

# **Economic Costs of Absenteeism, Presenteeism and Early Retirement Due to Ill Health: A Focus on Saudi Arabia**

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**Report to the US Chamber of Commerce**

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November 2015

2015

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## Executive Summary

This report provides estimates of the economic cost due to productivity losses arising from absenteeism, presenteeism and early retirement due to ill health. For Saudi Arabia, these losses equate to a total of 9.7% of GDP by 2030 as shown in Table ES1. This is the largest impact of any of the countries included in this study as comparator countries. The majority are middle income developing countries from around the globe, although the US, Japan and Singapore are also included.

**Table ES1 Total economic impact of absenteeism, presenteeism and early retirement**

	2015			2030		
	Presenteeism & absenteeism	Early retirement	Total	Presenteeism & absenteeism	Early retirement	Total
Brazil	5.2	2.2%	7.4%	5.8	2.7%	8.5%
China	3.5	2.1%	5.6%	4.3	2.7%	7.0%
Colombia	4.9	2.3%	7.2%	5.4	2.7%	8.1%
India	4.8	2.5%	7.3%	5.0	2.9%	7.9%
Japan	4.1	3.2%	7.3%	4.6	3.9%	8.5%
Mexico	3.7	1.8%	5.5%	3.9	2.4%	6.3%
Poland	4.7	3.0%	7.7%	5.5	3.5%	9.0%
Saudi Arabia	6.0	1.7%	6.7%	7.0	2.7%	9.7%
Singapore	3.3	2.9%	6.2%	3.6	3.1%	6.7%
South Africa	4.9	2.1%	7.0%	5.2	2.2%	7.4%
Turkey	5.3	1.8%	7.1%	6.0	2.4%	8.4%
USA	5.2	3.3%	8.5%	5.5	3.0%	8.5%

Source: VISES estimates.

These estimates are driven by the intersection of an ageing workforce with the high burden of chronic disease, now increasingly prevalent in developing, as well as high income countries. Of the comparator countries, Saudi Arabia has a double problem. Its population is ageing rapidly with those aged 50-64 expected to increase by 4.6% per annum from 3.9 million in 2015 to over 6.0 million by 2030. Moreover this age group is the least healthy of the comparator countries. It has the highest burden of disease arising from non-communicable diseases (NCDs) of any of these countries driven by relatively high rates of mental illness, diabetes and heart disease. Its BMI levels are significantly higher than any of the other countries, particular for women, of whom almost half would be defined as obese.

How these trends impact on the Saudi Arabian economy is more complex than for countries with relatively closed labour markets. Of the Saudi Arabian population of 29 million, about 9 million are foreign sourced workers. Increasing rates of illness among older workers, both foreign and Saudi, will probably increase the demand for foreign labour to replace those who either leave or retire due to ill health. This may offset the adverse economic effects on GDP of the loss of labour supply due to ill health, but seems likely to increase Saudi Arabian dependency on foreign workers.

## Context of the Study

In spite of very different circumstances, most countries face three challenges in common:

- their populations are ageing, in different ways and to different degrees;
- there is an existing high prevalence of non-communicable diseases (NCDs), such as heart and respiratory disease, stroke, cancer and mental illness, particularly for older age groups; and
- many risk factors for the future incidence of NCDs are high, and in some cases continuing to rise.

Taken together these factors already impose heavy costs on business, governments and individuals, and threaten much greater costs in the future. The economic costs arise largely because due to ill health, people aren't able to work as much as they would like. They may either be sick and absent from work (absenteeism), present at work but not working at full capacity due to illness (presenteeism), or retired prematurely, say from those aged 50-64 due to ill health (early retirement due to ill health). The economic costs on productivity imposed by each of these groups has been modelled and included in this report. There are others who may not work at any time due an incapacity and/or health condition which has been present for most of their lives. This group is not explicitly covered in this report.

Following an initial report for the APEC Business Advisory Council (ABAC) and the Life Sciences Innovation Forum (LSIF) in 2014, VISES has prepared four reports, Sheehan et al. (2014), Sweeny et al. (2014) and Rasmussen et al. (2015a, 2015b) now covering eighteen countries on three aspects of these economic costs. These are:

- absenteeism;
- presenteeism; and
- early retirement due to ill health.

This summary report draws on these earlier reports with a focus on Saudi Arabia with eleven other comparator countries chosen as most relevant from the eighteen.

