.7	8.9	0.29	0.53
70-74	8.1	8.7	0.34	0.39
80+	7.5	8.4	0.40	0.26

Public-private composition of utilisation

The costs (prices in the private sector) of medical care provided in public and private sectors differ. In Sri Lanka, unit prices in the private sector are considerably higher than unit costs in the public sector. Thus, which sector care is delivered in has an influence on overall costs. In practice, these costs are not likely to be independent, for two reasons:

(i) Work-practices in the public sector, which reflect public sector costs, will influence work-practices in the private sector. For example, the short outpatient consultation time observed in the public sector is reflected in comparable norms about what is demanded in the private sector. Similarly, certain aspects of quality (mostly consumer quality) in the private sector are set higher than prevailing levels in the public sector in order to attract patients.

(ii) The bulk of private sector provision involves public sector physicians. Private sector practice compensates such physicians for the lower compensation in their public sector jobs. To some extent, costs of physician time are thus inter-related in the two sectors.

However, we lack an adequate model that allows us to operationalise the dynamic interaction of the private and public sectors as implied above. So for the purposes of this projection model, the simple approach is taken of assuming that such costs (prices) are independent, and will reflect prior trends. It is then necessary to project the future share of overall future utilisation that is provided for in both sectors, as well as the level of costs and prices in the two sectors. The baseline (2005) is assumed to be the same as the share of outpatient utilisation reported in the CB CFS 2003/2004 for 2003/2004; this was 44% for outpatient visits. The share of inpatient utilisation as estimated for the same year using MOH administrative data and results of a census survey of private hospitals conducted by the Institute for Health Policy in collaboration with Ministry of Health during 2006; this was 96% for inpatient admissions.

The model projections use three different scenarios about the future trend in the public-private share of medical care provision. All the scenarios assume that the health system will evolve to reach its final state by 2040, when the final public-private shares of provision will be realised. After 2040, it is then assumed that these shares will not change. The choice of a 40 year end point is based on the presumption that when Sri Lanka reaches a level of economic development comparable to an upper-middle income economy today, it will have largely decided upon the type of healthcare system that it wants.

Each scenario therefore represents different assumptions about the long-term strategy for public sector provision. The three scenarios are outlined in Table 3.9.

In the "No change" scenario, the relative public-private composition of personal medical services is assumed not to change. In the "Increased privatization" scenario, the private sector is assumed to increase its share of overall provision at a rapid rate to reach levels comparable to, but actually more privatised than those seen today in Malaysia and Hong Kong SAR, which are the most relevant comparators to Sri Lanka. In this scenario, the private share of inpatient admissions increases only to 25%, much less than in the outpatient segment. Note that in contrast, the private sector currently only accounts for 5% of admissions in Hong Kong SAR, and less than 25% in Malaysia, so in this scenario inpatient provision is more private-sector provided than in these two other economies. However, in the absence of insurance, most people will not be able to afford private inpatient services, so the share is unlikely to increase substantially beyond that. The third scenario, "Public strengthening", assumes that the public sector will increase its overall share of provision, primarily in the outpatient sector through strengthening of primary care provision. This option might be considered the most likely scenario, given that the public role in healthcare financing is almost greater at higher levels of economic development.

Table 3.9: Model scenarios: Trends in public sector share of medical care use

Scenario	Outpatient contacts (2040 & onwards share)	Inpatient admissions (2040 & onwards share)
No change	44%	96%
Increased privatization	25%	75%
Public strengthening	75%	97%

Productivity in public sector

Although changes in age structure and health status combined with changes in health seeking behaviour will alter the level of demand for health services, the trend in total cost of such services will also depend on changes in their unit cost. The efficiency with which public sector health services utilise resource inputs in delivering medical services is an important determinant of long-run cost growth. It has been found to have a potentially large impact in the previous projections for Sri Lanka, and also for other countries such as the UK (Wanless, 2002). The amount of resources used to deliver a given level of services is equivalent to the cost. Increases in efficiency imply that these same services can be produced at lower cost, and visa versa in the case of reductions in efficiency. In most sectors of the economy, productivity improvement is the norm, and there is no intrinsic reason to think this is not the case also in the health sector.

Measuring productivity in the health services (and most public services) is not straightforward or easy, either in Sri Lanka or in advanced economies. The principal reasons for this are that the outputs in the health services are difficult to define, that most are not produced for the market which would enabled them to be priced, and that quality is difficult to measure (Mark, 1988; Hatry and Fisk, 1992; Eurostat, 2001; Wanless, 2002). What we do know is that for tax-funded public sector hospital systems in advanced economies, annual productivity improvements are the norm (Hensher, 2001). In recent work, Rannan-Eliya (2004) has shown that annual incremental productivity improvements are the norm in many developing countries, and that annual increases averaged about 0.8% during the second half of the twentieth century in a large number of countries studied. In the specific case of Sri Lanka, the available data indicate that productivity improvement has been the norm for the public sector health services, since at least 1950 (Rannan-Eliya and de Mel, 1997; Rannan-Eliya, Forthcoming).

Quality change should be incorporated into measurements of productivity change. However, there are no assessments available for Sri Lanka of the trend-rate in quality improvement, although this is not that surprising given that such measurements are not readily available even for most OECD economies, such as the UK (Wanless, 2002). For the purposes of these projections, we ignore productivity improvement represented by quality change, although noting in passing that the long-term historical trend in Sri Lanka is consistent with a picture of improving clinical quality in that hospital case-fatality rates have consistently improved, over-crowding has fallen, and an increasing share of patients are being treated at higher level facilities with more specialized staff and services (Rannan-Eliya, 2004).

We confine consideration of productivity change to changes in non-quality-adjusted unit costs. There are two types of empirical evidence available to assess historical trends. The first is a comparison of overall national outputs with actual expenditures, and the second are the data collected in successive cost surveys of government hospitals.

Evidence of long-term trends in cost per unit of service

The approximate average national costs of a unit of service can be estimated approximately by dividing MOH's recurrent expenditures at facility level by the volume of units of service. Annual data exist for the total volume of outpatient visits and admissions, and for annual recurrent expenditures by MOH. More detailed data on the number of bed-days are not available for all years.

The proportion of recurrent expenditures which are spent at hospital and facility level is not known on an annual basis, but it closely corresponds to the share of the budget allocated to patient services. In addition, there are several independent historical estimates of the hospital share of recurrent expenditures that indicate that this ratio has been typically in the range of 70-80% since the early 1950s (Table 3.10).

shown in Figure 3.2 with the unit costs being expressed as a ratio of per capita GDP in the given year. The unit costs are expressed as a ratio to per capita GDP, as this would be the most appropriate comparison, given that health services are labor-intensive in production.

As can be seen, there was a substantial, steady decline in unit costs as a ratio of per capita GDP

Table 3.10: Proportion of MOH expenditures devoted to hospital services

Year	Share of recurrent (%)	Share of capital (%)	Share of total (%)	Source
1958	75%	NA	NA	Abel-Smith (1967)
1973	NA	NA	65%	Simeonov (1975)
1986	77%	59%	75%	MOH Annual Health Bulletins
1991	78%	86%	80%	Rannan-Eliya and Mel (1997)
1994	81%	58%	77%	World Bank (1996)
1997	64%	NA	NA	Ministry of Health et al. (2003)
2004	NA	NA	74%	IHP Sri Lanka Health Accounts

There have been four nationally-representative costing studies, conducted in 1974 (Simeonov, 1975), 1991 (Somanathan, 1998), 1997 (Somanathan et al., 2000) and 2006 (survey by Institute for Health Policy for Ministry of Health in process of publication), which shed light on the ratio of facility-level expenditures incurred in providing inpatient and outpatient services. We were not able to obtain the detailed reports of the Simeonov study, and must rely only the results published in the main report. For the 1991 World Bank/MOH facility cost study, we depend on the published analysis of Somanathan (1998), since the original World Bank analysis was never published and contained serious flaws.

