

# IP15: Should Productivity Losses due to Illness be Considered in Health Economic Evaluations?

Tuesday, 6<sup>th</sup> September 2016  
09:45 - 10:45



## Agenda and Panellists

### Introduction

#### **Craig Brooks-Rooney**

Head, Asia-Pacific  
Costello Medical Singapore

### Productivity in HE evaluations: which perspective should be used?

#### **Dr Ken Redekop**

Associate Professor, Institute of Health Policy and Management, Erasmus University;  
Visiting Associate Professor, Saw Swee Hock School of Public Health, National University of Singapore.

### Human Capital vs Friction Cost Approach: Which to Choose?

#### **Dr Wee Hwee Lin**

Assistant Professor  
Department of Pharmacy, Faculty of Science & Saw Swee Hock School of Public Health,  
National University of Singapore

### Considering Presenteeism and Unpaid Work in Productivity Loss Calculations

#### **Dominique Milea**

Director Health Economics & Epidemiology Asia  
Lundbeck Singapore

### Discussion

## Pause for thought...

- Decision on funding for one of two different health technologies:

	Intervention A	Intervention B
Incremental QALYs	1.2	1.2
Incremental cost	\$20,000	\$20,000
Target population	Patients aged 20-50 years old ~1,000 patients per year	Patients aged 20-50 years old ~1,000 patients per year

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Productivity impact:		
• Absenteeism	• ↓ 10%	• ↓ 30%
• Presenteeism	• ↓ 15%	• ↓ 25%
• Disability/early retirement	• No change	• ↓ 10%

- Which would you choose?

## Pause for thought...

- Decision on funding for one of two different health technologies:

	Intervention A	Intervention B
Incremental QALYs	1.2	1.2
Incremental cost	\$20,000	\$20,000
Target population	Patients aged 20-50 years old ~1,000 patients per year	Patients aged 20-50 years old ~1,000 patients per year
Productivity impact:		
• Absenteeism	• ↓ 10%	• No change
• Presenteeism	• ↓ 15%	• ↓ 50%
• Disability/early retirement	• No change	• No change

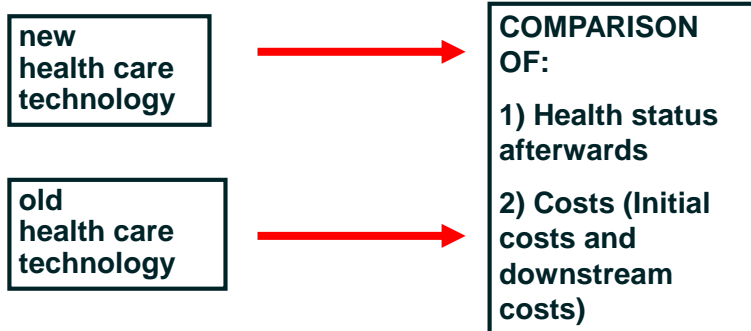
- Which would you choose?

## Productivity costs in health policies: relevant or not?

Ken Redekop

September 6, 2016

# Economic Evaluation



## QUESTIONS TO CONSIDER:

1. Does the new intervention cost more than the old one?
2. Does the new intervention result in more health than the old one?
3. Does the extra health gain (from the new intervention) justify the extra costs (resources) required?

*Erafus*

## Frequency of economic evaluations (2012-14)

Table II. Top 20 countries most frequently studied in economic evaluations by income group