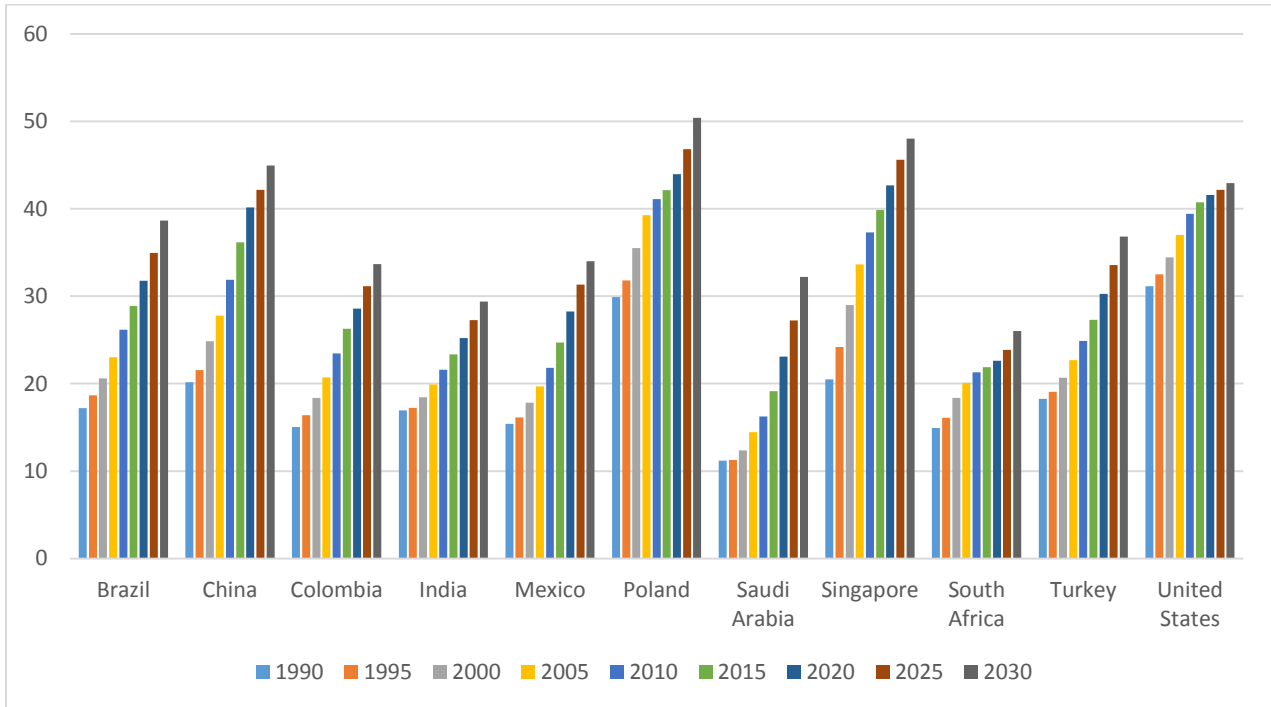
## Population and Labour Force Ageing

### Population ageing

While no single indicator can capture the diversity of ageing patterns, Figure 1 provides one summary indicator, the proportion of the population that is aged 45 years and over. The chart provides actual data for 1990-2010 and projections out to 2030 using the central case of the latest UN population projections (United Nations 2014).

In 1990, the proportion of Saudi Arabia's population aged over 45 was only 11%, behind South Africa at 15% the next lowest of this group of comparator countries. In the period to 2015, the proportion for Saudi Arabia increased to 19%, and in the period to 2030 it is projected to increase by 13%, to 32%, the largest increase of any of the selected countries.

**Figure 1 Share of population aged 45 years and over, 12 countries, 1990-2030 (projected)**



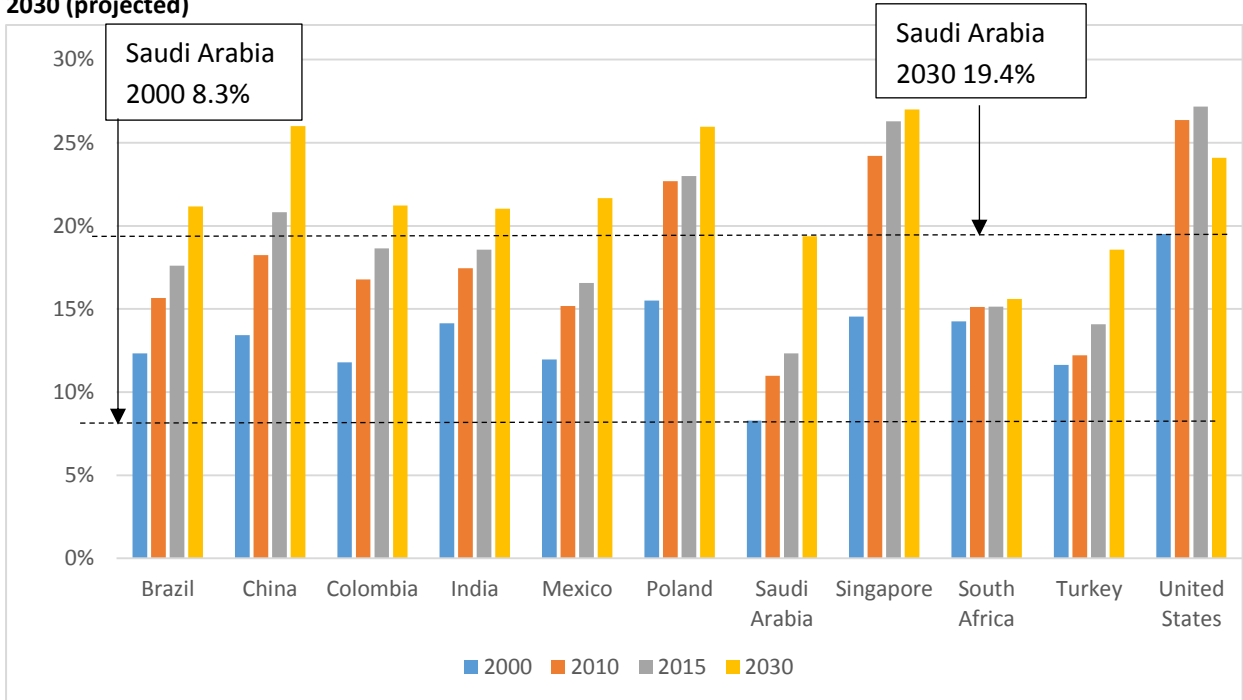
Source: United Nations (2014).

