

The Economic Burden of Illness in Canada and Beyond

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On the State of the Art in Costing Methods: Workshop 2015



PROTECTING CANADIANS FROM ILLNESS



Public Health
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Canada

Outline

- Cost of Illness
- Economic Burden of Illness in Canada
- System of Health Accounts

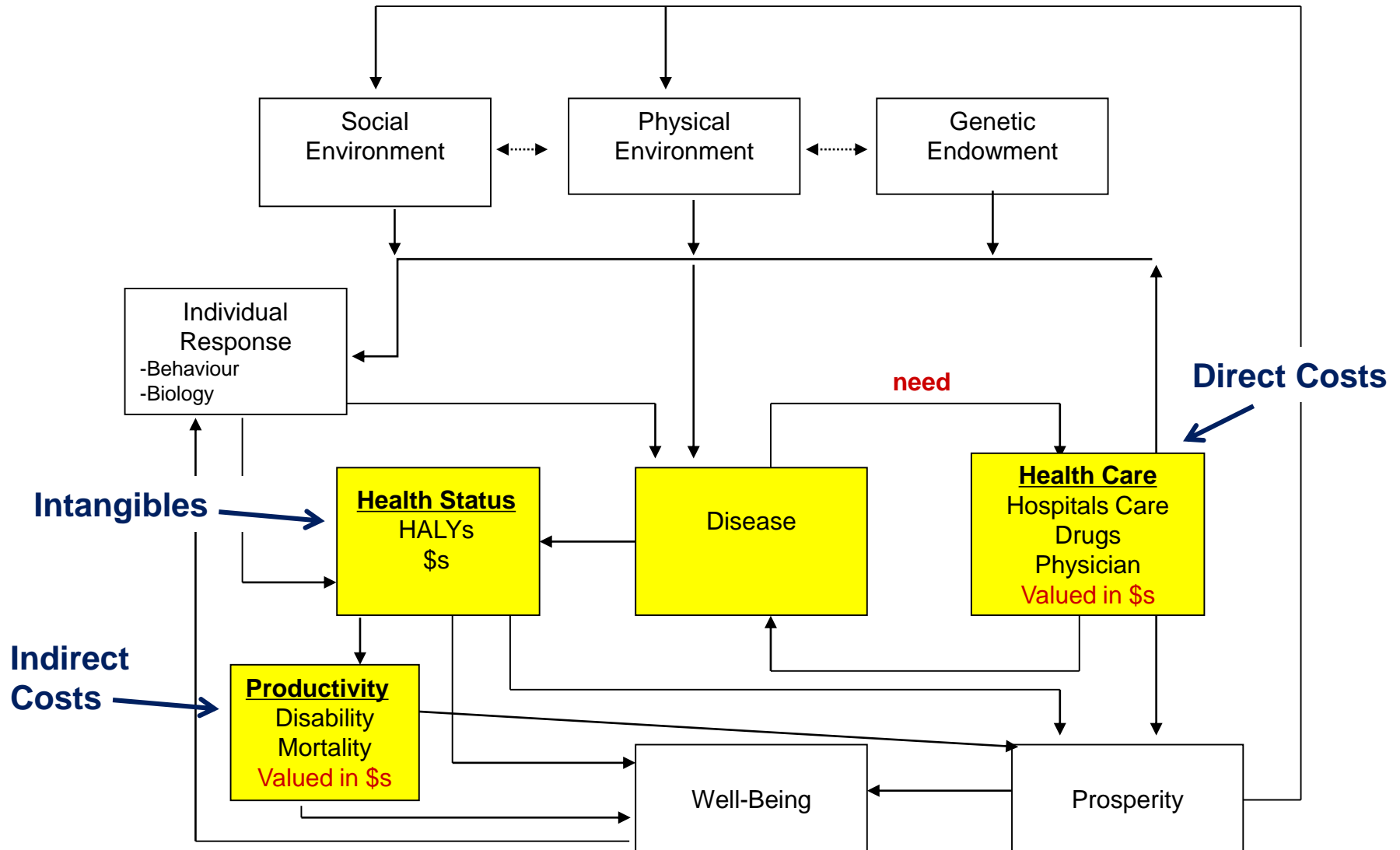
Cost of Illness

- Measure of the burden of illness
- COI = direct costs + indirect costs + “intangible costs”
- Direct costs
 - » Hospital, physician, drug, long-term care, other...
 - » Medical care
- Indirect costs
 - » Lost production due to time in hospital, disability, premature mortality
 - » Caregivers
 - » Economy, non medical care

