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National Health
Expenditures:
A synthesis of
available data



**World Health
Organization**

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**WHAT IS THE IMPACT OF NON-
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EXPENDITURES:
A SYNTHESIS OF AVAILABLE
DATA**

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SUMMARY

The paper summarizes the findings of spending on five major non communicable diseases (cardiovascular, endocrine, respiratory, mental disorders and neoplasms) in 13 countries (and less detailed analysis for additional 5 countries) for which data using a national health accounts framework for analysis are available. In most of the available studies, they together account for over a third of a country's total health expenditures. In most countries, expenditures on cardiovascular diseases (CVD) are the highest (varying between 8-22%) followed by cancers and mental health although the order changes as country incomes fall. In terms of hospital spending, these major non-communicable diseases (NCDs) account for almost half of the total hospital spending in most countries.

Six countries had sufficient data to allow comparisons in two periods of time. Shares spent on these major NCDs increased over time with the largest increase in Germany, from 27 to 51% of total health expenditures) between 2002 and 2006. Increases in expenditures on mental health account for the greatest component of the increases. The exception is the US when the shares of these NCDs fell from 48 to 45% between 2000 and 2005.

Although the proportions of total health expenditures are similar, there is wide variation in per capita spending on these conditions across countries. Per capita spending on the five conditions varies from \$33 in India, to \$850 in Australia and \$2800 in USA (in international dollars after adjusting for differences in costs - i.e. purchasing power of the domestic currency - across countries)

Objective

To find the share of major noncommunicable diseases (NCDs) in total expenditures on health (TEH) for selected countries

Methods

There are two sources of information on health expenditures relating to NCDs. The first is based on national health accounts (NHA) disease distribution analysis (NHA-DDA). This uses the NHA framework which defines a set of rules for measuring total expenditures on health from public, private and external sources. It also provides ways of identifying expenditures by different agents and on different uses or population groups e.g. by demographic characteristics (e.g. age, gender), economic characteristics (income groups) and disease classifications.

The second method is called cost-of-illness (COI). These studies are based on either the prevalence or incidence of specific illness. They estimate the typical natural history of the disease and typical treatment patterns - e.g. number of hospitalizations, outpatient visits etc - and obtain the total costs by multiplying the types and use of treatment by an average cost of treatment. Sometimes prevention and promotion costs are added in separately.

There are many problems with COI studies. They often overestimate costs by assuming all people obtain the standard treatments, which is problematic particularly in developing countries. They rarely have control groups, so tend to attribute all costs incurred by a person with a condition to that condition. This does not account for the fact that people would have incurred health costs even in the absence of that disease. Comorbidity may be double counted in each of the different diseases and therefore the expenditures summed from different diseases will add up to be larger than TEH.

Most studies of both types use the ICD 9 or ICD10 classification of diseases to allocate the health expenditures across major disease categories.

While over 130 countries have captured total expenditures on health using the NHA framework, we could find data from only 18 countries which have estimated expenditures for some of the major non-communicable diseases (NCDs) using the NHA-DDA approach. This note synthesizes available findings for 13 of them for which a complete data set is available: Australia, Canada, Czech Republic, Estonia, France, Georgia, Germany, Hungary, India, Republic of Korea, Sri Lanka, Slovenia, and Sweden. We also report some less detailed findings for Kiribati, Thailand, Tonga, and Vanuatu where NCDs expenditures are captured only for public (government) expenditures and for Mexico where detailed analysis is available for cardiovascular diseases, diabetes and obesity.

Some additional results are also available for Japan, Spain and the UK for the mid-1990s.

Results based on the COI approach are available for CVD for European Union (EU) countries for 2006 and for diabetes for 2010. However, while we refer to them we do not report them because they do not use a method that ensures that all of the estimated costs across the different diseases add up to the total costs.

Data has been compiled from a systematic search of the published literature and through personal communication with people we know have undertaken this form of analysis.

We present results in terms of the proportion of total health expenditures and the proportion of hospital expenditures taken by the five NCDs categories. We also present per capita expenditures in international dollars (I\$). International dollars are derived by exchanging domestic currencies into dollars at an exchange rate that takes into account purchasing power (i.e. cost levels) in the different countries so it is a better summary measure of the purchasing power of expenditure on the diseases in each setting. Technically, the exchange rate from domestic currency to international dollars is the number of domestic currency units that would be required to purchase the same quantity of goods and services domestically as 1\$ purchases in the US.