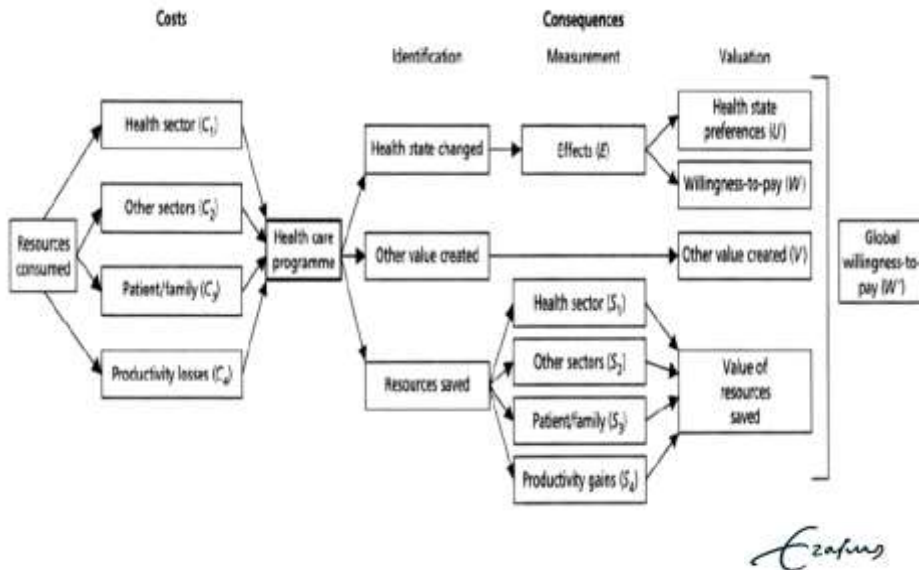
Rank	High income		Upper-middle-income		Low and lower-middle-income				
	Country	N	%	Country	N	%			
1	USA	813	35%	China	116	30%	Uganda	49	27%
2	UK	478	20%	South Africa	71	18%	India <sup>a</sup>	41	22%
3	Netherlands	183	8%	Brazil	56	14%	Kenya <sup>a</sup>	41	22%
4	Canada	162	7%	Thailand	36	9%	Zambia	39	21%
5	Spain	136	6%	Iran	31	8%	Malawi	35	19%
6	Germany	109	5%	Colombia <sup>a</sup>	28	7%	Nigeria <sup>a</sup>	34	18%
7	Australia	100	4%	Mexico <sup>a</sup>	28	7%	Tanzania <sup>a</sup>	34	18%
8	Italy	98	4%	Turkey	24	6%	Zimbabwe	33	18%
9	Sweden	74	3%	Botswana <sup>a</sup>	23	6%	Congo, Dem. Rep.	30	16%
10	France	57	2%	Namibia <sup>a</sup>	23	6%	Ethiopia	29	16%
11	Japan	45	2%	Angola	18	5%	Lesotho <sup>a</sup>	28	15%
12	Belgium	42	2%	Gabon	17	4%	Mozambique <sup>a</sup>	28	15%
13	Denmark	33	2%	Mauritius <sup>a</sup>	14	4%	Rwanda <sup>a</sup>	28	15%
14	Korea, Rep. <sup>a</sup>	31	1%	Peru <sup>a</sup>	14	4%	Vietnam <sup>a</sup>	28	15%
15	Norway <sup>a</sup>	31	1%	Seychelles <sup>a</sup>	14	4%	Ghana	27	15%
16	Greece	29	1%	Bulgaria	13	3%	Central African Republic	26	14%
17	Ireland	27	1%	Argentina <sup>a</sup>	12	3%	Burundi <sup>a</sup>	25	14%
18	Switzerland <sup>a</sup>	24	1%	Hungary <sup>a</sup>	12	3%	Cameroon <sup>a</sup>	25	14%
19	Finland <sup>a</sup>	24	1%	Maldives	11	3%	Eritrea <sup>a</sup>	25	14%
20	Taiwan	23	1%	Serbia	10	3%	Burkina Faso	24	13%
	High-income countries	2350	100%	Upper-middle-income countries	391	100%	Low- and lower-middle-income countries	184	100%

<sup>a</sup>Equal ranking with country above and/or below.