Cost of Illness, continued

- “Intangible”
 - » Pain, suffering (morbidity)
 - » Value of life (mortality)
 - » Valued in:
 - Utility terms: DALYs, QALYs
 - Dollars: WTP, VSL

Determinants of Health



COI Methodologies

- Incidence vs. prevalence based
 - » Snapshot at a point in time (e.g. year)
 - » Whole disease pathway
- Direct costs: two main approaches
 - » Top down
 - » Bottom up

COI Methodologies, cont'd

- Indirect costs
 - » Human capital method
 - » Friction cost method
- Intangibles / value of life
 - » Various WTP methods
 - » QALYs / DALYs
 - » Value of a statistical life (VSL)

Potential use of COI studies

- Providing information on the burden of specific diseases
- Estimating disease costs covering the entire classification of diseases, enabling mutual comparison of disease costs
- Clarifying the most important cost components of treating specific diseases and prioritising diseases
- Explaining recent trends in costs
- Projecting future disease costs
- Compare changes in patterns of practice (countries, time)
- Incorporating results to other analyses

Economic Burden of Illness in Canada

- Cost-of-illness (COI) and injury study based on standard reporting units and methods
- Objective and comparable information on the magnitude of the economic burden of illness and injury in Canada
- Offers comparable cost totals by diagnostic category, sex, and age group for:
 - » Direct costs (hospital care, physician care, and drugs)
 - » Indirect costs (value of lost production due to morbidity and premature mortality)
- 165 diagnostic sub-categories
- EBIC 2005-2008 released in June, 2014

EBIC Direct Cost Components

- Hospital care
 - » Attributed to the most responsible diagnosis
- Physician care
 - » Based on publically available Manitoba cost totals rather than P/T record-level physician billing data
- Drugs
 - » Linked data from retail pharmacies and diagnostic information from a physician survey
 - » IMS Brogan

EBIC Indirect Cost Components

- Value of lost production due to morbidity
 - » Canadian Community Health Survey (CCHS)
 - » Days off work and associated health condition
- Value of lost production due to premature mortality
 - » Vital Statistics Death Database, coded by ICD
- Both indirect cost components
 - » Estimated using friction cost method
 - » Provincial unemployment duration used to denote the '*friction period*' (time to replace a worker)
 - » Sex, age group and province-specific earnings used to value lost production

Cost Estimates by Diagnostic Category, Cost Type and Cost Component, Canada, 2008 (\$'000,000 Current Dollars)

Diagnostic Category	Hospital Care	% of Hospital Care	Drug	% of Drug	Physician Care	% of Physician Care	Other Direct	% of Other Direct	Total Direct	% of Total Direct	Direct Rank
Certain Infectious and Parasitic Diseases	871.1	1.8	696.7	2.5	509.3	2.1	0.0	0.0	2,077.0	1.2	16
Respiratory Infections	958.9	2.0	509.3	1.8	1,125.2	4.7	0.0	0.0	2,593.3	1.5	12
Maternal Conditions	1,382.7	2.8	58.5	0.2	792.1	3.3	0.0	0.0	2,233.3	1.3	13
Perinatal Conditions	928.6	1.9	9.8	0.0	42.0	0.2	0.0	0.0	980.4	0.6	18
Nutritional Deficiencies	108.7	0.2	77.2	0.3	158.0	0.7	0.0	0.0	343.9	0.2	22
Malignant Neoplasms	2,329.4	4.7	467.1	1.7	1,031.7	4.3	0.0	0.0	3,828.2	2.2	8
Other Neoplasms	431.3	0.9	49.8	0.2	484.0	2.0	0.0	0.0	965.1	0.6	19
Diabetes Mellitus	492.7	1.0	1,198.2	4.3	487.3	2.0	0.0	0.0	2,178.2	1.3	14
Endocrine Disorders	423.4	0.9	1,728.4	6.2	587.5	2.5	0.0	0.0	2,739.2	1.6	11
Neuropsychiatric Conditions	5,520.3	11.2	3,551.3	12.7	2,347.0	9.9	0.0	0.0	11,418.6	6.6	2
Sense Organ Diseases	520.3	1.1	283.4	1.0	1,329.3	5.6	0.0	0.0	2,132.9	1.2	15
Cardiovascular Diseases	5,068.0	10.3	4,272.7	15.3	2,352.0	9.9	0.0	0.0	11,692.7	6.8	1
Respiratory Diseases	1,818.5	3.7	1,197.2	4.3	632.6	2.7	0.0	0.0	3,648.3	2.1	10
Digestive Diseases	2,839.4	5.8	1,434.0	5.1	1,232.6	5.2	0.0	0.0	5,506.0	3.2	5
Genitourinary Diseases	1,499.2	3.1	670.8	2.4	1,626.4	6.8	0.0	0.0	3,796.5	2.2	9
Skin Diseases	410.3	0.8	680.5	2.4	833.1	3.5	0.0	0.0	1,923.9	1.1	17
Musculoskeletal Diseases	1,795.9	3.7	1,982.5	7.1	2,002.5	8.4	0.0	0.0	5,780.8	3.4	4
Congenital Anomalies	302.9	0.6	35.0	0.1	139.0	0.6	0.0	0.0	477.0	0.3	20
Oral Conditions	153.6	0.3	42.3	0.2	214.1	0.9	0.0	0.0	410.0	0.2	21
Injuries	3,395.8	6.9	259.7	0.9	1,435.0	6.0	0.0	0.0	5,090.5	3.0	7
Symptoms, Signs and Ill-Defined Conditions	2,131.7	4.3	1,283.1	4.6	1,846.1	7.8	0.0	0.0	5,260.8	3.1	6
Factors Influencing Health and Contact with Health Services	5,543.4	11.3	700.4	2.5	2,573.7	10.8	0.0	0.0	8,817.5	5.1	3
Total EBIC Cost Estimates	38,926.1	79.2	21,187.6	75.9	23,780.3	100.0	0.0	0.0	83,894.0	48.8	
Unattributable Costs ⁽¹⁾	10,196.4	20.8	6,734.8	24.1	0.0	0.0	71,179.6	100.0	88,110.8	51.2	
Total Costs ⁽²⁾	49,122.5	100.0	27,922.4	100.0	23,780.3	100.0	71,179.6	100.0	172,004.8	100.0	