Results

Results are presented for the latest year that data are available. Results are presented for five major NCDs conditions - cardiovascular diseases, endocrine and nutritional disorders (in many places this is linked essentially to diabetes - NHA-DDA data were not available for diabetes separately), respiratory diseases, neoplasms and for mental and behavioural disorders. Data are presented by shares of total health expenditures and in hospital/inpatient expenditures. We also provide per capita expenditures for these conditions in terms of international dollars. These exchange domestic currencies into dollars using exchange rates that adjust for variations in costs across countries.

Key Findings

In the 13 countries with complete data, with most data coming from years around 2005 (except Canada for 1998 and France for 2002), expenditures for the five NCDs accounted for over a third of THE, with over 50% for Germany. The lowest proportion was in Georgia at 6% partially because a large part of private expenditures on NCDs could not be allocated by specific disease condition (Table 1).

Cardiovascular diseases (CVD) have the highest share of total health expenditures except for Australia, Germany, France and The Netherlands where the highest share is for mental disorders. In Australia, Czech Republic, and Canada the share on CVD was around 8-9 % of total health expenditures; in Estonia, where the data is available only for the Estonian Health Insurance fund, it is 22%; in all other countries these shares vary between 12-18%. In Georgia, the share of total health spending spent on CVD is very small. The highest spending was on mental disorders followed by cancers. In India expenditures on CVD are 16% followed by respiratory diseases (9%).

Five countries with time series data, show an increase in the share of all five NCDs categories, with the highest increase in Germany which increased from 27%-51%. Most of the increase comes from expenditures for mental health and behavioural disorders (Table 2). Mental disorders have the largest share of expenditures among the 5 NCDs in 2005. In USA, the shares for most NCDs fell, except for neoplasms and endocrine disorders where there was a slight increase (Table 2).

There is wide variation in per capita expenditures across countries on the major diseases with only \$33 spent in India and over \$2500 spent in the US. This is not surprising given the large variations in GDP and in total health expenditures across the countries. While most countries spent under \$250 per capita on CVD, The Netherlands and France spent more than \$350 per capita, Germany more than \$500 and USA over \$1000 per capita. Germany, The Netherlands and USA spent in the range of \$600 per capita on mental health. In most cases there were increases in per capita spending between the two time periods for which data were available (Tables 3 and 4).

Hospital expenditures were about a third of total health expenditures, except in the Republic of Korea where they were only a quarter of TEH, and in France where they accounted for half of the total health expenditures. The five major NCDs account for almost half of total hospital spending in most countries (Table 5).

In all countries except Sri Lanka, the share of hospital expenditures is more than 10% for CVD. The other two highest categories are mental health and neoplasm disorders. In France and The Netherlands, mental health expenditures account for almost 20% of hospital expenditures. Endocrine diseases account for about 2-3 % of hospital expenditures and respiratory infections take up 5-6 % of hospital expenditures.

While the shares may be similar for most countries, again there are large variations in per capita expenditures (in PPP dollars) for hospital spending by NCDs categories (Table 6). In Sri Lanka, of the per capita expenditures of \$32 on inpatient care, the largest share went on cancers (7.2%) followed by CVD (6.8%). In Georgia, per capita hospital expenditures were \$104 in 2008, of which \$48 were spent on mental health. While per capita expenditures in hospitals for all diseases increased for France, Germany and The Netherlands, it declined for Australia over time except for mental disorders (Table 7).

More detailed information is available for Sri Lanka and India. In Sri Lanka all NCDs conditions accounted for 39% of total health expenditures and in India this proportion is 48%. In Sri Lanka, the expenditures for treatment of cancers and acute heart attacks in 2005 were predominantly publicly financed while those for diabetes, asthma, and heart disease were predominantly financed out-of-pocket by patients or their families. Most inpatient care and almost all preventive care were funded by the government, while most private expenditures were for outpatient services, the purchase of medicines from pharmacies and clinical investigations from private laboratories. For CVDs, diabetes, and asthma about half the out-of-pocket expenditures were for outpatient care and drugs. The need for frequent clinic visits created repeated costs (Engelgau et. al. 2010).

In India, Mahal et al. (2010) found that between two study periods (1995-96 and 2004) the share of NCDs in total out-of-pocket health expenditures in India increased from 31.6% to 47.3%, suggesting a growing importance of NCDs in terms of their financial impact on households and a higher financial risk burden on affected individuals and households. The odds of incurring catastrophic hospitalization expenditures were nearly 160 percent higher with cancer 30 percent greater for CVD or injuries than when hospitalization is due to a communicable disease.