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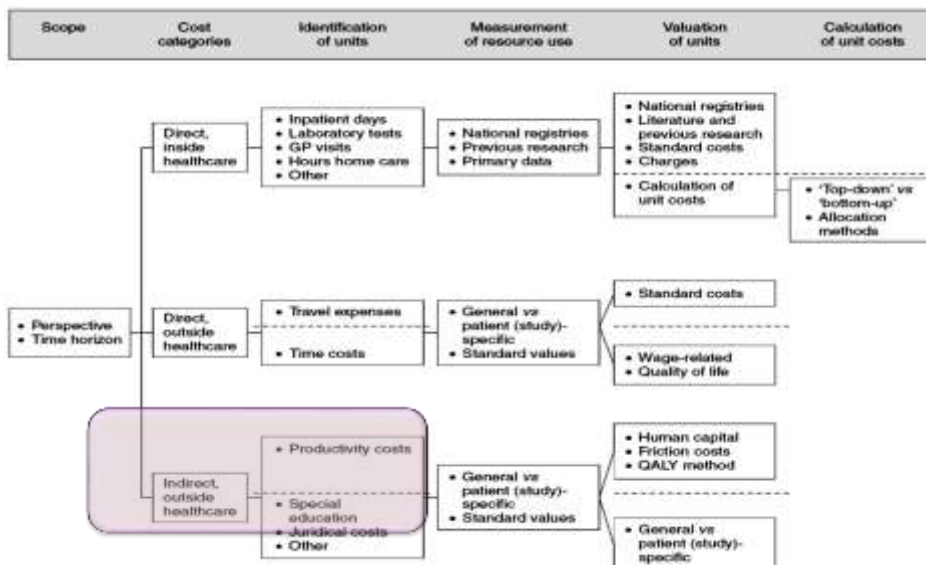
Ref: Pitt et al., Health Econ 2016

## Components of an economic evaluation



Ref: Drummond et al., Methods for the Economic Evaluation of Health Care Programmes, 2005

## Manual for costing studies (Netherlands) (CVZ/ZIN, iMTA)



Ref: Oostenbrink et al, PharmacoEcon, 2002

## Which perspectives are used in pharmacoeconomic in guidelines?

	Australia	Canada	France	Germany	Sweden	The Netherlands	England & Wales	United States of America	China Mainland	South Korea	Taiwan	Thailand	Malaysia
Perspective	N/A	This perspective may include costs that are incurred by long-term care, social services, or community-based services	Economic evaluation studies of health care programmes must adopt the widest possible perspective in order to include all the relevant outcomes of each programme studied. The choice of the range of observation must be justified.	As of Jan 1st, 2011 according to AMNOG law, FIC can define the perspective in its commission of IQWiG. The primary perspective will be the health care sector's, optional perspectives can be social security (including long term nursing care and other branches of social security) or societal perspectives	Societal	Societal perspective. Report unrelated medical costs in life years gained separately.	N/A	N/A	N/A		Mainly societal, may separate into payer and others	N/A	Provider or Funder. Patient and societal perspective are encouraged

Source: ISPOR website, accessed July 26, 2016;  
<http://www.ispor.org/PEGuidelines/COMP3.asp>