Footnotes:

(1) The unattributable amount of expenditures for each direct cost component was calculated as the NHEx expenditure total minus the costs attributable by EBIC categories.

(2) Source: Canadian Institute for Health Information, National Health Expenditure Trends, 1975 to 2012 (2).

Note: Discrepancies may occur due to rounding.

Cost Estimates by Diagnostic Category, Cost Type and Cost Component, Canada, 2008 (\$'000,000 Current Dollars)

Diagnostic Category	Mortality	% of Mortality	Morbidity	% of Morbidity	Total Indirect	% of Total Indirect	Indirect Rank	Total (Direct + Indirect)	% of Total (Direct + Indirect)	Total (Direct + Indirect) Rank
Certain Infectious and Parasitic Diseases	13	2.9	826.9	5	839.9	5	5	2,916.90	1.5%	12
Respiratory Infections	5.1	1.1	2,812.40	17.2	2,817.60	16.7	2	5,410.90	2.9%	7
Maternal Conditions	0.2	0	-	-	0.2	0	18	2,233.50	1.2%	15
Perinatal Conditions	0.1	0	-	-	0.1	0	19	980.50	0.5%	18
Nutritional Deficiencies	0.3	0.1	-	-	0.3	0	17	344.20	0.2%	22
Malignant Neoplasms	166	36.6	420	2.6	586.1	3.5	6	4,414.30	2.3%	9
Other Neoplasms	1.8	0.4	-	-	1.8	0	15	966.90	0.5%	19
Diabetes Mellitus	12.3	2.7	132.9	0.8	145.2	0.9	10	2,323.40	1.2%	14
Endocrine Disorders	6.3	1.4	-	-	6.3	0	13	2,745.50	1.5%	13
Neuropsychiatric Conditions	19.1	4.2	1,024.40	6.2	1,043.40	6.2	4	12,462.00	6.6%	1
Sense Organ Diseases	0	0	-	-	0	0	21	2,132.90	1.1%	16
Cardiovascular Diseases	92.4	20.4	269.6	1.6	362	2.1	7	12,054.70	6.4%	2
Respiratory Diseases	11.3	2.5	110	0.7	121.3	0.7	11	3,769.60	2.0%	11
Digestive Diseases	24.5	5.4	151.1	0.9	175.6	1	8	5,681.60	3.0%	6
Genitourinary Diseases	3.8	0.8	156.5	1	160.3	1	9	3,956.80	2.1%	10
Skin Diseases	0.4	0.1	-	-	0.4	0	16	1,924.30	1.0%	17
Musculoskeletal Diseases	2.5	0.5	1,395.50	8.5	1,398.00	8.3	3	7,178.80	3.8%	5
Congenital Anomalies	2.9	0.6	-	-	2.9	0	14	479.90	0.3%	20
Oral Conditions	0	0	-	-	0	0	20	410.00	0.2%	21
Injuries	84.6	18.6	2,909.00	17.7	2,993.50	17.8	1	8,084.00	4.3%	4
Symptoms, Signs and Ill-Defined Conditions	7.5	1.6	-	-	7.5	0	12	5,268.30	2.8%	8
Factors Influencing Health and Contact with Health Services	-	-	-	-	0	0	22	8,817.50	4.7%	3
Total EBIC Cost Estimates	454.0	100.0	10,208.3	62.3	10,662.3	63.3		84,258.4	44.6	
Unattributable Costs ⁽¹⁾	0.0	0.0	6,188.1	37.7	6,188.1	36.7		104,596.8	55.4	
Total Costs ⁽²⁾	454.0	100.0	16,396.4	100.0	16,850.4	100.0		188,855.1	100.0	