### Implications for labour supply

The population shifts discussed above, which showed increases in those aged over 45, have significant implications for the incidence of NCDs, since they have higher rates of prevalence in older age groups. These higher rates of NCDs contribute to the higher levels of absenteeism, presenteeism and early retirement.

Figure 2 focuses on the preretirement workforce aged 50-64. It shows the changes in this age group as a proportion of the total labour force over the period 2000 to 2030 (projected). Saudi Arabia has a relatively small proportion of its workforce in this age group compared with the other countries. The proportion aged 50-64 in 2000 at 8.3% is the lowest of all the other countries in this group and remains lowest over the period to 2015.

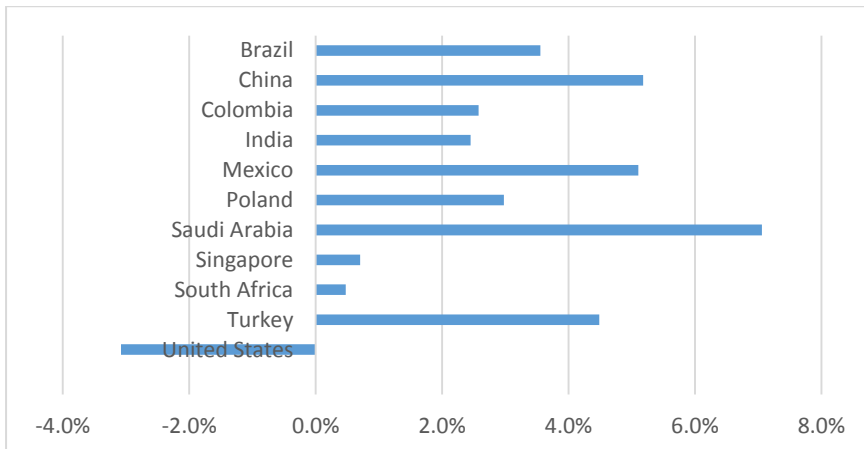
**Figure 2 Proportion of the labour force aged 50-64, Saudi Arabia and ten other countries, 2000, 2010, 2015 and 2030 (projected)**



Source: ILO (2014).

However as shown in Figure 3, between 2015 and 2030, while it remains lower than most other countries, the proportion for Saudi Arabia is expected to increase by 7.1%, the greatest of all the comparator countries. The next largest increase is 5.2% for China. The US is noteworthy for being the only country in this group to have a declining proportion in this age cohort.

**Figure 3 Increase in the projected proportion of the labour force aged 50-64, ten countries, 2015-2030**



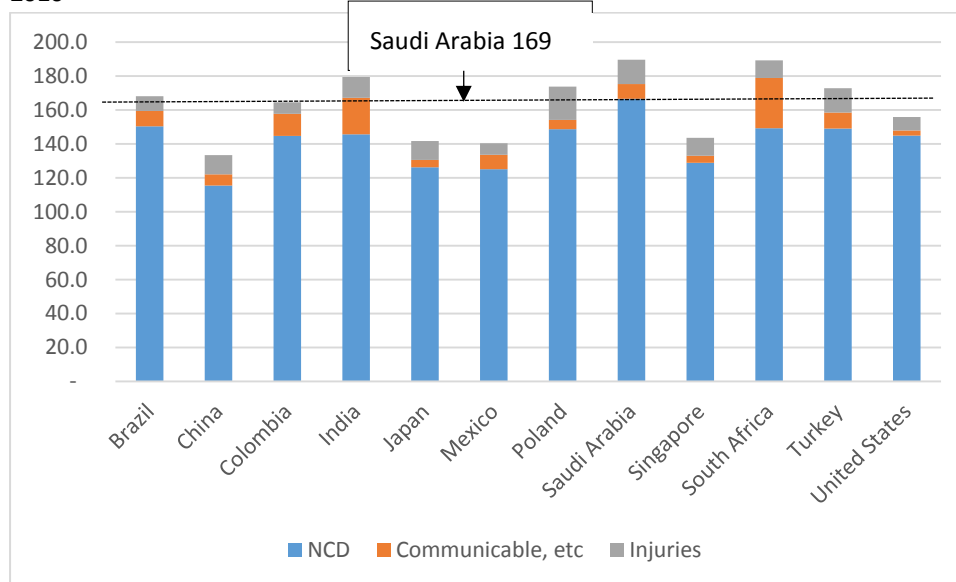
Source: ILO (2014).