*Erafus*

## Which perspectives are used in pharmacoeconomic guidelines?

Item	Japan [1,2]	China Mainland [3]	South Korea [4]	Taiwan [5]	Thailand [6]	England and Wales [7]
Title and year of the Document	• Guideline for analytical methods for health economics evaluation (2012)	• China Guidelines for Pharmacoeconomic Evaluation (2011)	• Pharmaceutical Economic Evaluation Guidelines (January 2008)	• Guidelines of Methodological Standards for Pharmacoeconomic Evaluations (2004)	• Health Technology Assessment Guideline (2008)	• Guide to the Methods of Technology Appraisal (June 2008)
Perspective	<ul style="list-style-type: none"> <li>Standard: public healthcare payer's perspective (only public medical costs)</li> <li>Public healthcare and long-term care payer's perspective can be used (+ cost of public nursing care)</li> <li>Restricted societal perspective may be performed (+ other direct costs and productivity loss)</li> </ul>	<ul style="list-style-type: none"> <li>Primarily society perspective</li> <li>Other perspectives: payer, employee, health care provider, patient</li> </ul>	<ul style="list-style-type: none"> <li>Insurer perspectives</li> <li>Society perspective</li> </ul>	<ul style="list-style-type: none"> <li>Mainly societal perspective (separate into payer and others)</li> </ul>	<ul style="list-style-type: none"> <li>Depends on study objectives (patient's perspective when making treatment decisions for the individual patient)</li> </ul>	<ul style="list-style-type: none"> <li>All direct health effects, whether for patients or, when relevant, other people (principally carers)</li> </ul>
Costs to be included	<ul style="list-style-type: none"> <li>Public healthcare costs</li> <li>Public nursing care costs</li> <li>Productivity loss depending on the selected perspective (can include family members or caregivers rather than patient alone)</li> </ul>	<ul style="list-style-type: none"> <li>Primarily direct medical costs, followed by direct non-medical cost and indirect cost if data available</li> </ul>	<ul style="list-style-type: none"> <li>All cost items relevant to pharmaceutical treatment in the analysis from such perspectives should be included, no matter who paid those costs</li> <li>Productivity costs accrued by death or illness should not be included</li> </ul>	<ul style="list-style-type: none"> <li>Depends on study perspective</li> </ul>	<ul style="list-style-type: none"> <li>Depends on study perspective</li> <li>Direct medical, direct non-medical and indirect costs should be included if societal perspective is used</li> </ul>	<ul style="list-style-type: none"> <li>Potential direct and indirect resource costs for the NHS and PLS that would be expected</li> </ul>

Source: Millier et al., ISPOR 2014

## Which perspective is used in the UK?

- Interventions with health outcomes in NHS settings

Productivity costs and costs borne by people using services and carers that are not reimbursed by the NHS or social services should not usually be included in any analyses. That is, a societal perspective will not normally be used.

*“Costs of lost production and any costs borne by patients and carers that are not reimbursed by the public sector should be included if a sufficiently wide perspective is also adopted.”*

Source:

<https://www.nice.org.uk/process/pmg4/chapter/incorporating-health-economics>

Note: this webpage says that a cost-utility analysis ignores productivity costs. This is not true.



## No consensus on perspective and productivity costs

- Productivity costs are still quite controversial in economic evaluations of healthcare interventions
- What are the pros and cons of including productivity costs?
- Issues for each country to consider:
  - Which perspective is best for that country?
  - Should all countries use the same perspective?



Which elements should be included in an economic evaluation?

	Health	Productivity costs
Patient		
Caregiver/family		
Others		

*Ezapuro*

Which elements should be included in an economic evaluation?

	Health	Productivity costs
Patient		
Caregiver/family		
Others		

- Possible argument: content of the healthcare system should be based on improving the patient's health

*Ezapuro*



## Which elements should be included in an economic evaluation?

	Health	Productivity costs
Patient		
Caregiver/family		
Others		

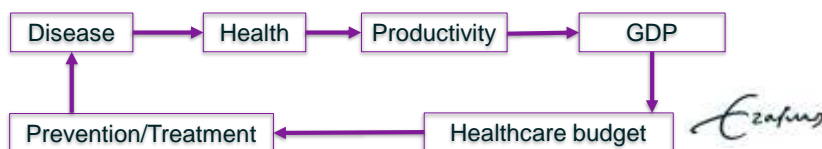
- Possible argument: content of the healthcare system should be based on the health of all persons and not just the health of the patients

*Ezapuro*

## Which elements should be included in an economic evaluation?

	Health	Productivity costs
Patient		
Caregiver/family		
Others		

- Possible argument: content of the healthcare system should also consider the wider societal implications.
- Productivity affects the GDP, which affect all parts of society



## Should productivity costs be considered?

- Do YOU think that productivity costs should be included in economic evaluations?
- What is your rationale?