Footnotes:

(1) The unattributable amount of expenditures for each direct cost component was calculated as the NHEX expenditure total minus the costs attributable by EBIC categories.

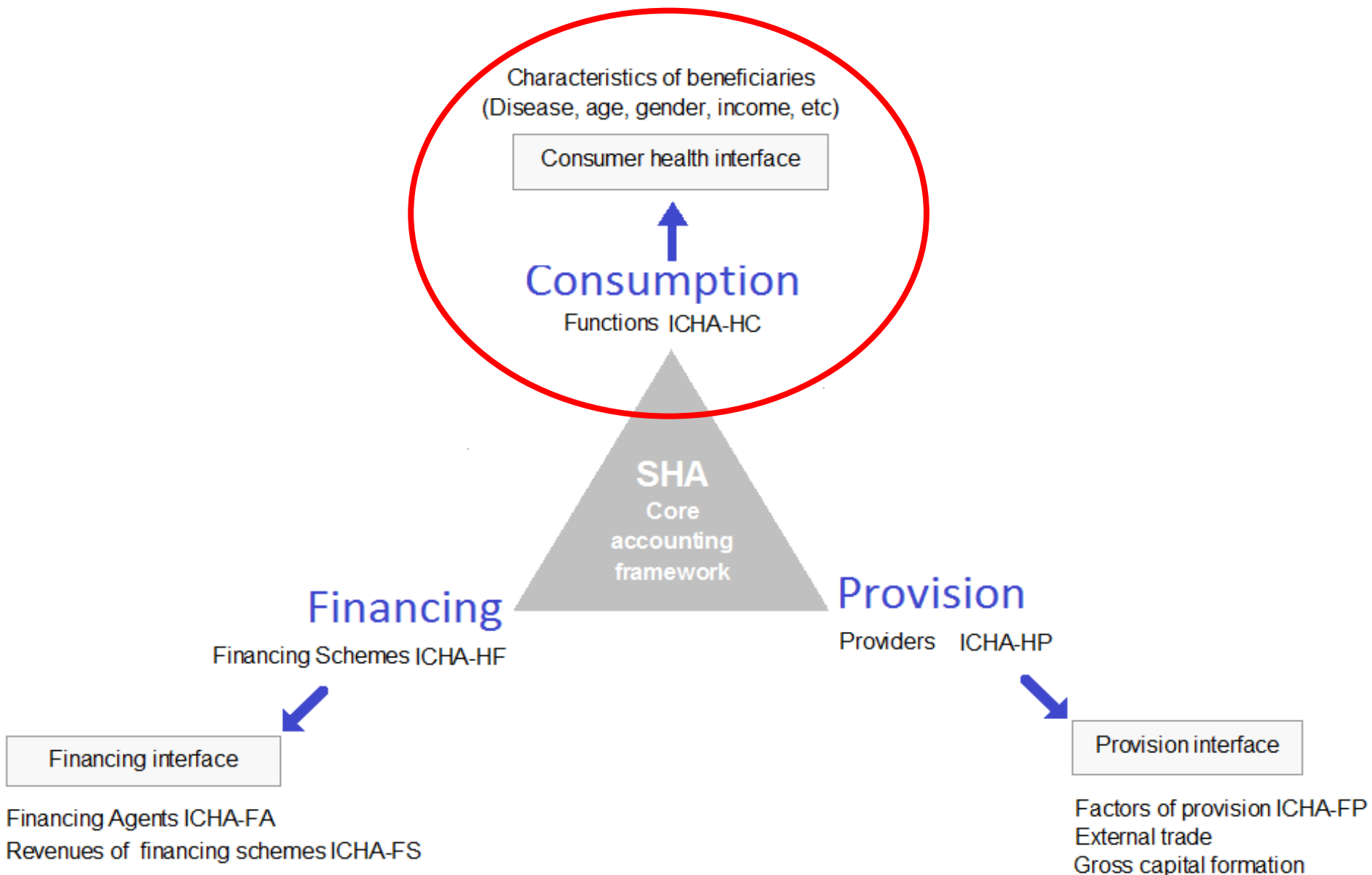
(2) Source: CIHI' s National Health Expenditure Trends, 1975 to 2012 (5).