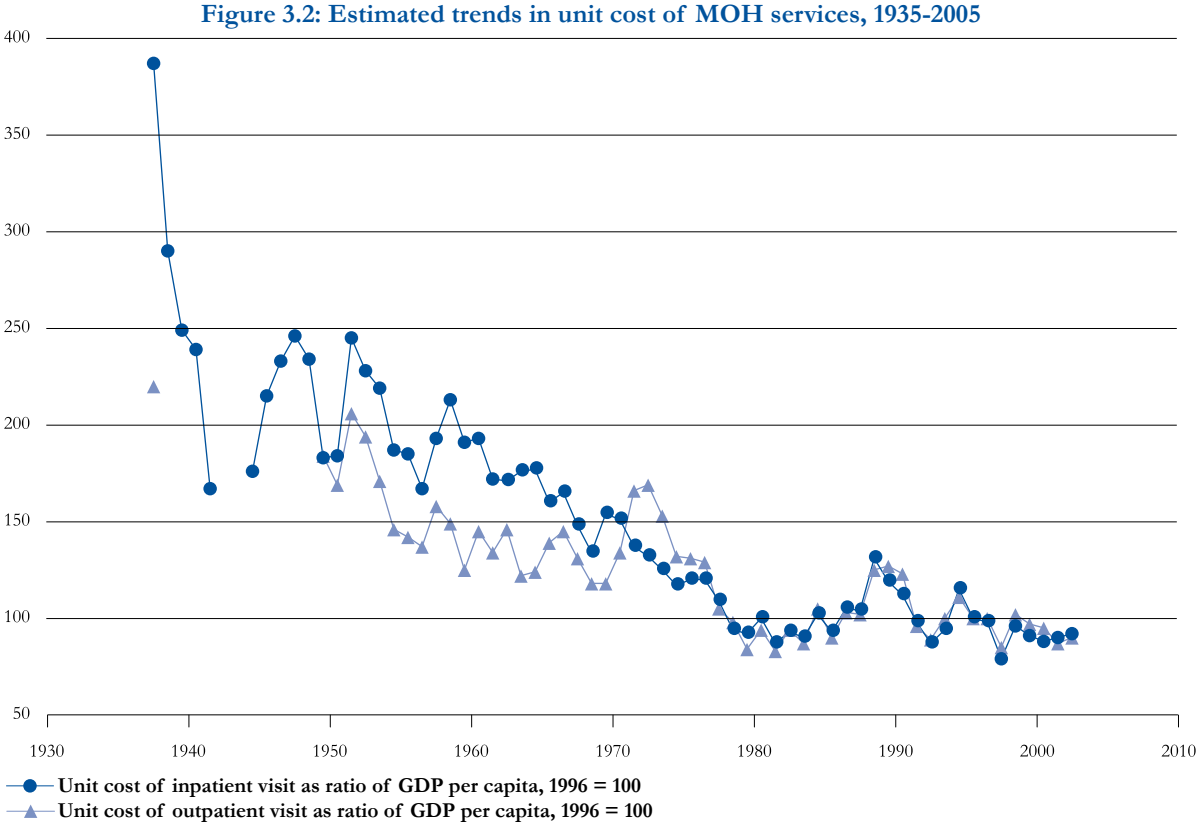
Review of these various sources of information suggest that a relatively stable proportion of 70-80% of MOH expenditures have been allocated to facilities providing medical services during 1955-2005. In addition, the various sources suggest that inpatient services have accounted for 60-70% of total facility expenditure, with perhaps some increase over the years. Coupling these various sources of information permits construction of tentative estimates of the overall average unit cost of inpatient admissions and outpatient visits in MOH facilities since the 1930s. These are

between 1935 and 1982, of the order of 2-3% per annum. From 1982 to 1989 this trend reversed, and then there is evidence of renewed decline in the decade from the mid-1990s to 2003.

Evidence of short-term trends in unit cost of services

Evidence of a more detailed nature is available from a comparison of data from the MOH/IDA study of hospital costs in four districts in 1991 (Somanathan, 1998), the study of public hospital costs in 1997 in seven districts, including the original four studied in 1991 (Somanathan et al., 2000), and the 2006 survey of 2005 cost by IHP of hospitals in three districts. Since the first two surveys were full censuses of inpatient facilities in the relevant districts, and the third was a stratified sample survey, the results permit analysis of the overall changes in unit costs for all health services in the four districts during 1991-1997, and in two districts between 1991 and 2005. The four districts, which were studied in both studies, were Colombo, Matale, Galle and Polonnaruwa, whilst Colombo and Matale were also surveyed in 2006. Such a comparison is shown in Table 3.11 where the unit cost estimates are the mean of unit costs

Figure 3.2: Estimated trends in unit cost of MOH services, 1935-2005



estimates obtained for individual facilities weighted by the number of admissions or visits in the relevant facilities.

Table 3.11 shows that the unit cost of admissions in nominal rupees rose consistently in both time periods. However, the general price level in the economy (as measured by the GDP deflator) rose 74% during 1991-1997 and 86% during 1997-2005. At the same time, nominal per capita GDP rose 122% between 1991-1997 and 141% during 1997-2005. Thus, inpatient unit costs declined in real terms (i.e., adjusted for inflation) during the first time period, and then increased in the second, whilst outpatient unit costs significantly declined in the whole period. On the other hand, when making comparison with trends in per capita GDP, both inpatient and outpatient unit costs declined in the first period, whilst inpatient costs increased and outpatient costs decreased in the second period (Table 3.12).

The overall picture that emerges from this is that for most of the past 50 years, unit costs of both

Table 3.11: Unit costs of outpatient visits and inpatient admissions in four districts, 1991-2005 (Rupees)

District	Outpatient visits			Change (%)		Admissions			Change (%)	
	1991	1997	2005	1991-1997	1997-2005	1991	1997	2005	1991-1997	1997-2005
Colombo	81	199	150	146%	-25%	1,344	2,239	7,171	67%	220%
Matale	26	63	64	142%	2%	411	610	2,675	48%	339%
Galle	30	106		253%		629	1,494		138%	
Polonnaruwa	15	44		193%		550	965		75%	
All districts	49	109		122%		1,071	1,538		44%	

Note: Unit cost estimates for 1991 have been adjusted to account for differences in the method of data collection in the two studies, by constraining the ratio of overall facility inpatient to outpatient costs to be the same as in 1997. Alterations in the ratio do not alter the main conclusions, as such changes will increase the unit costs of one service but at the same time reduce the unit costs of the other service.

Table 3.12: Average annual rate of change in unit costs of outpatient visits and inpatient admissions in two districts, 1997-2005

	Outpatient unit costs	Inpatient unit costs
Nominal rate of change	-2%	31%
Real rate of change (adjusted with GDP deflator)	-7%	11%
Real rate of change in relation to per capita GDP	-8%	5%

Note: Comparisons are made for Colombo and Matale districts, with arithmetical means of unit costs being used.

inpatient and outpatient services have generally declined by 2-4% per annum in relation to per capita GDP, except that since the mid-1990s, there has been an increase in inpatient unit costs and a more rapid decrease in outpatient unit costs. The most likely explanation for this is that in the past decade, expenditures on the average admission have increased with changes in the disease profile and patient expectations, some increases in quality such as greater supply of medicines for inpatients, and with hospitals concentrating resources more on inpatients.

For the purposes of the projections, since we do not know what drove the reductions in unit cost in the long-term, nor what led to the increase in unit costs during the 1990s, it is difficult to come to firm conclusions about the future course of change in unit costs. However, it can be concluded with confidence that substantial changes in unit costs have occurred historically and are likely to do so in future. At the same time, we need to consider the possibility that the long-term trends from 1980-2005 may be suggesting that there is an inherent limit to continued cost reduction, and that future inpatient cost reductions will be much harder to achieve. What may be happening in recent years is that there continues to be significant productivity improvement, but there are also significant cost-increasing quality improvements in response to consumer expectations, which results in no net reduction in costs, or increasingly a modest increase. Taking these considerations into account, we consider three different scenarios for changes in public sector unit costs as outlined in Table 3.13.

In the "Cost reducing" scenario, unit costs for both inpatient and outpatient care are projected to decline gradually, at rates somewhat less than the long-term historical average. In the second scenario, "Quality-improving stable costs", both inpatient and outpatient costs are expected to stabilize, with any productivity gains being used to improve quality and thus leading to no net cost reductions. In the third scenario, "Cost increasing", all unit costs are projected to increase over time, with the long run increase in inpatient costs being somewhat lower than the past few years, but still more than the long-run historical experience. This last scenario is not consistent with historical experience, and must be considered unlikely.

The "Steady improvement" numbers can also be considered quite reasonable for such long-range projections, since they are also quite consistent with the annual rates of productivity increase targeted for in the public hospital systems of many advanced economies today. The United Kingdom and Hong Kong SAR (Hospital Authority, 2001) both official set targets for 2% annual productivity improvement in their publicly-run hospital systems.

Table 3.13: Model scenarios: Annual percentage change in public sector unit costs

Scenario	Annual change in unit cost of outpatient services in relation to GDP per capita	Annual change in unit cost of inpatient services in relation to GDP per capita
Cost reducing	-2%	-1%
Quality-improving stable costs	0%	0%
Cost increasing	1%	1%

Note: Better understanding of the factors driving productivity change in the Sri Lankan public sector ought to be a high priority for future research, since as discussed below, this is an important driver of future resource requirements.