## Burden of disease

The WHO Global Burden of Disease study (Murray et al. 2015) estimates both prevalence and severity of disease. It uses the number of years lived with disability (YLD) as an indicator of the impact of morbidity arising from disease. The results are grouped in three broad sequelae: communicable, maternal, perinatal and nutritional conditions, non-communicable diseases (NCDs) and injuries.

Figure 4 shows the burden of disease arising from morbidity for Saudi Arabia and the other eleven countries, for those in their preretirement years aged 50-64. The figure shows that the burden of disease, as measured by YLDs, is highest for Saudi Arabia and South Africa, 190 and 189 YLDs per 1000 respectively; with India at 179 YLDs per 1000 the next highest. This is largely because of the very high level of NCDs which account for 169 YLDs per 1000 compared with 150 for Brazil and 149 YLDs per 1000 for Poland, South Africa and Turkey. Injuries are also relatively high, contributing 14 YLDs per 1000 compared with an average of 11. Non-communicable diseases are, however, relatively low.

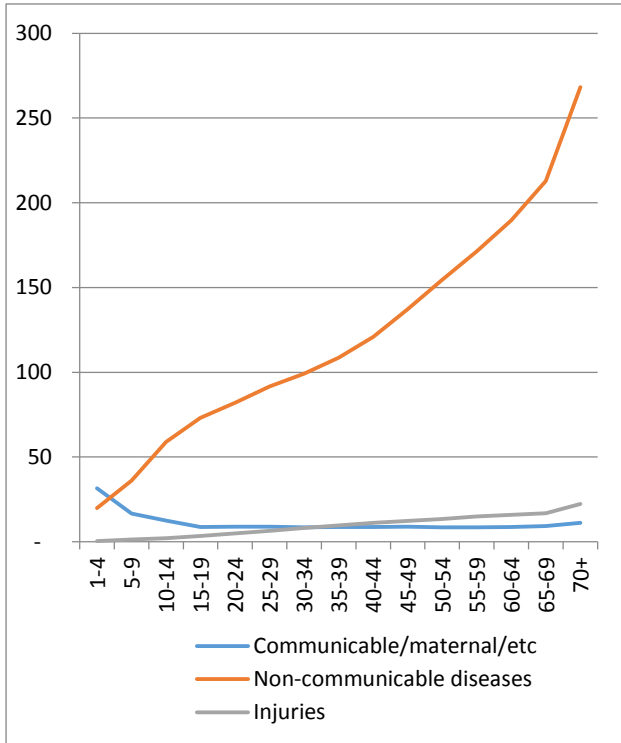
**Figure 4 Morbidity by cause (YLDs per 1,000) of those aged 50-64, Saudi Arabia and other selected countries, 2010**



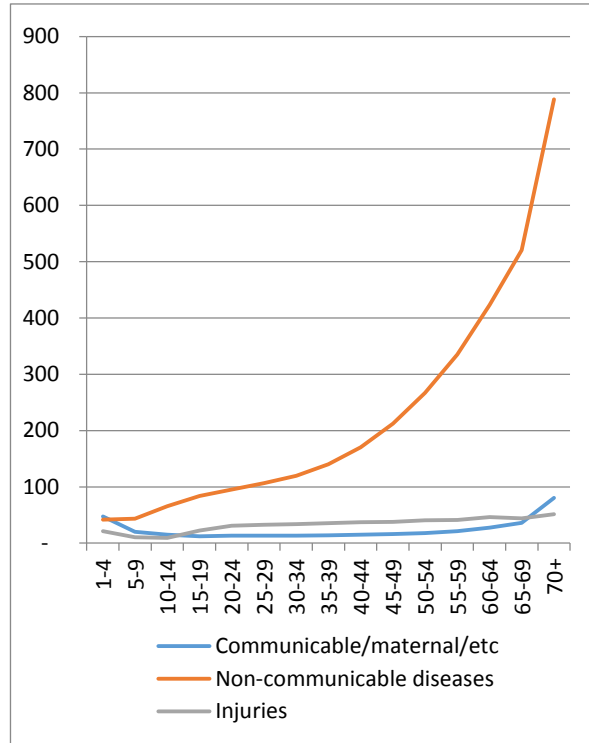
Source: IHME (2015).

NCD's are not only the largest component of disease burden, but rise exponentially with age. Figures 5 and 6 show the rapid increase in the rate of morbidity (YLDs per 1000 population) and total burden of disease (includes deaths and is measured in Disability Adjusted Life Years (DALYs) per 1000 population) for Saudi Arabia. Both charts indicate the steep rise in the burden of NCDs with age. However, Figure 6, which combines the burden of mortality and morbidity in the one measure, shows the particularly rapid rise in the burden of NCDs per 1000 of population from age 50.