Note: Any discrepancies may be due to rounding.

System of Health Accounts (SHA), 2011

- “Framework for standard reporting for expenditure on health and its financing” OECD
- SHA provides a framework---direct costs
 - » Scope and types of expenditures
 - » Rules on how to allocate expenditures
 - » Classifying recipients
- Consistent methodologies for the compilation of health expenditure accounts
 - » Standard classifications
 - » Comparability and standardized results
- Released in October 2011 (revision of SHA 1.0)
 - » OECD, Eurostat, WHO

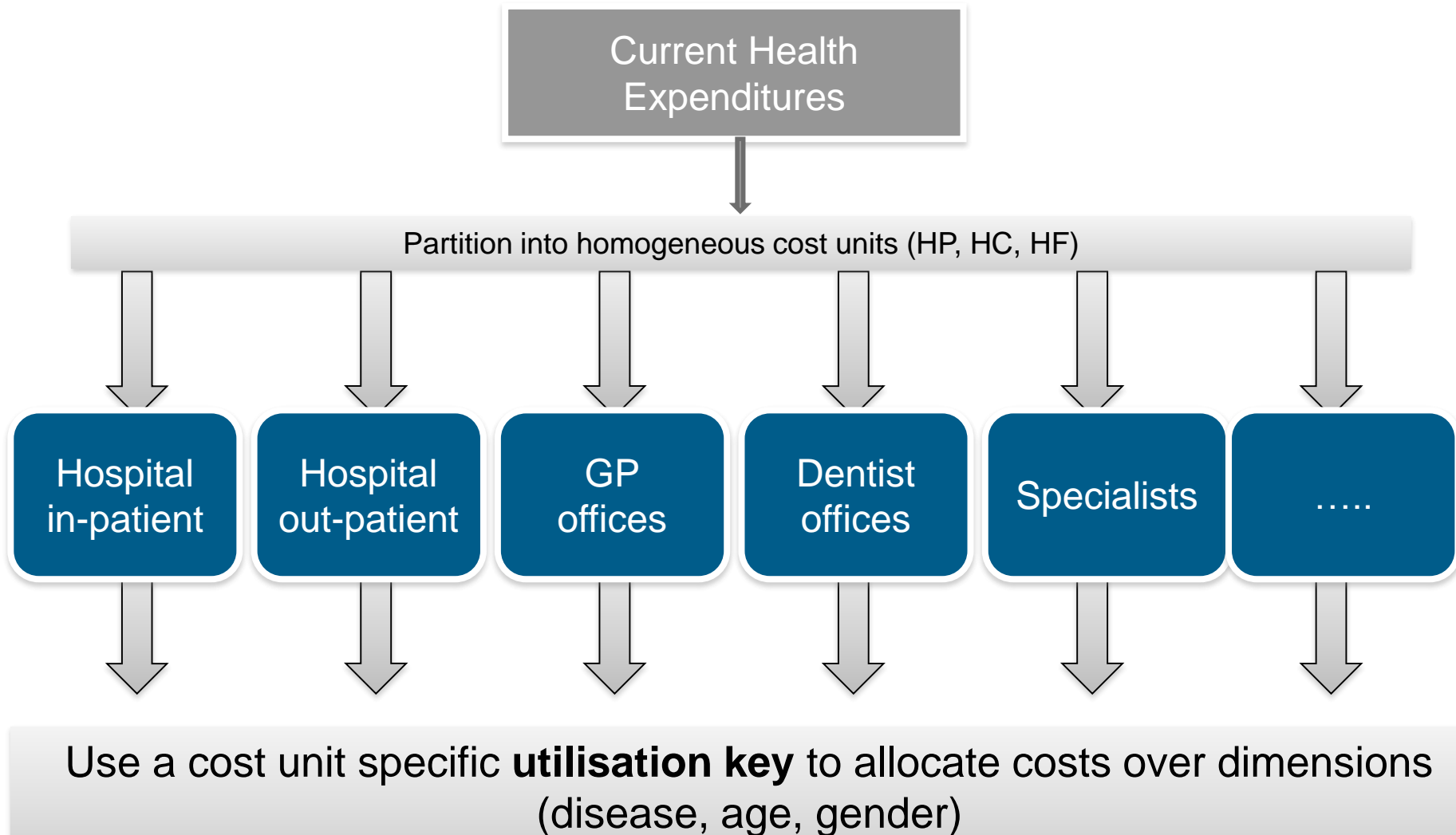
SHA 2011 Framework (tri-axial relationship)