Price changes in private sector

We do not have accurate and comprehensive data on prices in the private sector. In their absence we have computed a crude price index for private sector services based on the ratio of private expenditures as estimated in the national health accounts to the estimated volume of services delivered. Table 2.13 provides estimates of these for the period 1990-2003, and compares them with changes in the GDP deflator and nominal GDP per capita. Considerable caution must be attached to use of these estimates, since the underlying data and estimates used are themselves subject to a considerable degree of imprecision. The private expenditures for outpatient services refer to Category D expenditures (Table 3.14), which include all out-of-pocket expenditures, including expenditures associated with visits to public sector facilities, and self-purchases of medicines and other medical goods and services. Category D expenditures are used to represent inpatient expenditures.

As a ratio to GDP per capita, the average price for outpatient services changed between 1990 and 2003 at an average annual rate of +0.7%, whilst the average price of inpatient services increased at an average annual rate of 3.8%. These statistics are evidence of significant price inflation in the private medical sector, which is also confirmed by other data from studies of private health insurance reimbursement claims.

However, it is presumed that the annual increase in private sector inpatient service prices is unlikely to be sustained in the very long run, because at some point they may reach a point beyond which services become unaffordable. For this reason, the projections envisage three different scenarios. In the first, "standard" scenario, the prices of outpatient services and inpatient services continue to increase at steady rates somewhat less than observed in the 1990s. In the second scenario (price stabilization), which is included more for comparison purposes, price levels are assumed to move in line with GDP per capita growth. In the third scenario, prices are projected to escalate significantly, although in the case of inpatient prices this is again at slower rates than observed in the recent past. These three scenarios are summarized in Table 3.15.

Macroeconomic projections

The projection model projects expenditures both in nominal terms and in relation to GDP. However, because the inflation rate or annual changes in unit costs and unit prices of services are set in relation to GDP per capita, the projection forecasts are insensitive to the level of GDP, when expressed as a ratio to GDP. The main purpose of the model therefore is to project expenditures in relation to GDP.

Nevertheless, three different scenarios for macroeconomic indicators are incorporated, but because these have no implications for the results in terms of percentage of GDP ratios, these are not discussed further.

Table 3.14: Estimated price and volume of private sector services, 1990-2003

	1990	1997	2003
Inpatient volume (millions of admissions)	0.089	0.122	0.146
Outpatient volume (millions of visits)	48	39	56
Category C - Inpatient expenditures (Rs. millions)	612	2,180	7,610
Category D - Outpatient expenditures (Rs. millions)	4,670	12,100	27,300
Inpatient price index (1990=100)	100	261	762
Outpatient price index (1990=100)	100	318	505
GDP deflator (1990=100)	100	193	298
GDP per capita (1990=100)	100	254	462

Source: IHP staff estimates and IHP Sri Lanka Health Accounts database.

Table 3.13: Model scenarios: Annual percentage change in public sector unit costs

Scenario	Annual change in unit cost of outpatient services in relation to GDP per capita	Annual change in unit cost of inpatient services in relation to GDP per capita
Standard	0.20%	0.50%
Price stabilization	0.00%	0.00%
Price escalation	1.00%	1.00%

Distribution of Expenditures by Age

Estimates of the age distribution of expenditures

Personal medical service expenditures represent 80-85% of national health expenditures. These are incurred in delivering inpatient and outpatient services to individual patients. Ideally, the relative distribution of such expenditures would be estimated by examining the relative distribution of utilisation of different services, the relative costs involved in producing individual services, and the differences in resource intensity associated with provision of these services to different age groups. However, in Sri Lanka data are not currently available to compute the resource intensity of service episodes or visits by age and sex. Such data are currently being compiled by the Institute for Health Policy for publication later in 2007, and might be used in future revisions of the model.

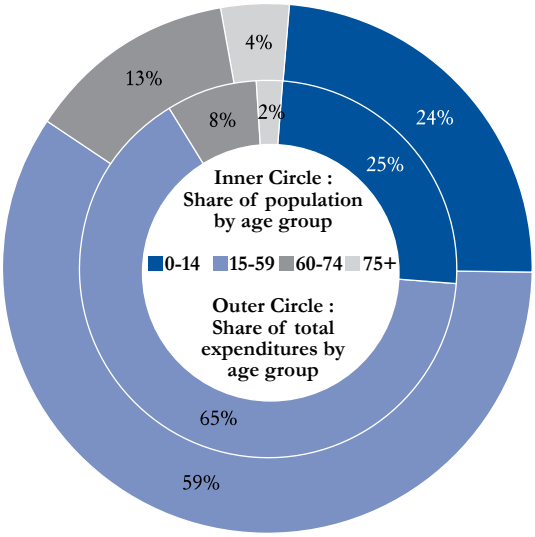
In the absence of such data, the only option is to consider the variation in volumes of services provided to people in different age and sex groups. Consequently, the following strategy was used to compute the distribution of personal medical services expenditures by age and sex group, for the base year of 2005. First, the average unit costs (prices) of outpatient and inpatient medical services delivered by the public (private) sector were estimated by dividing the total number of annual contacts into the estimate of such expenditures as reported in the SLHA database. These costs or prices were then forwarded into the future according the trajectories assumed in the model. Second, the number of visits per year within each age and sex group was applied to these unit cost estimates in order to obtain estimates of total expenditures by age and sex group, having first allocated all visits to either public or private sectors. Table 4.1 illustrates the results for 2005. The same analysis can then be carried for all other years, in order to obtain a projection of the age-composition of future spending.

As is illustrated in Figure 4.1, the older age groups account for a substantially larger share of overall expenditures than their share of population. This is due to their larger share of overall utilisation. If data were available on the relative resource intensity of visits by different age groups, then this might serve either to reduce or increase the disparity.

Table 4.1: Calculation of personal medical service expenditures by age for 2005 in model

Age group (years)	Share of population	Public outpatient costs (Rs. M)	Public admission costs (Rs. M)	Private outpatient expenditures (Rs. M)	Private admission expenditures (Rs. M)	Total expenditures (Rs. M)
0-14	25%	4,896	5,541	9,376	2,209	22,022
15-59	65%	9,920	17,810	18,995	7,099	53,824
60-74	8%	2,199	3,920	4,211	1,562	11,892
75+	2%	644	1,056	1,234	421	3,355
All	**100%**	**17,659**	**28,327**	**33,816**	**11,291**	**91,093**

Figure 4.1: Comparison of expenditure and population distributions by age, 2005



Projections of Healthcare Costs, 2001-2101

Cost impact of individual factors

By allowing one factor to change, whilst holding other factors constant in the model, it is possible to quantify the potential range of impact of each individual factor in isolation on total costs. The results shown in Table 5.1 illustrate the implications of different scenarios in change in each factor on total national health spending and total public spending on health, during the 2001-2101 time period. The results for 2025 can be understood as an indication of the immediate cost increases that might be expected in the medium term in Sri Lanka, whilst the 2101 projections can be considered as estimates of what expenditures would be in this model when Sri Lanka has completed its demographic transition and has achieved a stable (or even declining), but much older population.

The results are expressed as the change in percentage share of GDP in relation to the initial levels in 2005, which are total national health spending – 4.2% of GDP, comprising public expenditure on health – 2.0%, and private expenditure on health – 2.2%.

The first set of figures, which show the impact of different demographic scenarios holding all other factors constant, imply that ageing itself will increase total national health expenditure by only 0.7% to 0.9% of GDP by 2100. Although this is a significant increase, it is not as great as might have been expected, and reflects both that the ageing has already had an impact on expenditures in Sri Lanka, and that increased spending on elderly people will be compensated somewhat by reduced spending on younger age groups.

Depending on the cost driver considered, national health expenditures in 2100 are projected to range anywhere from 1.2% of GDP less than in 2005 to 3.4% of GDP more than they would be in the baseline projection when only ageing occurs. The biggest increases can be seen to occur in scenarios where outpatient demand for medical treatment increases rapidly, health services become more privatized, or if price escalation in the private sector continues at high levels.