**Figure 5 Morbidity by age (YLDs per1000), Saudi Arabia, 2010**



**Figure 6 Total burden of disease (DALYs per 1000), Saudi Arabia, 2010**



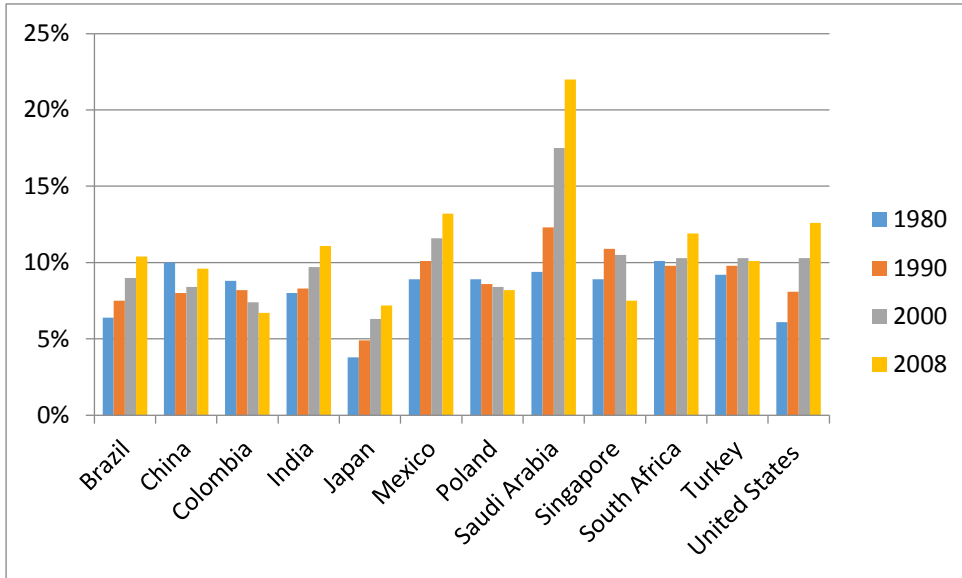
Source: IHME (2015).

Elevated disease risk factors lead to NCDs. Being overweight and obese for instance is an important risk factor for many NCDs. Saudi Arabia has high BMI (body mass index) levels. Overweight is defined as values greater than 25 kg/m<sup>2</sup>, while obesity is defined as greater than 30 kg/m<sup>2</sup>. For women, the average BMI in Saudi Arabia is 30 kg/m<sup>2</sup> meaning that about half the female population is obese. The average for men is 28 kg/m<sup>2</sup> meaning that more than half the population are overweight, a large proportion of whom are obese.

This is having a major impact on diabetes (see Figures 7a and 7b) and on cardiovascular disease.

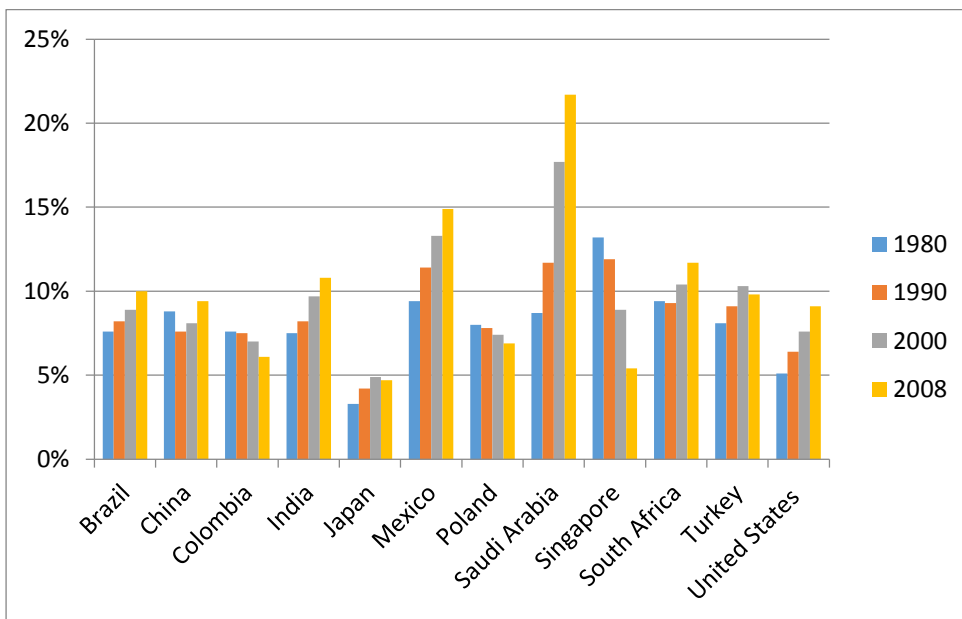


**Figure 7a Diabetes prevalence, males, per cent of population, ten countries, 1980 to 2008**



The prevalence of diabetes is very high in Saudi Arabia with 22% of both males and females suffering from the condition<sup>1</sup>. This is more than twice the average for the other comparator countries. It has also grown rapidly since 1990, when the prevalence was comparable to other high prevalence countries, such as Mexico and Singapore. The trend since could not be more contrasting with that of Singapore, particularly for women. The proportion of women in Singapore with diabetes is now less than half the proportion in 1990.