Information on government expenditures was available from Thailand, Tonga, Vanuatu and Kiribati. The public sector in Thailand, for example, spent \$36.5 on inpatient curative health expenditures in 2007, 21% of this is on the five NCDs categories. While the highest proportion was spent on injuries, disease of the circulatory system followed with 10% of total inpatient expenditures; 5% on respiratory diseases; 3% on mental disorders and 1.5% each on neoplasm and diabetes mellitus (based on data from IHPP, Thailand).

Inpatient public expenditures for NCDs from Tonga, Vanuatu and Kiribati show treatment of NCDs represented 19.6% of public inpatient hospital based-expenditures in Tonga; 9% in Vanuatu; and 11.8% in Kiribati in the early years of this century (Doran 2003).

In Mexico, expenditures on cardio vascular diseases, diabetes and obesity account for almost 40 billion pesos or 6.7% of TEH in 2006 (Ávila-Burgos L 2009). Of these, CVD accounts for 55.2%, diabetes 40.6%, and obesity 4.2%. Most of the funding for these 3 conditions come from public sector (73%), principally from seguridad social (social health insurance, 62%); and 27% from private sector (principally from OOP spending). In terms of services, most of the expenditures are on curative care (73.5%) and medical goods (23%) with preventive care accounting for less than 3% of these expenditures. Hospitals account for 23% of the provision of care and ambulatory care for 52%.

Discussion

This paper summarizes the findings of spending on five major non-communicable disease complexes (cardiovascular, endocrine, respiratory, and mental disorders and neoplasms) in 13 countries for which data based on NHA-DDA are available. In most of the available studies, these conditions together accounted for over a third of a country's total health expenditures. In most countries, expenditures on diseases of the circulatory system were the highest (varying between 8-22%) followed by mental health and cancers although the order changes as country incomes fall. In terms of hospital spending, these major NCDs account for almost half of total hospital spending.

Six countries had sufficient data to allow comparisons in two periods of time. Shares on these major NCDs increased over time with the largest increase in Germany, from 27 to 51% of total health expenditures) between 2002 and 2006. Increases in expenditures on mental health account for the greatest component of the increases. The exception is the USA when the shares of these NCDs fell from 48 to 45% between 2000 and 2005.

Although the proportions of total health expenditures are similar, there is wide variation in per capita spending on these conditions across countries. While the share of these major NCDs in total health expenditures is very similar in India (39%), Australia (32%), and Slovenia (36%), per capita expenditures for these major NCDs vary from \$33 in India, to \$650 in Slovenia and \$850 in Australia (in international dollars after adjusting for differences in costs, or purchasing power of the domestic currency, across countries).

The results presented here for NCDs are broadly similar to estimates based on the COI methodology (Allender S. et al. 2008 and <http://www.heartstats.org/datapage.asp?id=4541>). For example, COI studies in EU countries suggest that CVDs alone account for an average of 10% of total health expenditures, with the variation across the countries from 5% - 17%.

Healthcare expenditures on diabetes derived from COI studies suggest higher estimates than from NHA-DDA studies - accounting for 11.6% of the projected total healthcare expenditures in the world in 2010. About 80% of the countries included in the study were predicted to spend between 5% and 13% of their total healthcare dollars on diabetes. More than 80% of the estimated global expenditures on diabetes are made in the world's economically richest countries, not in the low- and middle-income countries where over 70% of people with diabetes live (Source Diabetes Atlas : <http://www.diabetesatlas.org/content/regional-data>). However, many of these studies assume that all people with diabetes are diagnosed and treated according to appropriate treatment protocols.

This paper makes a contribution by focusing on studies that have used the consistent NHA-DDA methods. Accordingly, it is not possible for the sum of expenditures across the different conditions to add up to more than the observed total health expenditures, at least in theory. This restriction is not applied to most COI studies, in particular those focusing on a particular condition.

The results presented in the paper should, however, still be treated carefully. The different studies found that some expenditures could not be allocated to particular diseases, with the proportion of "unallocated" costs varying across the studies. For this study, we allocated them to the different conditions in proportion to the costs that could be allocated. The second issue is that the studies did not use totally standard methods for NHA-DDA. It is suggested that standardized methods should be strengthened to present and compare the data across countries. Despite this, however, we think that the NHA-DDA method is the most appropriate one to use in seeking to understand the contributions of different diseases to total health expenditures.