Table 5.1: Impact of changes in individual factors on health spending under different scenarios, 2001-2101

Demography

	Low		Standard		High	
Change from baseline	**2025**	**2101**	**2025**	**2101**	**2025**	**2101**
NHE as % GDP	0.41%	0.92%	0.40%	0.81%	0.40%	0.69%
Public expenditure as % GDP	0.23%	0.46%	0.24%	0.42%	0.23%	0.36%
Private expenditure as % GDP	0.18%	0.46%	0.17%	0.39%	0.16%	0.33%

Outpatient activity rate

	Slow increase		Optimistic		Rapid increase	
Change from baseline	**2025**	**2101**	**2025**	**2101**	**2025**	**2101**
NHE as % GDP	0.23%	1.32%	0.35%	2.26%	0.47%	3.44%
Public expenditure as % GDP	0.05%	0.30%	0.08%	0.51%	0.11%	0.78%
Private expenditure as % GDP	0.17%	1.02%	0.27%	1.75%	0.37%	2.66%

Inpatient activity rate

	Slow increase		Optimistic		Rapid increase	
Change from baseline	**2025**	**2101**	**2025**	**2101**	**2025**	**2101**
NHE as % GDP	0.00%	0.00%	-0.08%	-0.14%	0.26%	0.26%
Public expenditure as % GDP	0.00%	0.00%	-0.05%	-0.09%	0.17%	0.17%
Private expenditure as % GDP	0.00%	0.00%	-0.03%	-0.04%	0.09%	0.09%

Distribution of patient visits by sector

	Public strengthening		No change		Increased privatisation	
Change from baseline	**2025**	**2101**	**2025**	**2101**	**2025**	**2101**
NHE as % GDP	-0.23%	-0.40%	0.00%	0.00%	1.40%	2.44%
Public expenditure as % GDP	0.20%	0.35%	0.00%	0.00%	-0.26%	-0.45%
Private expenditure as % GDP	-0.43%	-0.75%	0.00%	0.00%	1.65%	2.89%

Unit cost of public sector medical services

	Cost reducing		Quality improving stable		Cost increasing	
Change from baseline	**2025**	**2101**	**2025**	**2101**	**2025**	**2101**
NHE as % GDP	-0.45%	-1.32%	0.00%	0.00%	0.41%	2.97%
Public expenditure as % GDP	-0.36%	-1.09%	0.00%	0.00%	0.35%	2.51%
Private expenditure as % GDP	-0.09%	-0.23%	0.00%	0.00%	0.06%	0.46%

Unit price of private sector medical services

	Price stabilization		Standard		Price escalation	
Change from baseline	**2025**	**2101**	**2025**	**2101**	**2025**	**2101**
NHE as % GDP	0.00%	0.00%	0.11%	0.60%	0.42%	3.06%
Public expenditure as % GDP	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Private expenditure as % GDP	0.00%	0.00%	0.11%	0.60%	0.42%	3.06%

It should be noted that all the factors with the exception of demography exhibit wide ranges in their potential impacts. There is little uncertainty in the medium term population size and structure projections, because in the medium term the size and age structure is predetermined by past birth rates and age structures, and changes during the projection period in fertility rates and mortality will not have much substantive impact. In the case of the other factors, the wide ranges in potential outcomes reflect the relative scarcity of data on past trends and current limited understanding of their dynamics. It is important to note that if better estimates of future cost requirements are required, then better data and analysis is required of past and current trends than is available currently.

Figure 5.1 contrasts the comparative impact of several key factors in the case of the middle scenario for each. As can be seen, the factor which will have the greatest impact on total costs would be the trend increase in outpatient utilisation rates (+0.35% of GDP by 2025 and +2.26% of GDP in 2101), followed by ageing (+0.40% in 2025 and +0.81% in 2100). The other cost driver of note is the price level in the private sector for medical services. Even at the modest trends assumed in the mid-range scenario, changes in prices will have almost as large an impact as population aging itself by 2101.

The uncertainty in these estimates are illustrated in Figure 5.2, which shows the range in impacts on baseline expenditures of each cost driver that are assumed in the scenarios chosen for the model. What this underlines is that whilst the pure effect of ageing can be predicted with considerable accuracy, the greatest uncertainty is with the impact of other factors. Of these other factors, the most important, in terms of their potential impact on future costs, will be the changing health awareness and increased propensity of Sri Lankans to use medical care when ill, and the overall public-private mix in health care provision and financing.

The demand effects are most likely to have a substantial impact in the area of outpatient utilisation. Sri Lanka already has one of the highest inpatient admission rates (>20% per annum) in the world, which is higher than in most OECD countries, and despite still having a relatively young population. On the other hand, outpatient utilisation rates are still not unusually high, and equivalent to the average in most OECD countries. Thus, there

Figure 5.1: Impact of key cost drivers on national health care costs in the mid-range scenarios, 2005-2101 (change in health spending as % GDP from level in 2005)

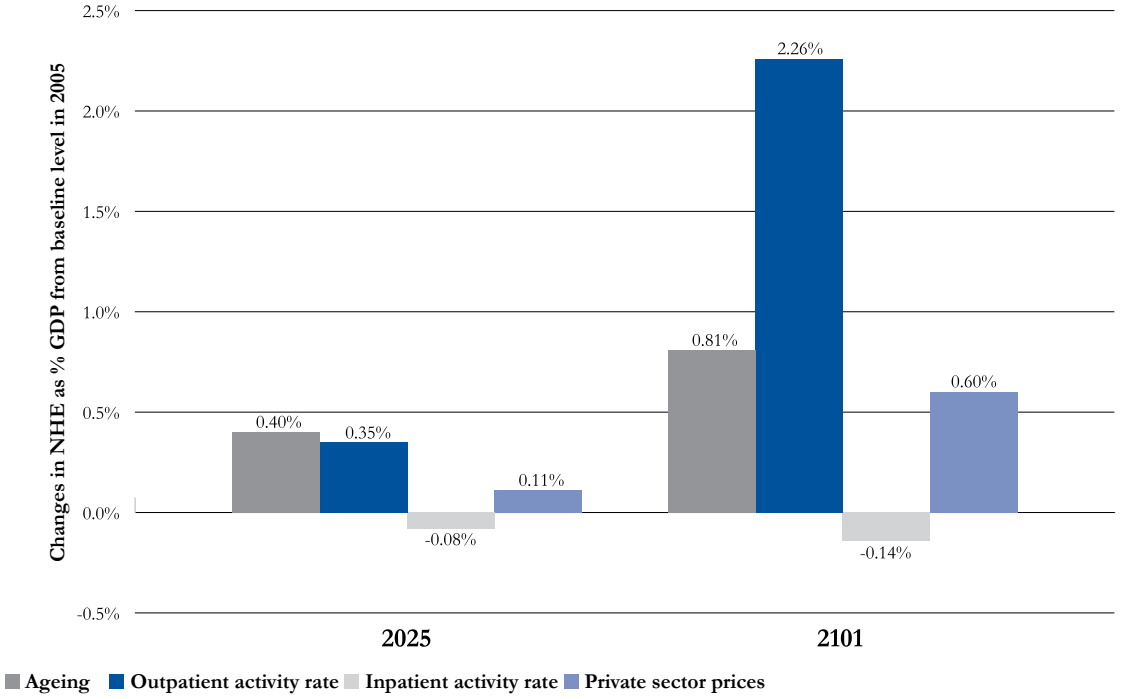
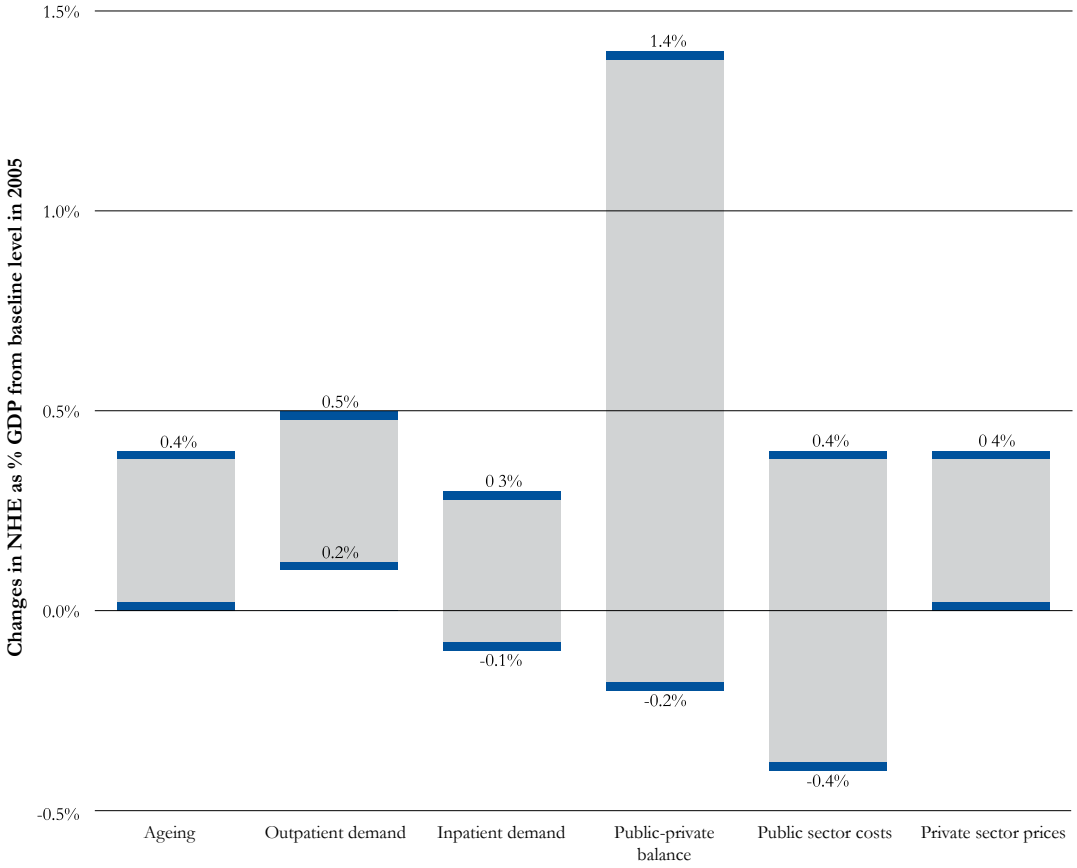


Figure 5.2: Range in impacts of key cost drivers on national health care costs in 2025 (change in health spending as % GDP from level in 2005)



is considerable potential for outpatient utilisation to increase significantly in future, in tandem with improving health status and increasing health awareness. In fact, it is plausible that the current high admission rates actually mask an unmet need for adequate ambulatory care services, which in over-pressed government OPDs is met by referring patients for short-stay admissions. This points to the need to provide increased funding for better quality and more integrated ambulatory care services in future.