*Ezafun*



## Human Capital vs Friction Cost Approach

**ISSUE PANEL: SHOULD PRODUCTIVITY LOSSES DUE TO  
ILLNESS BE CONSIDERED IN HEALTH ECONOMIC  
EVALUATIONS?**

ISPOR AP, Singapore, 2016

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National University of Singapore

## Human Capital Approach (HCA) - Concept

- Illness or death leads to lost work time
- The value of a life thus depends on the discounted value of future earnings of an individual over the expected life time



Ref. Pritchard and Sculpher, 2000

## HCA - Pros

- Simple to understand
- Easy to do

## HCA - Cons

- Not Working = No Economic Value



Jim Rogers,  
Multimillionaire,  
Retired at age 37

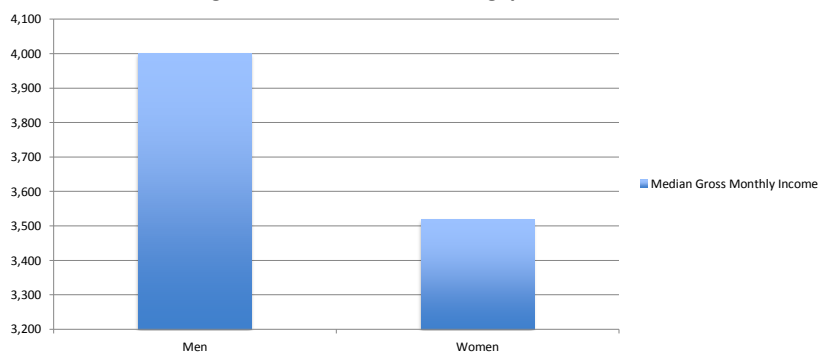


Rhea Wahlberg,  
Top model turned Stay-at-home-Mum

## HCA - Cons

- Gender and race discrimination in income

**Median Gross Monthly Income from Work of Employed Residents  
aged 15 Years and over in Singapore in 2014**



## HCA - Cons

- Value of lost leisure time not considered



## HCA - Cons

- HCA tends to overestimate lost productivity because of the lifetime horizon



## Friction Cost Approach (FCA) - Concept

- Someone who drops out of the workforce can be replaced by another currently unemployed individual
- Length of lost productivity is not over a lifetime but over a limited friction period

## FCA - Concept

- Friction period:
  - time taken to find the replacement and for the replacement to get up to speed and reach the same level of production previously achieved by the person replaced
  - Currently set at 6 months



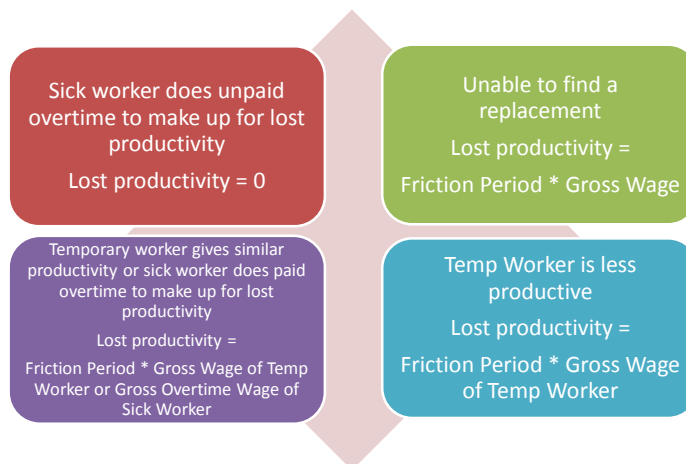
## FCA - Concept

- Lost productivity due to mortality and permanent or long-term disability are treated similarly



## FCA - Concept

- Four possible scenarios for short-term illness



## FCA - Advantages

- More reflective of real life scenarios

## FCA - Cons

- Assumes that the replacement is an unemployed individual. However, it is probably more true that the replacement is currently employed somewhere else
  - Issue of multiple friction periods





## FCA- Cons

- Assumes that individuals with the right skills and qualifications are readily available
- Or that company has ready spare capacity



## HCA vs FCA

- HCA tends to overestimate lost productivity compared to FCA

**Table 3**

Ref. Clinicoecon Outcomes Res. 2013; 5: 565–573.