**Figure 7b Diabetes prevalence, females, per cent of population, ten countries, 1980 to 2008**



Source: Danaei et al. (2011).

Diabetes is both a disease condition and a risk factor. Diabetes increases the likelihood of heart disease and stroke. Both account for a high burden of the disease in Saudi Arabia for men and women. For those aged 50-64, diabetes represents 14.5% and 16.4% of morbidity and heart disease is the major cause of

<sup>1</sup>In the most comprehensive study to date, Danaei et al 2011 ranked Saudi Arabia third and fourth highest for prevalence of diabetes for males and females respectively of 199 countries surveyed.

death. Mental and behavioural disorders are also major causes of morbidity, accounting for almost 20% of the disease burden for women and 16% for men. As discussed below, mental illness is a major cause of absenteeism and presenteeism and so its high incidence for Saudi Arabia has a significant impact on the estimated productivity losses.

## Estimating the Worker Attendance Costs of NCDs

### Modelling methodology

The modelling methodology is based on estimating the reduction in productive capacity due to the impact of ill health on the workforce as a result of absenteeism, presenteeism and early retirement.

The modelling of the impact of NCDs on absenteeism and presenteeism is undertaken for 13 non-communicable diseases listed in Table 1 that were identified as most relevant to reductions in labour force participation and productivity using the disease descriptions from the 2010 Global Burden of Disease study (Murray et al. 2012). The disability weight indicates the severity of each disease.

**Table 1 Disability weights and absenteeism and presenteeism assumptions, twelve countries**

Disease	Disability weight	Per cent productivity loss due to absenteeism per employee per year	Per cent productivity loss due to presenteeism per employee per year
Ischemic heart disease	0.13013	2.8	6.8
Ischemic stroke	0.30300	2.8	6.8
Hemorrhagic and other non-ischemic stroke	0.30300	2.8	6.8
Diabetes mellitus	0.09463	0.8	11.4
Chronic obstructive pulmonary disease	0.19667	6.1	17.2
Asthma	0.05600	5.0	11.0
Migraine	0.43300	4.5	20.5
Tension-type headache	0.04000	4.5	20.5
Major depressive disorder	0.23000	10.7	15.3
Dysthymia	0.11000	10.7	15.3
Osteoarthritis	0.09100	2.5	11.2
Rheumatoid arthritis	0.33733	2.5	11.2
Neoplasm	0.32150	7.0	8.5

Sources: Murray et al. (2012), Salomon et al. (2012) and Goetzal et al. (2004).

To calculate the economic loss due to morbidity suffered by people in the labour force, one of the key aspects of the model is to quantify the impact of disease on labour force participation and on productivity at work. For this we use estimates by Goetzal et al. (2004) on productivity loss due to absenteeism and presenteeism by disease fitted to the disease categories used in the modelling (Table 1). An extensive review of the literature in the various countries on these issues has been conducted for this project, but no better source of such estimates has yet been identified.

Multiplying the GDP per person in the labour force estimates by the loss in productivity from a disease, gives the estimated reduction in GDP per person attributable to a particular disease. Multiplying this by

the prevalence in the labour force of that disease, gives an estimate of the annual loss in GDP from that disease.

### Interpreting the estimates

The overall estimates of the GDP losses arising from deaths (from 2010 onwards) and from absenteeism and presenteeism from the prevalence of NCDs in the actual and potential workforce are summarised in Table 2. Table 2 shows the total estimated losses in US\$ billions, at 2010 values and at five-year intervals over 2010-30, and also these costs as a share of GDP for each country.

In interpreting these estimates, it is important to note that they primarily reflect the pattern of ageing of the population of labour force age in the various countries, and the level of age standardised NCD mortality and non-fatal prevalence rates in 2010.

Saudi Arabia has the highest economic cost, 6.0% of GDP in 2010 of any of the comparator countries, despite a relatively low proportion of its population being over 45 years of age. The high cost reflects the high burden of disease. The increase from 2010 to 2030 to 7%, however, is driven by the rapid ageing of the workforce over that period.

Table 2 Estimates of lost GDP from NCD deaths, absenteeism and presenteeism, 11 countries, to 2030

	2010	2015	2020	2025	2030
	(\$ billion)				
Brazil	111.3	129.8	148.7	167.0	184.0
China	209.5	270.6	336.1	410.2	485.7
Colombia	14.2	18.7	24.0	30.5	38.1
India	81.5	109.6	145.2	191.2	249.2
Japan	225.4	237.7	256.6	275.4	290.7
Mexico	39.0	51.2	65.8	82.7	102.0
Poland	22.5	27.6	32.5	38.5	45.7
Saudi Arabia	31.7	44.7	61.3	78.2	100.5
Singapore	7.9	9.7	11.2	12.3	13.3
South Africa	18.2	23.1	28.9	35.9	44.7
Turkey	39.0	52.4	66.9	84.2	103.7
USA	779.9	872.2	963.0	1051.5	1142.6
	(share of GDP, %)				
Brazil	5.2	5.4	5.6	5.7	5.8
China	3.5	3.8	4.0	4.2	4.3
Colombia	4.9	5.1	5.2	5.3	5.4
India	4.8	4.8	4.8	4.9	5.0
Japan	4.1	4.2	4.4	4.5	4.6
Mexico	3.7	3.8	3.8	3.9	3.9
Poland	4.7	4.9	5.1	5.3	5.5
Saudi Arabia	6.0	6.2	6.5	6.7	7.0
Singapore	3.3	3.4	3.5	3.6	3.6
South Africa	4.9	4.9	5.0	5.1	5.2
Turkey	5.3	5.6	5.8	5.9	6.0
USA	5.2	5.4	5.5	5.5	5.5

Source: VISES estimates.