Expenditures by Disease project—COI under SHA framework

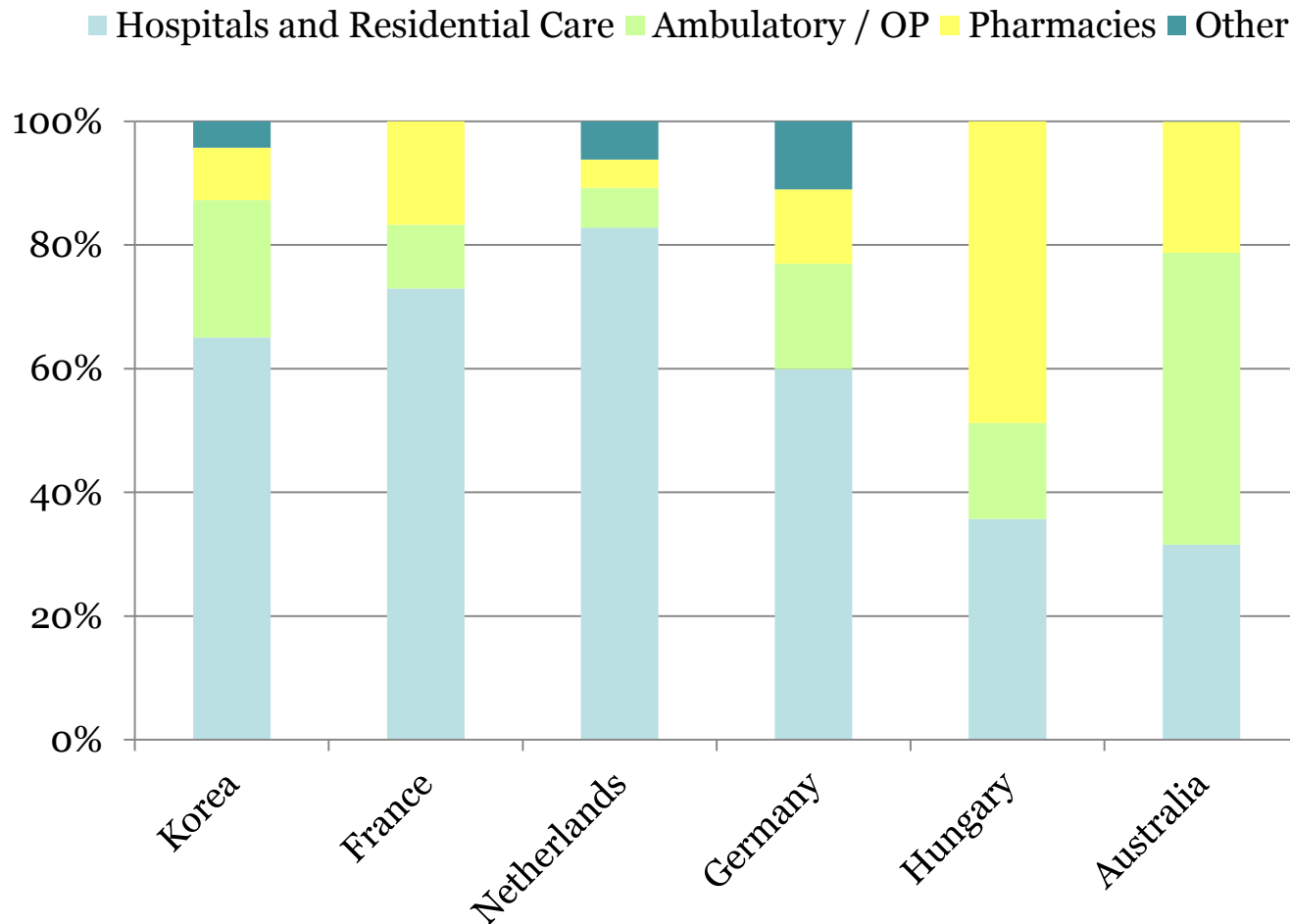
- COI expansion of SHA
- Estimating Expenditure by Disease, Age and Gender under the System of Health Accounts (SHA) Framework (2008)
- Can allocate by disease or diagnostic category
 - » ICD chapter, ISHMT (depending on availability of data)
- Breakdown by age, sex, socio-economic status
- Consistent, standardised approach
 - » Diseases
 - » countries