The message in these projections is that the overall public-private balance matters greatly. In general, increasing private sector involvement on the financing and provision side will generally increase overall costs, as private sector provision is more expensive than public sector provision, and because it is harder to control costs in the private sector.

Cost projections for 2005-2101

By combining the various scenarios for each of the identified cost factors, it is possible to derive projections of total health system and total government health expenditure costs. These are illustrated below in the form of three sets of scenarios. The three scenarios are chosen to illustrate the potential range in changes in baseline expenditures, and they also provide some indications as to the possible implications of different policy stances. In all three scenarios, the middle population projection is employed.

The first scenario, represented by Projection A, is chosen was illustrate a situation where the public sector is strengthened. In this scenario, the net impact of the cost drivers is to slow expenditure growth. In the second scenario, represented by Projection B, the emphasis is on private sector reliance, and the net impact is rapid growth in expenditures. The full permutation of assumptions in these two scenarios can be considered unlikely to occur, and are provided only to illustrate the uncertainty in the projections. The central scenario, represented by Projection C, is one in which all cost factors develop in their middle scenarios. This projection might be considered the most likely projection.

Projection A – public sector strengthening

In this projection, it is envisaged that the government acts to decisively increase the government's role in the health sector: (i) it increases funding for health services; (ii) it continues to force productivity gains from the public sector, but uses these to pay for quality improvements in public sector provision, which in turn support the shift of patients from the private sector to the public sector; and (iii) it implements policies to control price escalation in the private sector. This type of shift to public sector dominance (at least on the financing side) can be considered consistent with what we see occurring in most countries with economic development, but ultimately depends on critical policy shifts to be made. However, the likelihood of this happening must be considered high in the case of Sri Lanka, given that it has historically tended to favour a more pro-active state involvement in the health sector than other economies at its level of economic development.

In this projection, as presented in Table 5.2, total national health spending climbs to almost five percent of GDP by 2025, and continues to increase owing the pressure primarily of ageing to almost 7 percent by the end of the century. In this scenario, the public share of financing increases to almost 60% of total financing. The resulting profile of spending indicates a trajectory very similar to that which has been observed in the past three decades in Hong Kong SAR, China (Leung et al., 2006).

Projection B – private sector reliance

In this projection, it is envisaged that the government policy works to reduce the involvement of the government in the health sector: (i) it diminishes public involvement in health services and encourages private sector responsibility; (ii) does not actively seek to control prices in the private sector leading to price escalation; (ii) it invests less effort in achieving productivity gains in the public sector, and as private sector prices rise, it experi-

ences cost-pressure on inputs needed for the public sector and thus public sector cost inflation; and (iv) increases in outpatient demand for services are reduced as patients face increased personal costs for treatment. This type of shift to private sector dominance (at least on the financing side) can be considered consistent with what some would advocate in Sri Lanka (and elsewhere).

In this projection, as presented in Table 5.3, total national health spending climbs to over seven percent of GDP by 2025, and continues to increase owing to the pressures primarily of ageing and private sector price escalation to 26 percent by the end of the century. In this scenario, the public share of financing decreases to less than 30% of total financing. The resulting profile of spending indicates a trajectory similar to that which has been seen in the past six decades in the USA.

Projection C – status quo

This projection is the status quo scenario, where no major changes in policy are attempted, and the government spends enough to maintain the current public-private mix in provision: (i) the current public-private mix is maintained; (ii) outpatient and inpatient demand for services continue to increase at historical levels, with no efforts made to change the organisation of services; and (iii) public sector unit costs increase modestly as in recent years, but prices in the private sector are stabilized at current levels.

In this projection, as presented in Table 5.4, total national health spending climbs to over five percent of GDP by 2025, and continues to increase owing to the pressures primarily of ageing and public sector cost escalation to 11 percent by the end of the century. In this scenario, the public share of financing still increases to 60% of total financing, owing to the lack of productivity gains in the public sector, combined with increased demand in the public sector. It is also worth noting that in this scenario, public spending as a share of GDP ends up being higher than in Projection A. The message here might be that benign neglect may be more expensive for the government than an active involvement in the sector.

Table 5.2: Projected health spending (Projection A), 2005-2101

Baseline Output	2005	2015	2025	2050	2075	2101
NHE as % GDP	4.20%	4.50%	4.60%	5.20%	6.00%	6.70%
Public expenditure as % GDP	2.00%	2.30%	2.50%	3.10%	3.50%	3.80%
Private expenditure as % GDP	2.20%	2.20%	2.10%	2.10%	2.50%	2.90%
Public share in financing	47%	51%	55%	59%	58%	57%

Table 5.3: Projected health spending (Projection B), 2005-2101

Baseline Output	2005	2015	2025	2050	2075	2101
NHE as % GDP	4.20%	5.80%	7.70%	13.20%	18.70%	26.40%
Public expenditure as % GDP	2.00%	2.20%	2.30%	2.70%	3.60%	4.80%
Private expenditure as % GDP	2.20%	3.60%	5.40%	10.50%	15.10%	21.60%
Public share in financing	47%	38%	30%	21%	19%	18%

Table 5.4: Projected health spending (Projection C), 2005-2101

Baseline Output	2005	2015	2025	2050	2075	2101
NHE as % GDP	4.20%	4.80%	5.30%	7.00%	8.80%	11.10%
Public expenditure as % GDP	2.00%	2.40%	2.70%	3.70%	5.00%	6.60%
Private expenditure as % GDP	2.20%	2.40%	2.60%	3.30%	3.90%	4.60%
Public share in financing	47%	50%	51%	53%	56%	59%

Age composition of expenditures

The projection model also provides forecasts of the age composition of future expenditures for personal medical services. Figure 5.3 and Figure 5.4 illustrate the changes in the age composition of the Sri Lankan population and in the age composition of personal medical service expenditures during 2001-2101 in the case of Projection A.

Figure 5.3 shows the changing age structure of the population during the time period, with reduction in the share of children, and increases in the share of the population in the oldest age groups. The under-15 year old age group declines from 25% to 15%. At the other end of the age range, the proportions aged 60-74 years and 75 years and over increase from 7% and 2% to 18% and 15% respectively by 2101. As will also be noted during the century covered by this chart, the overall age structure of Sri Lanka's population is projected to stabilized, as the country completes the process of demographic transition and population aging. It should also be noted that by 2070 the process of aging will be largely complete on current trends.