Other countries, such as China and Mexico, which are also ageing rapidly, benefit from lower disease burden levels. Although the growth in economic cost is rapid, by 2030 it is still relatively low at 4.3% and 3.9% respectively.

### The Economic Loss Due to Early Retirement

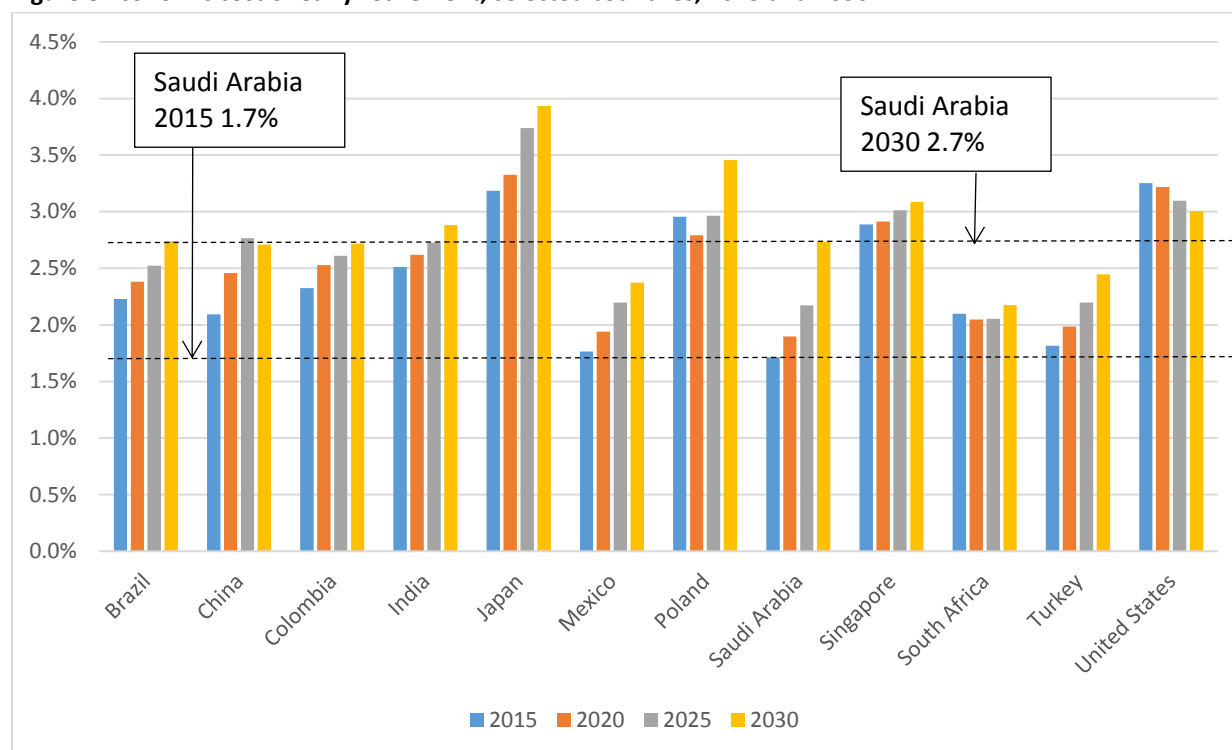
The best data we have about the behaviour of early retirees is from two surveys conducted in Australia, the Survey of Disability, Ageing and Carers (SDAC) and the Retirement and Retirement Intentions survey. The SDAC provides details about those with disability by age, their sources of income and extent of disability. From this we gain a lot of information about the prevalence of disability by degree of impairment by age. The Retirement and Retirement Intentions survey provides data by age about the reasons for retirement, including due to ill health. To the extent that we have been able to cross reference this against US data, the key parameters seem to be similar. In addition, we have obtained unpublished data about Australian disability pension recipients.

Our modelling assumes that the decision to retire due to ill health is based on the impact of the relative morbidity of the work force aged 50-64, measured in DALYs, in each of the selected countries.

There is very little data from the relevant countries with the necessary detail to model economic loss, so we used parameters drawn from the Australian data, which we adjusted where we could to the circumstances of the particular selected country. For instance, in arriving at the proportion of the work force aged 50-64 who were disabled according to the international WHO/World Bank definition, we used the Australian proportion (the US proportion was very similar) adjusted for country-specific disease burden sourced from the Global Burden of Disease study. A proportion based on Australian experience of these was estimated to have retired.