Human capital approach and friction cost method in studies evaluating productivity cost for mortality, disablement, and/or work absence

	Mortality		Disablement		Work absence	
	HC	FC	HC	FC	HC	FC
Katselidou et al[29]	€9.9 million	€302,513	€264 million	€5.7 million	€4.9 million	€4.3 million
Koopmanschap and van Ineveld[30]	2,072 million DFL	60 million DFL	2,615 million DFL	19 million DFL	624 million DFL	353 million DFL
Koopmanschap et al[31]	8 billion DFL	0.15 billion DFL	49.1 billion DFL	0.15 billion DFL	23.8 billion DFL	9.2 billion DFL
Lopez-Bautista et al[1]	Cancer: €122.4 million CVD: €80.8 million	Cancer: €2.5 million CVD: €1.7 million			Cancer: € 13.3 million CVD: €30.8 million	Cancer: €13.2 million CVD: €23.8 million
Oliva et al[2]	Breast: €113.1 million Cervical: €21.7 million	Breast: €2.3 million Cervical: €391,600	Breast: €139.3 million Cervical: €206 million	Breast: €3.4 million Cervical: €310,400	Breast: €16.4 million Cervical: €1.2 million	Breast: €3.9 million Cervical: €432,000

**Abbreviations:** DFL, Dutch Florin (The Netherlands currency); CVD, cardiovascular disease; FC, friction cost approach; HC, human capital method.

So, which way to go?



So, which way to go?

- Short term absenteeism
  - Costs will be very similar between the two approaches
- Mortality and permanent absenteeism
  - Do both, as a form of sensitivity analysis
  - The truth is somewhere in between



# Other Considerations When Assessing Productivity Costs

**ISSUE PANEL: SHOULD PRODUCTIVITY LOSSES DUE  
TO ILLNESS BE CONSIDERED IN HEALTH ECONOMIC  
EVALUATIONS?**

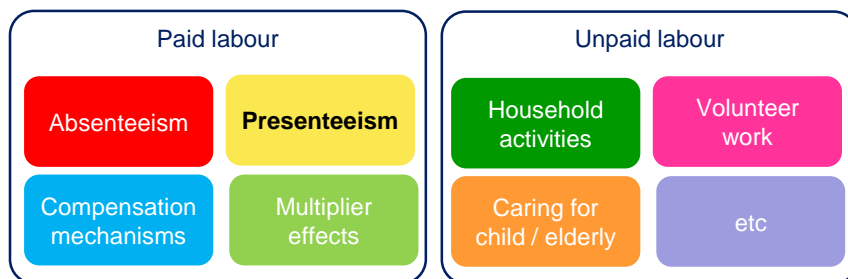
ISPOR AP, Singapore, 2016

Dominique Milea

Director Health Economics & Epidemiology Asia  
Lundbeck Singapore Pte Ltd

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## Factors influencing productivity costs



Krol M et al. Productivity costs in economic Evaluation: Past, Present, Future. *Pharmacoeconomics* 2013; 31:537-549  
Krol et al, How to Estimate Productivity Costs in Economic Evaluation, *Pharmacoeconomics* 2014; 32:335-344

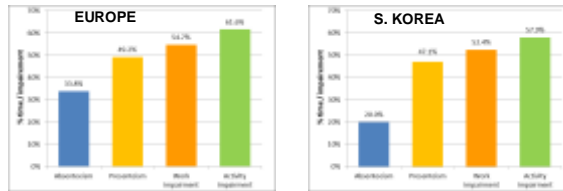
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## Presenteeism is more relevant for some geographies