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Tables

Source of original data for the tables

Tables 1-7 are author's analysis based on the following sources:

- Recent data for Australia, Canada, France Netherland and Germany: and Czech Republic, Hungary and Korea are from OECD.
- Data for earlier years for Australia, Canada, France Germany and The Netherlands is from R. Heijnk et. al. 2006: International comparison of cost of illness and personal communication.
- Data for India is from World Bank report "World Bank 2010. The Economic Implications of Non-Communicable Disease for India; Mahal et. al. (2010)
- Data for Sri Lanka is from Engelgau et. al. (2010).
- Thailand data is through personal communication, International Health Policy Program (IHPP), Thailand
- USA data is from Roehrig e. al. (2009) and personal communication
- Data for Estonia is through personal communication and presentation on Health Expenditures by Patient Characteristics, Luxembourg 2006, Natalja Eigo
- Slovenia data is from personal communication and also from OECD.
- Georgia data is from NHA, Ministry of Labour, Health and Social Affairs.
http://www.moh.gov.ge/index.php?lang_id=ENG&sec_id=54.

Note for the tables:

Keys for country names: Australia – AUS, Canada – CAN; Czech Republic - CZE; Estonia - EST; France - FRA; Georgia - GEO; Germany - DEU; Hungary - HUN; India - IND; The Netherlands - NLD; Republic of Korea - KOR; Slovenia - SVN; Sri Lanka - LKA, Sweden - SWE; United States of America - USA. A large component of expenditures is not allocated by diseases especially the components comprising preventive and promotive care, and capital expenditures. There are large variations in unallocated expenditures varying from 4 % in Republic of Korea to 48% in Czech Republic. We have allocated the unallocated expenditures in the same ratios as the allocated expenditures; e.g. in Estonia, allocations are available only for Estonian Health insurance funds which comprise over 62% of total health expenditures. The same ratios are applied to remaining 38% of TEH. In Georgia, 25% of total health expenditures is for NCDs. 60% of expenditures identified under NCDs have not been classified under different categories of NCDs, giving a low share for 5 NCDs.

Table 1: Share of major NCDs in total health expenditures (%)

Country	AUS	CAN	CZE	DEU	EST	FRA	GEO	HUN	IND	KOR	NLD	SVN	USA
Year	2004/5	1998	2006	2006	2004	2002	2005	2006	2004	2006	2005	2006	2005
Cardiovascular disease (CVD)	8.6	9.0	9.2	16.2	22.0	12.0	0.8	18.4	15.6	13.4	11.1	13.5	17.0
Neoplasm (cancers)	4.7	3.1	5.5	7.9	9.4	7.1	1.9	8.2	4.7	7.7	5.5	6.7	7.2
Endocrine and metabolic diseases	4.4	2.1	2.0	4.0	5.4	3.9	0.01	6.1	4.8	4.1	2.7	2.4	4.4
Respiratory diseases	4.8	4.5	3.2	5.4	7.2	7.3	0.4	5.8	8.9	10.8	4.9	6.2	6.6
Mental health & neurological disorders	9.6	6.2	4.6	17.4	5.2	13.5	3.0	7.8	5.3	6.0	20.3	7.1	9.5
Share of 5 major NCDs in TEH	32	25	25	51	49	44	6	46	39	42	44	36	45

Source: Authors Analysis

Table 2: Time series comparison of share of major NCDs in total health expenditures (%), 6 countries

Country	AUS		FRA		DEU		NLD		GEO		USA	
	2000	2004/5	1998	2002	2002	2006	2003	2005	2005	2008	2000	2005
Cardiovascular disease (CVD)	8.2	8.6	8.2	12.0	9.7	16.2	7.7	11.1	0.8	1.0	18.5	17.0
Neoplasm (cancers)	4.6	4.7	4.3	7.1	5.2	7.9	3.8	5.5	1.9	2.3	6.7	7.2
Endocrine & metabolic diseases	3.9	4.4	2.6	3.9	3.9	4.0	1.8	2.7	0.0	0.1	4.3	4.4
Respiratory diseases	5.5	4.8	4.3	7.3	3.8	5.4	3.5	4.9	0.4	0.5	8.1	6.6
Mental health and neurological disorders	4.5	9.6	6.6	13.5	4.8	17.4	8.2	20.3	3.0	4.3	10.6	9.5
Share of 5 major NCDs in TEH	27	32	26	44	27	51	25	44	6	8	48	45