In essence, the economic loss is equal to those in early retirement multiplied by the average GDP per worker for each of the selected countries. This is projected using the ILO workforce projections for each country for those aged 50-64. The results are shown for 2015 through to 2030 in Figure 5 and Table 3. Given the complexity of the trends in risk factors, the age adjusted disease burden rate is assumed to be constant over the projection period.

**Figure 8 Economic cost of early retirement, selected countries, 2015 and 2030**



Source: VISES estimates.

The projections are largely driven by the ageing process. For Saudi Arabia, the economic cost of early retirement in 2015 is estimated to be one of the lowest at 1.7%, but increases by the largest amount to 2.7% by 2030. This reflects the movement of a large cohort into the 50-64 age group over the projection period.

**Table 3 Economic cost of early retirement, selected countries, 2015 and 2030**

	2015	2020	2025	2030
Brazil	2.2%	2.4%	2.5%	2.7%
China	2.1%	2.5%	2.8%	2.7%
Colombia	2.3%	2.5%	2.6%	2.7%
India	2.5%	2.6%	2.7%	2.9%
Japan	3.2%	3.3%	3.7%	3.9%
Mexico	1.8%	1.9%	2.2%	2.4%
Poland	3.0%	2.8%	3.0%	3.5%
Saudi Arabia	1.7%	1.9%	2.2%	2.7%
Singapore	2.9%	2.9%	3.0%	3.1%
South Africa	2.1%	2.0%	2.1%	2.2%
Turkey	1.8%	2.0%	2.2%	2.4%
USA	3.3%	3.2%	3.1%	3.0%

Source: VISES estimates.

In countries with relatively closed labour markets, the premature retirement of workers, particularly those who are skilled and experienced, represents a loss of economic capacity and potentially a loss to GDP. Modelling the impact of premature retirement for Saudi Arabia is challenging because of the high foreign worker component.

Our modelling assumes that foreign workers will remain in Saudi Arabia, and in the same way as the resident population, their early retirement will represent a loss to Saudi Arabia's productive capacity. However, with its more open labour market, the economic outcomes are likely to be more complex and difficult to predict. The economic loss may depend on whether the sick foreign worker, or Saudi workers who retire prematurely, can be replaced by another foreign worker of equivalent skill and knowledge. In such cases, the loss to the economy may be felt on the income side with continuing or increased remittances rather than in lost production. However, whatever the complexity of these outcomes, it is likely that the demand for foreign workers will be increased as a result of early retirement due to ill health.

This report considers only economic costs. Earlier reports in this series have included the fiscal costs to government and business of pension and other support for early retirees (Rasmussen et al 2015a, 2015b). The early retirement due to ill health of the Saudi Arabian population will impose costs on government and business that will extend beyond the narrow economic costs estimated in this report.

## Conclusions from the Analysis

The high level of burden of disease arising from NCDs indicates that for most of the developing countries included in this study, chronic disease is at least as great a health problem for these countries as for the developed countries, such as the US, where these conditions are longstanding and their acknowledged importance has led to the development of intervention programs.

**Table 4 Total economic impact of absenteeism, presenteeism and early retirement**

	2015			2030		
	Presenteeism & absenteeism	Early retirement	Total	Presenteeism & absenteeism	Early retirement	Total
Brazil	5.2	2.2%	7.4%	5.8	2.7%	8.5%
China	3.5	2.1%	5.6%	4.3	2.7%	7.0%
Colombia	4.9	2.3%	7.2%	5.4	2.7%	8.1%
India	4.8	2.5%	7.3%	5.0	2.9%	7.9%
Japan	4.1	3.2%	7.3%	4.6	3.9%	8.5%
Mexico	3.7	1.8%	5.5%	3.9	2.4%	6.3%
Poland	4.7	3.0%	7.7%	5.5	3.5%	9.0%
Saudi Arabia	6.0	1.7%	6.7%	7.0	2.7%	9.7%
Singapore	3.3	2.9%	6.2%	3.6	3.1%	6.7%
South Africa	4.9	2.1%	7.0%	5.2	2.2%	7.4%
Turkey	5.3	1.8%	7.1%	6.0	2.4%	8.4%
USA	5.2	3.3%	8.5%	5.5	3.0%	8.5%

Source: VISES estimates.

It is clear that with time, most of the developing and middle income countries will have an increasing proportion of their workforce entering the older age groups where the burden of NCDs is much higher. Without greater attention to improved health behaviours, the work forces of these countries will become less healthy and more subject to absenteeism, presenteeism and early retirement.

Overall modelling undertaken for this study (summarised in Table 4 ) has indicated that the economic costs of absenteeism and presenteeism range from 4-7% of GDP by 2030 and 3-4% of GDP for early retirement due to ill health, taking productivity impact to 6-10 % of GDP. Saudi Arabia has the highest projected economic cost at 9.7%. This is largely due to the elevated disease burden for a range of NCDs, which arise in particular from high BMI levels, such as diabetes and cardiovascular disease.

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