In Projection A, total national health expenditures only increase from 4.2% of GDP to 6.7% of GDP

Figure 5.3: Changes in age structure of population, 2001-2101 (Projection A)

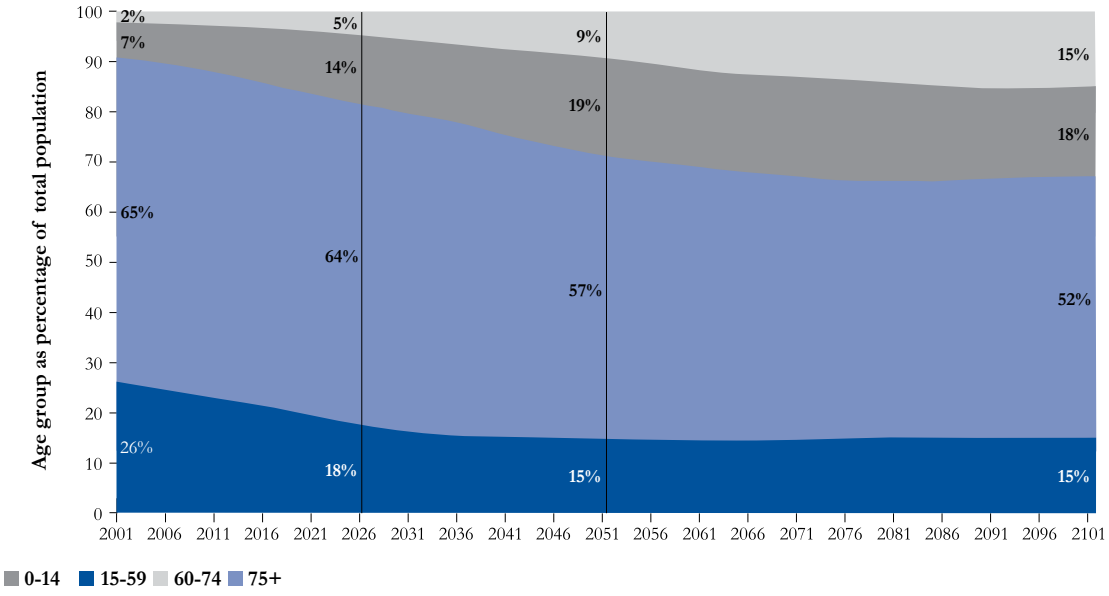
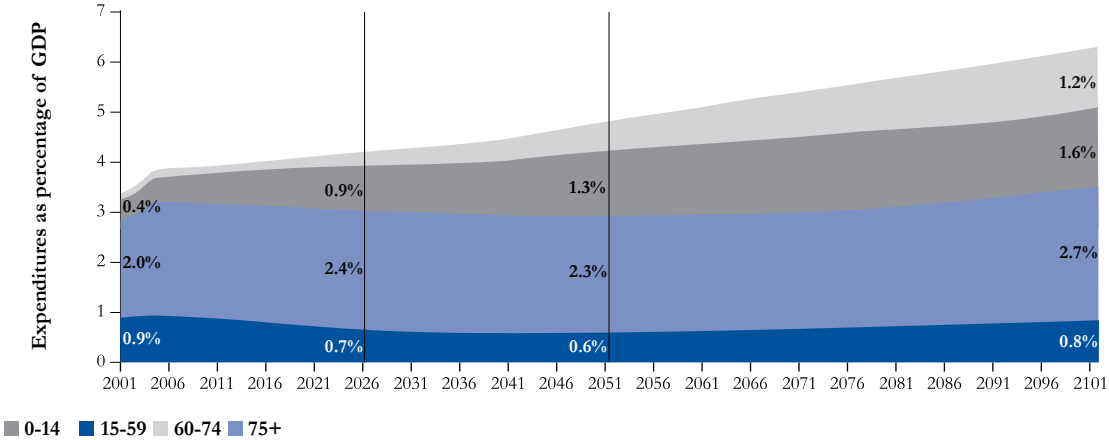


Figure 5.4: Changes in personal medical service expenditures by age group as share of GDP, 2001-2101 (Projection A)



by 2101. However, this involves an increasing proportion of overall expenditures accounted for by the oldest age groups, as illustrated in Figure 5.4. Expenditures on personal medical services for the under-15 year age group declines from 0.9% of GDP to 0.6% in 2050 before increasing modestly to 0.8% of GDP by the end of the century. There is some modest increase in expenditures on 15-59 year olds, but the major increase is in expenditures on the over-60 year olds. Expenditures for 60-74 year olds quadruples from 0.4% to 1.6% of GDP, whilst expenditures for 75 years and over age group increases more than ten-fold from 0.1% to 1.2% of GDP by 2100.

Summary

The projections given above are baseline projections of the current status quo. They project what the resource requirements of the existing national health system would be under various scenarios for changes in underlying cost drivers, but with no substantive policy change, no change in quality levels, no introduction of major new services and no changes in the financing structure. The message in these projections is that it is possible to maintain current levels of provision, access and quality with no substantial increase in national health spending as a percentage of GDP, i.e., within the range 5.0-7.0% of GDP, if productivity improvements can keep pace with ageing and if the public sector strengthens in role in healthcare provision and financing.

Put in another way, what these projections indicate is that although the population will age in coming decades, at least in the next few decades the increase in costs associated with ageing could be mostly balanced by reductions in unit cost in the public sector driven by productivity growth. However, the major driver in costs is likely to be changes in health-seeking behaviour, leading to increasing use of personal medical services. Despite the latter, it should still be possible to maintain current levels of service provision and quality without major increases in resource requirements. At the same time, increase private sector responsibility carries significant risks for significant cost increases.

Nevertheless, there is considerable uncertainty in these projections. A large part of this is due to the inherent uncertainty in making any future forecasts, and the limited time allowed for this analysis. A large part is also due to the limited understanding of underlying trends in the Sri Lankan health system. This points to need to develop better understanding of such trends as productivity growth in the public sector, price inflation in the private sector, and long-term changes in the propensity of Sri Lankans to seek medical care, in order to improve the evidence base for long-term planning. This should be addressed by more systematic collection of health systems data, and more diversity in the types of routine data collection, including more routine population based surveys.

Potential Changes in Costs by Disease

The impact of changes in the disease profile

The principal aim of these projections is to examine how demographic change and major system cost drivers may influence future trends in national health spending in Sri Lanka. The method chosen, which is the actuarial cost projection approach, does not require information on the actual epidemiological changes that might occur, as it is principally based on the idea the main trends, such as changes in demand for medical services, can be forecast in the aggregate without considering the specific disease causes. Experience in a wide range of countries shows that this is a robust and reliable approach (Rannan-Eliya and Wijesinghe, 2006).

At the same time, it would be of interest to many policy makers and health managers to know how the demands for different service may change at the same time that health spending increases with aging and with time. Unfortunately, we currently lack the data or knowledge to be able to project with any degree of confidence the future trends in the epidemiological profile of the country, so incorporating such epidemiological trends into a cost projection model is not feasible at present. Nevertheless, the underlying changes in the age structure of the population and of overall health spending do have some implications for the disease profile of expenditures. At the minimum, it is possible if we know the current distribution of expenditures by disease, to infer what the changes in age structure will mean for that distribution. Recent and ongoing work in Sri Lanka has in fact begun to make available such estimates of the disease distribution of expenditures, this information is used to assess how the disease profile of expenditures may change.

Projecting changes in disease expenditures with aging

Current spending by disease

As an extension to its work compiling Sri Lanka's health expenditure estimates, and with funding support from WHO, the Institute for Health Policy is developing the first disease-specific health accounts for Sri Lanka. This is a pilot study to test the feasibility of WHO guidelines for such estimates, and is one of two developing country pilots commissioned by WHO (the other is in Thailand), following earlier similar studies in Australia (Australian Institute of Health and Welfare, 2005) and other developed countries.

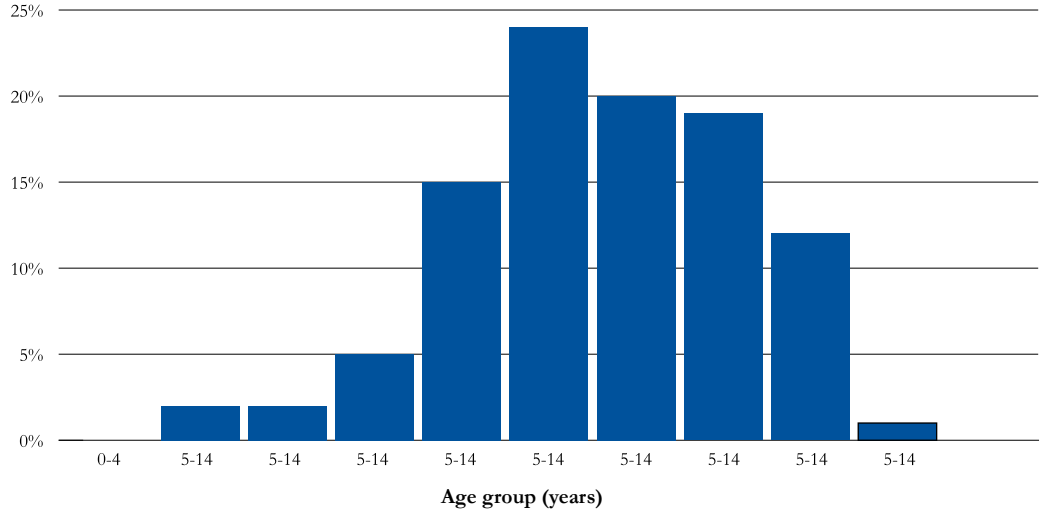
For the disease-specific health accounts, overall national health spending in Sri Lanka is being analyzed and decomposed into disease groups, and provisional estimates of this effort are used here. At the lowest level of classification this is being done by ICD-10 disease categories.