Source: Authors Analysis

Table 3: Per capita expenditures (PPP I\$) for major NCDs for 13 countries

Country	AUS	CAN	CZE	DEU	EST	FRA	GEO	HUN	IND	KOR	NLD	SVN	USA
Year	2004/5	1998	2006	2006	2004	2002	2005	2006	2004	2006	2005	2006	2005
Cardiovascular disease (CVD)	229	205	134	540	162	354	3	264	13	185	360	244	1066
Neoplasm (cancers)	126	72	81	264	70	209	6	118	4	106	179	121	448
Endocrine & metabolic diseases	116	47	29	134	40	116	0.2	87	4	57	87	43	273
Respiratory diseases	129	104	46	180	53	215	1	83	7	149	160	113	410
Mental health and neurological disorders	255	142	67	580	38	399	9	112	4	82	658	129	597
Per capita expenditures on 5 major NCDs	856	570	357	1697	363	1293	19	665	33	578	1444	650	2795
Per capita total expenditures on health	2663	2291	1452	3332	739	2953	303	1434	83	1379	3247	1815	6259

Source: Authors Analysis

Table 4: Time series comparison of per capita expenditures for major NCDs (PPP I\$), 6 countries

Country	AUS		FRA		DEU		NLD		GEO		USA	
Year	2000	2004/5	1998	2002	2002	2006	2003	2005	2005	2008	2000	2005
Cardiovascular disease (CVD)	198	229	237	354	296	540	232	360	3	4	869	1066
Neoplasm (cancers)	110	126	124	209	158	264	114	179	6	10	315	448
Endocrine & metabolic diseases	93	116	75	116	118	134	55	87	0	0	203	273
Respiratory diseases	134	129	125	215	117	180	106	160	1	2	383	410
Mental health and neurological disorders	107	255	190	399	146	580	249	658	9	19	499	597
Per capita expenditures on 5 major NCDs	641	856	750	1293	835	1697	756	1444	19	35	2270	2795
Per capita total expenditures on health	2406	2663	2886	2953	3043	3332	3022	3247	303	434	4703	6259

Source: Authors analysis

Table 5: Share of major NCDs (%) in expenditures on Hospital/ Inpatient curative care, 11 countries

Country	AUS	CZE	FRA	GEO	DEU	HUN	KOR	NLD	SVN	LKA	SWE
Year	2004/5	2006	2002	2008	2006	2006	2006	2005	2006	2005	2006
Cardiovascular disease (CVD)	12	15	13	3.5	18	21	15	12	12	6.8	17.9
Neoplasm (cancers)	10	9	11	8.4	13	12	18	9	11	7.2	12.2
Endocrine & metabolic diseases	3	2	3	0.2	3	2	2	2	3	1.5	1.8
Respiratory diseases	6	5	5	1.9	5	6	7	5	7	5.2	6
Mental health and neurological disorders	10	8	19	14.9	16	9	10	18	9	-	12
Share of 5 major NCDs in hospital expenditures	42	39	51	29	54	50	51	46	42	21*	50

Source: Authors analysis

* Only for 4 NCDs conditions

Table 6: Per capita expenditures on Hospital/ Inpatient curative care by major NCDs (PPP I\$), 11 countries

Country	AUS	CZE	FRA	GEO	DEU	HUN	KOR	NLD	SVN	LKA	SWE
Year	2004/5	2006	2002	2008	2006	2006	2006	2005	2006	2005	2006
Cardio Vascular disease (CVD)	86	71	133	3.6	179	80	49	142	69	2	141
Neoplasm (cancers)	68	41	115	8.7	135	45	59	106	63	2	96
Endocrine & metabolic diseases	24	11	25	0.2	27	8	6	24	16	0.5	14
Respiratory diseases	42	26	54	15.5	49	25	22	56	43	2	44
Mental health and neurological disorders	69	37	189	47.8	157	33	31	213	53	-	98
Total hospital expenditures (Per capita in \$PPP)	696	471	1012	104	1006	383	325	1188	586	32	788

Source: Author analysis

Table 7: Time series comparison of per capita expenditures on Hospital/ Inpatient curative care by major NCDs (PPP I\$), 4 countries

Country	AUS		FRA		DEU		NLD	
	2000	2004/5	1998	2002	2002	2006	2003	2005
Cardio Vascular disease (CVD)	93	86	105	133	150	179	133	142
Neoplasm (cancers)	73	68	93	115	103	135	91	106
Endocrine & metabolic diseases	25	24	19	25	26	27	21	24
Respiratory diseases	55	42	45	54	45	49	51	56
Mental health and neurological disorders	50	69	144	189	105	157	189	213
Total hospital expenditures (Per capita in \$PPP)	813	696	936	1012	877	1006	1074	1188

Source: Authors analysis

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