Top-down allocation of expenditures



Using COI results in International Comparisons

Mental Health Spending* by Provider



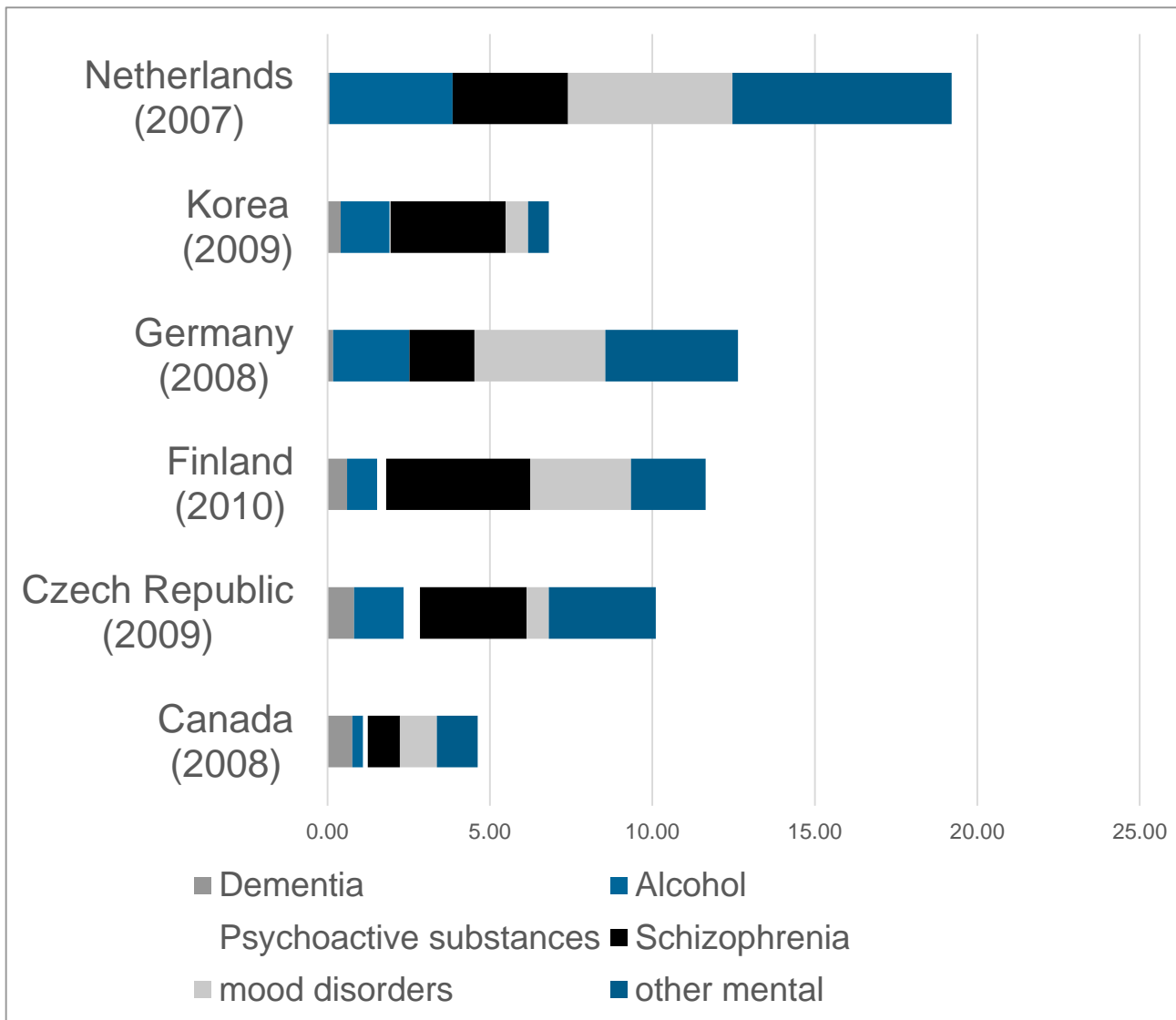
Source: unpublished OECD data

*ICD10 Chapter V

Share of allocated spending only.