Various methods are being used to develop these estimates. Inpatient treatment expenditures at government hospitals are being analyzed using a sample survey of patient records, whilst other similar surveys are available for patients who have consulted private general practitioners or who have been reimbursed by private insurance. Pharmacy spending is analyzed by considering the relationship between prescribing behaviour by physicians and disease. Other population surveys of illness and treatment use are also being used.

These estimates provide information on the age and sex distribution of different disease classes by age and sex. For example, Figure 6.1 presents the estimated distribution of all cardiovascular expenditures by age group in males in Sri Lanka in 2005. Note that this is a summary presentation, and more detailed distributions are available for major heart conditions in that class of expenditures.

Figure 6.2 presents the provisional estimates of current spending by major disease category in 2005. The same estimates also provide, as noted, information on the distribution of expenditures on specific diseases by age and sex. By taking into account the age and sex distribution of expenditures in each of these disease categories, and assuming this remains constant, it is possible to project the disease profile of spending assuming future health spending trends according to the projections of this study.

Figure 6.1: Distribution of expenditures for cardiovascular disease by age group in males, Sri Lanka 2005 (percent of total)



The main features of the current distribution to take note of are that most expenditures in Sri Lanka are no longer for communicable disease, but for non-communicable diseases (NCDs), including injuries. This is not surprising because Sri Lanka is well advanced in its demographic and epidemiological transition, and most deaths are already from NCDs and other related conditions.

Projecting disease profile of future spending

In projecting the disease profile of spending, the age and sex structure of overall spending in future years has been projected using the main projection model. It was then assumed that the structure of spending by disease in each age and sex group would remain unchanged, and with this assumption the future disease composition of spending was derived.

Figure 6.3 presents the profile of spending as inferred in this way for 2050. This projection assumes that the age and sex distribution of expenditure on each disease category remains the same, and that there are no other changes in the age-sex specific incidence or prevalence of diseases. Figure 6.4 presents the overall trends in spending as a share of GDP over the next century, as projected. Projection A of the main projection model is used for these projections.

In making these projections, certain limitations should be noted. First, the initial estimates are dependent on the accuracy of the available data in Sri Lanka. Other than the general scarcity of such data to make such estimates, certain issues are likely to have biased the estimates. For example, the data used included surveys of illness in the population, and in these surveys, respondents are likely to underreport many sensitive illnesses, such as mental illness and sexually-transmitted infections. Second, these surveys depend on self-reports by non-medical persons, and so the accuracy of the data is often uncertain. Second, although reliable and detailed information is available on what medicines are sold in Sri Lanka by pharmacies (one quarter of all spending), there are no reliable and detailed information on for what purposes such medicines are used for when purchased by households. Third, many patients who are treated by the health system, even in the public sector, do not have a firm diagnosis made, and so a large percentage of patients, especially in the outpatient sector, are classified as having no specific diagnosis.

Owing to the limitations noted, these estimates and projections are likely to understate differences in spending between diseases, and also understate any changes in the composition of spending over time. Nevertheless, it can be seen that there ageing is likely to have some impacts on the composition of spending. Specifically, it can be seen that spending on key NCDs is likely to increase substantially in relative terms. Spending on cardiovascular disease increases from 7.6% to 11.4% of total spending, for diabetes mellitus from 2.5% to 3.4%, and on chronic respiratory disease from 8.7% to 9.5%

by 2050. On the other hand these projections imply that the share of spending on cancer may actually not increase that much.

Interestingly, the composition of expenditures in 2050 as projected appear to resemble closely the profile of spending by disease in Australia currently, although cardiovascular disease, diabetes and asthma represent higher proportions of spending. This suggests that the main impact of ageing in Sri Lanka will be to give it a disease profile of spending similar to that of developed countries today. This is not perhaps such a surprising finding.

Figure 6.2: Expenditures by major disease group in Sri Lanka, 2005 (% of total personal medical spending)

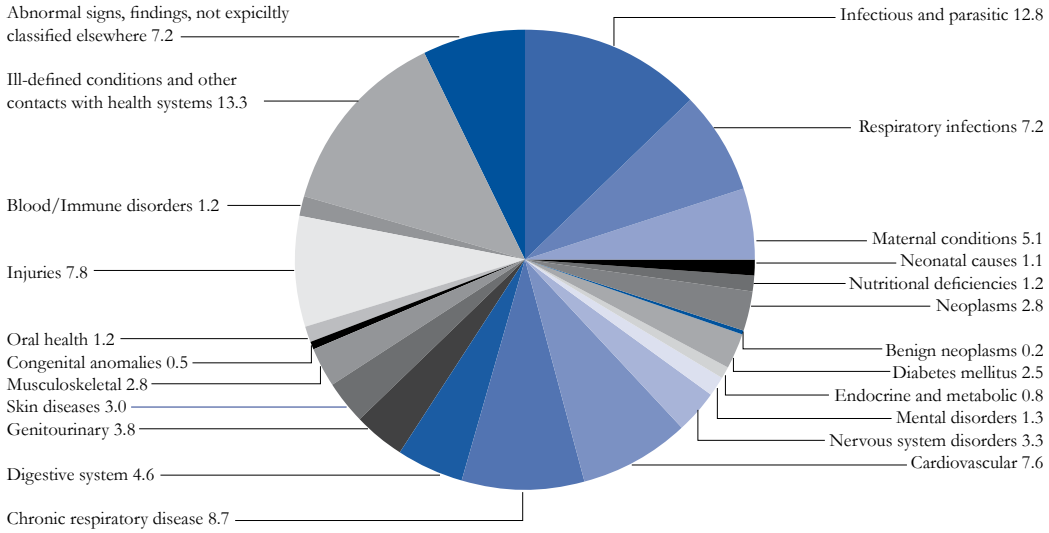


Figure 6.3: Expenditures by major disease group in Sri Lanka as projected for 2050 (% of total personal medical spending)