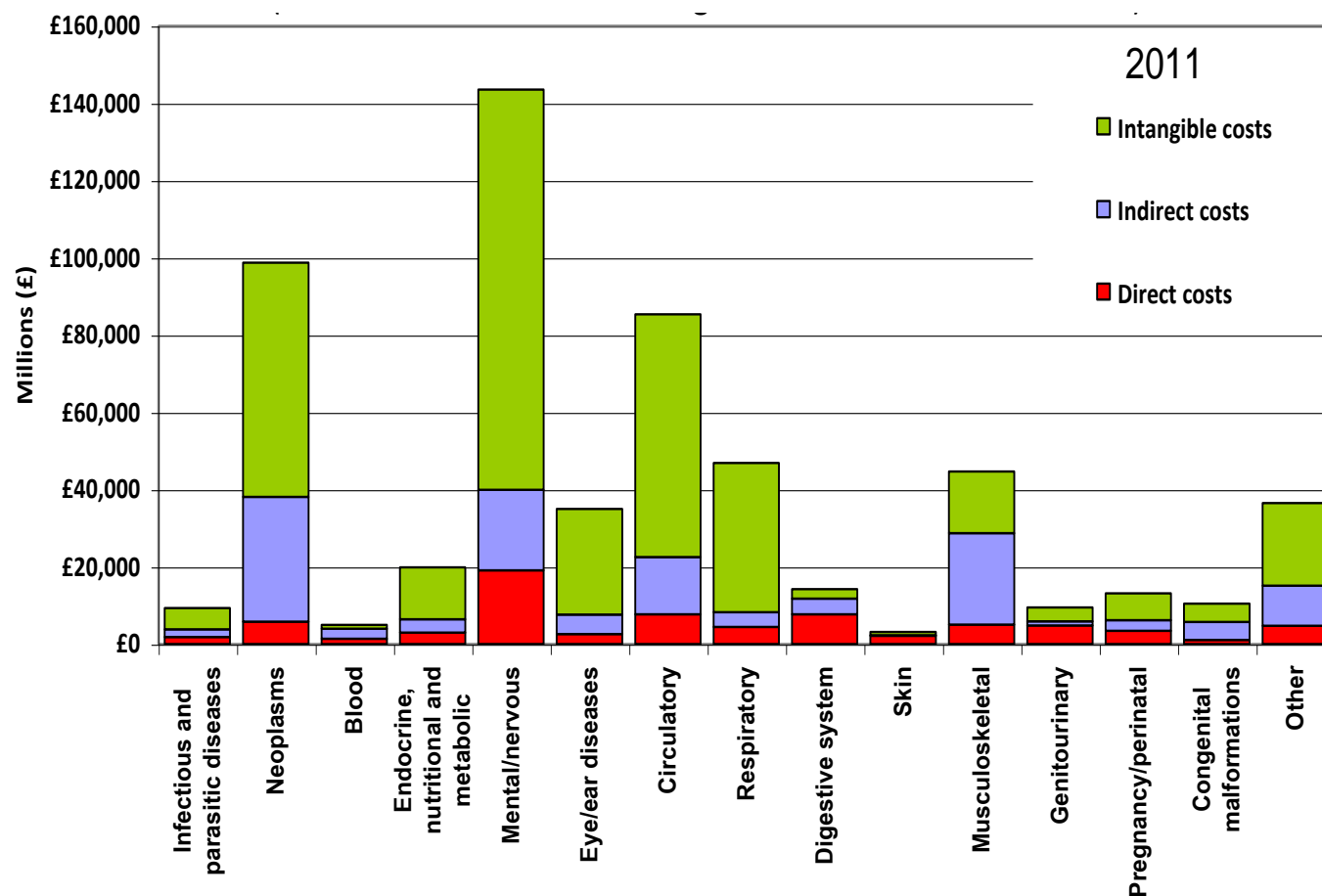
Data for 2006 except France 2002, Netherlands 2005

In-patient hospital expenditures by ISHMT as percentage of total health expenditures, Chapter V (Mental Health)



- Wide variation in mental health spending observed
- Due to differences in reporting?

Economic Burden of Disease in England, 2011



Source: UK Department of Health, 2013

Summary

- COI framework
- COI application with EBIC
- COI under SHA
- International applications and comparisons

Next steps EBIC

- Reduce unallocated expenditures
 - » Disability costs
 - » Other cost components
- Physician data from provinces/territories
- Examine co-morbidities
- Examine caregivers
- Consistent with SHA framework
- Regular releases/updates

Thank you!

Questions?

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Economic Burden of Illness in Canada:

<http://ebic-femc.phac-aspc.gc.ca/index.php>

System of Health Accounts:

<http://www.oecd.org/els/health-systems/estimating-expenditure-by-disease-age-and-gender.htm>