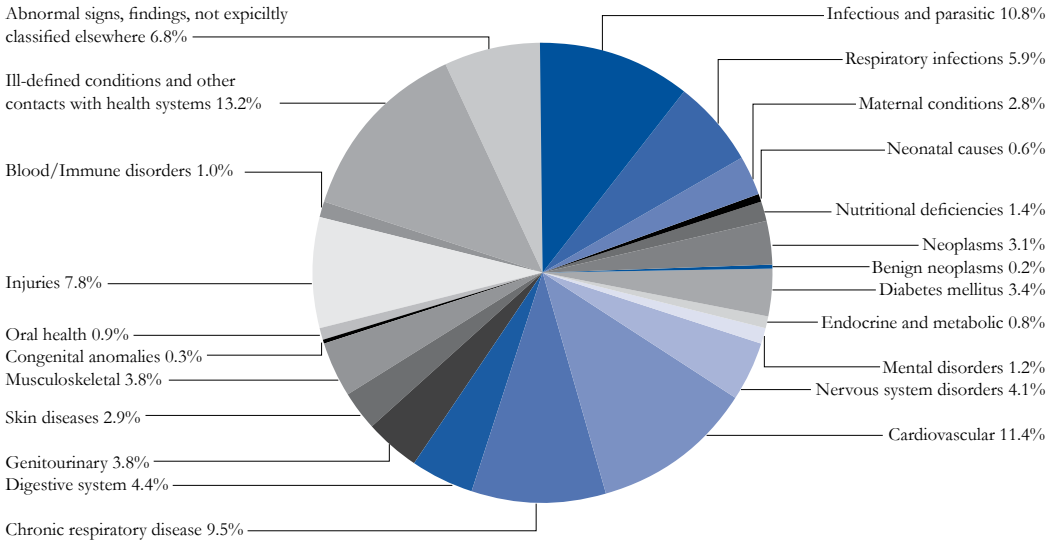
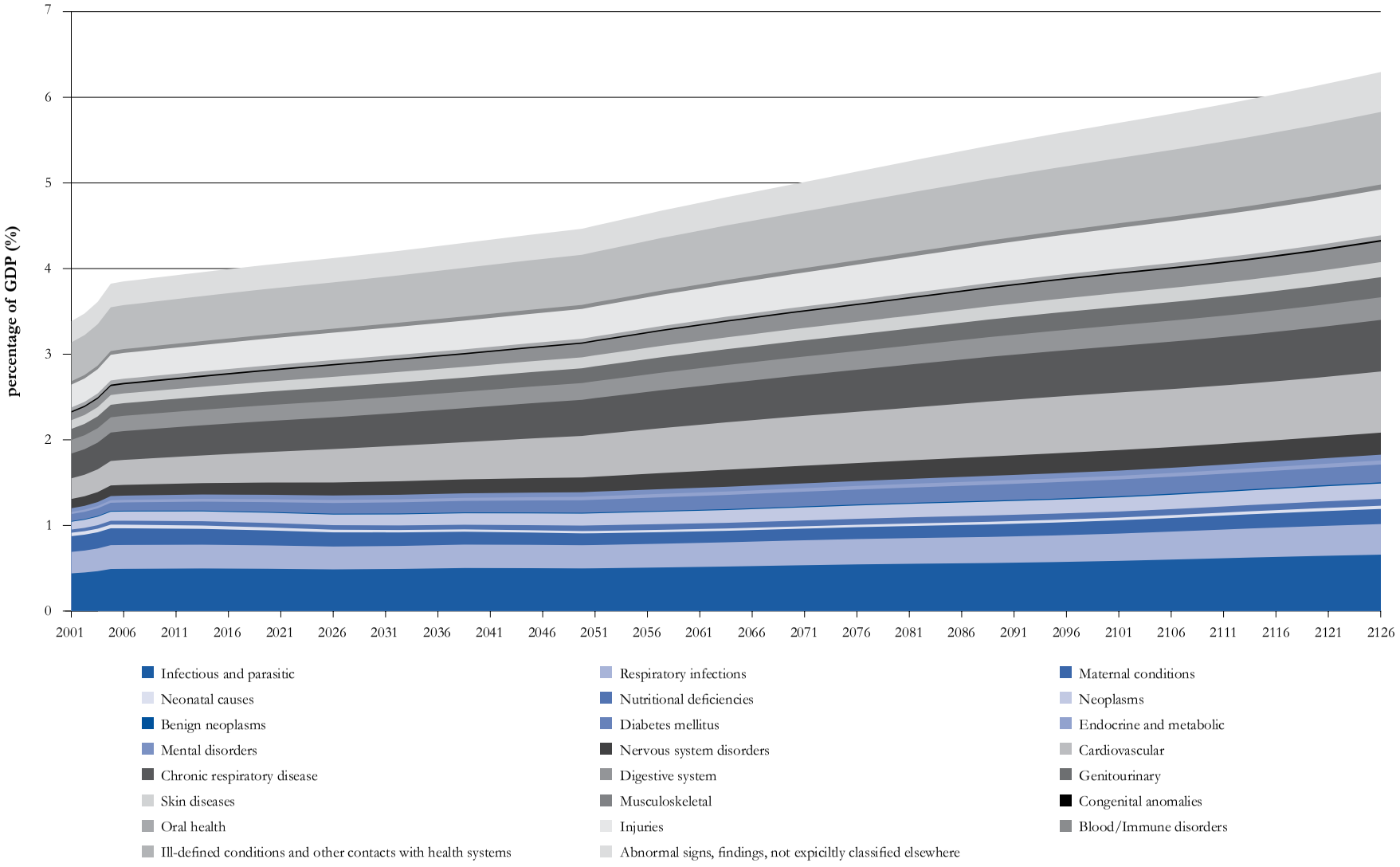


Figure 6.4: Trends in expenditures by disease, Sri Lanka 2001-2101 as a share of GDP



Conclusions

This study further develops an actuarial-cost projection model that projects expenditures for the national health system in Sri Lanka as a function of changes in population size and demographic structure, underlying changes in utilisation of medical services, productivity changes, and medical price inflation. There are evident limitations in the detail incorporated in the model, and these reflect the scarcity of suitable data in Sri Lanka, more than the weaknesses inherent to the model. Nevertheless, the process has demonstrated that it is possible to develop such models in the Sri Lankan setting, and that useful results can be obtained by exploiting available data.

It should be emphasized that the projections are not predictions of the actual future trend in expenditures. Instead they should be seen as idealized descriptions of the impact of specific cost drivers on overall health expenditures, under a varying range of different scenarios. In addition, it should recognized that the further into the future the projections run, the more uncertain the estimates are, and more likely they are to be misleading.

Cost drivers in health system, 2005-2101

Changes in the size and age structure of the national population over the next five decades can be anticipated with a large degree of confidence. The population will increase by approximately 10-15% to 20-23 million, and this increase is unlikely to be as high as 4 million.

The analysis undertaken points to the following conclusions:

1. Under the most likely scenarios, total health spending in Sri Lanka will reach 6-8% of GDP by the time its population has reached a stable age structure. This level of spending is similar to that of the lower spending OECD economies today, such as Japan and Greece, and indicates that Sri Lanka's health system is already quite cost-efficient.
2. The most significant cost driver of national health expenditures both in the short-term and long-term will be underlying changes in the propensity of individuals to use medical services when ill. Historically, the age-sex adjusted rates of utilisation of medical services have risen by 1-3% per annum. Even if future increases in age-sex adjusted outpatient contact rates moderate to only 1% per annum, this will add 1-2% of GDP to health system resource requirements. Increases in inpatient contact rates are not expected to significantly add to overall costs, since they are presumed to have reached close to their limit. (However, if quality in inpatient services is improved, such expenditures may also increase.)
3. The second important cost driver is changes in the age and sex structure of the population. Over time, the percentage of women is increasing (women use more medical services than men), and the increase in the elderly population is more than sufficient to balance the reductions in the size of the youngest age groups. Demographic change will add 0.4% of GDP to health system resource requirements by 2025, and 0.7-0.9% of GDP by 2101.
4. The third most important cost-driver is productivity change in the public sector health services. Productivity increases enable a health system to deliver the same volume of health services at lower costs, so they lead to cost reductions. Sri Lanka has historically experienced high rates of non-quality adjusted productivity improvement leading to sustained reductions in unit costs of services delivered. It is difficult to forecast the future trend in productivity change, but if unit cost changes consistent with historical experience of –0.3% per annum in relation to GDP per capita for outpatient services and –2.0% per annum in relation to GDP per capita are achieved, then this will reduce resource requirements in the health system by 0.4 to 0.5% of GDP. However, it is assumed that continuing cost reductions may not be realistic, and that overall unit costs may remain stable, as efficiency gains are used to pay for quality improvements.

5. The cost driver, the impact of which is most difficult to predict and yet can have the largest impact, is price inflation in the private sector. What limited reliable evidence exists for the insured sector indicates that there is significant price inflation in the private sector, but this is not representative of the overall private sector. In the absence of reliable data on these price trends, private sector price inflation is concluded to have minimal net effect, with the qualification that the actual impact could range from adding 0.1% to 3% of GDP to overall expenditures.
6. Given the higher rates of cost increase in the private sector and also the higher unit costs of treatment in the private sector, it is found that if the public role in the health system delivery is reduced that costs will increase more. This indicates that maintaining a strong public presence in delivery will help largely mitigate cost increases.

This study finds that ageing will have an impact on overall expenditures, but that it is not necessarily the most important factor. Underlying changes in utilisation, productivity and prices are likely to be far more significant from a policy perspective in terms of their impact on overall national health expenditures. The impact of ageing is also largely beyond policy influence, since the underlying demographic changes are not subject to much modification. This leads to the central conclusion that policy makers should be more concerned about overall system productivity trends and strengthening the public sector than demographic ageing.

The disease composition of expenditures was examined. These indicate that expenditures for NCDs will continue to increase, in particular for cardiovascular disease, chronic respiratory disease and diabetes mellitus. Although this will present new challenges, it will result in Sri Lanka's expenditure profile gradually becoming closer to that of the developed countries.

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Sri Lanka's population is ageing faster than in almost any other country. The percentage of Sri Lankans who are elderly is rapidly increasing, and the share of the young in the population is declining. There is increasing concern in Sri Lanka and in other countries about the potential cost implications of these trends for the health sector, and its ability to meet future patient demands. To begin to understand these challenges better, the Institute for Health Policy developed a health expenditure projection model to forecast future trends. This model uses an actuarial-cost projection technology, which is the one used in the leading developed nations, such as the UK and USA. Indeed, the model is the first example of such an approach in a developing country, and it considers a range of factors, including future changes in population size and structure, changes in patient healthcare seeking behaviour, productivity changes, and medical price inflation The results show that whilst ageing will add to future health care costs, the overall impact will be relatively small in comparison with other factors. Ageing is forecast to add an additional 0.4-0.9% of GDP to future healthcare costs during the next three to five decades, but overall health spending is likely to grow much more than that from the current 4% to 6-8% of GDP. Most of this increase will be driven not by ageing, but by changes in patient demand, and in overall health sector productivity and medical prices. The projections indicate that Sri Lanka's experience is likely to be similar to that of developed nations, where ageing is expected to be only a modest factor behind future cost increases. The implications of the model point to the need for national policy to worry less about ageing itself, and to focus on the productivity of health providers. The results also show that increasing the role of public spending in the overall financing of the health sector will be the best strategy to pursue, if the country wants to reduce the burden of future health care costs on the government and the public.

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