### eg. differences with Europe

A survey conducted in 300+ depressed patients in South Korea and 1400+ depressed patients in Europe reveal differences in work productivity impact

Absenteeism was lower in South Korea compared to Europe, whilst presenteeism, work & activity impairment were of similar level



However, the presenteeism index applies to a much higher number of worked hours in South Korea compared to Europe

in past 7 days ...	EUROPE	S. KOREA
Total nb hours worked	35.2	44.8
Nb hours missed* - mean, (SD)	11.5 (15.3)	9.1 (21.6)
Nb hours worked - mean, (SD)	23.7 (21.3)	35.7 (30.5)

\*due to depression



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Kim et al, Psychiatry Research 2016, 239:353-361  
Haro et al, Pharmacoeconomic Drug Saf 2013, suppl 1, S507

## There are numerous Instruments to Measure/Value Presenteeism

Selecting an appropriate instrument among those available is challenging



Among these instruments, 4 have been used in 112 studies in Asia: **WPAI** (86 studies), **WHO-HPQ** (16 studies), **SPS** (8 studies) and **LEAP** (2 studies)

Ospina et al - Systematic Review of Measurement Properties of Instruments Assessing Presenteeism - Am J Manag Care. 2015;21(2):e171-e185

## Challenges in Measuring Presenteeism

Empirical research has shown that the use of different instruments can lead to large difference in outcomes

Impact on productivity while at work is not as easily measured as time absent from work:

- Most of the instruments rely on **self-report**, which itself increases measurement uncertainty
- Estimation of **externalities** requires **assumptions** about the number of other workers impacted and the intensity of the effect
- **Translations** can also add uncertainty
  - Example: translation of WPAI - *“During the past seven days, how much did your xxx disorder affect your **productivity** while you were working?”*
  - In Japan - the term "**productivity**" is very rarely used for human beings. It was initially rendered as "**amount of work**" although this may have been interpreted as "**work load**". During the tests, respondents suggested instead a word close to "**effectiveness**"
  - In China - the term "productivity" was also rendered as "**effectiveness**"
  - In Thailand - the term "productivity" was rendered as "**capability**"

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## Challenges in Valuing Presenteeism

empirical research has shown that the use of different instruments can lead to large difference in outcomes

- Some of the available instruments to measure presenteeism do not have a **valuation component**
- The **friction cost method is hard to apply** in the context of presenteeism
- In applying the **human capital method** in the case of presenteeism, it is not clear whether the tasks not undertaken are of average value, above average or below average

As a consequence, decision-makers have concerns about the validity of estimates of productivity costs in economic evaluations

Improving these instruments should be a focus of research

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## Unpaid work is key for Asia

Example of the caregiving to the elderly

- Caring for the elderly is under responsibility of families
  - Confucianism and filial piety
  - Lack of social institutions in many countries
- Ultra-rapid aging societies
  - Increasing number of elderly and decreasing number of working-age resulting in increased dependency ratio
- As a consequence
  - Rapidly increasing burden for the working population
  - Shift of burden to the elderly



## How to identify & measure unpaid productivity?

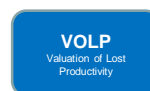
- Approach 1
  - measures the changes in time spent on unpaid labour
  - Difficult to distinguish between time spent on unpaid labour and leisure time
  - Third person criteria (Reid et al): all output replaceable by a third person can be considered unpaid labour
- Approach 2
  - measures the additional time others spend on unpaid labour tasks not performed by the patient due to illness
  - Avoids difficulties of approach 1 but underestimates unpaid work as all activities that are not compensated for or have disappeared are not considered.

## How to value unpaid productivity ?

- Opportunity cost approach
  - Value on lost unpaid work determined by a person's value of competing time use (eg net wage of a person's paid work)
  - Value of 1hr unpaid work differs between people with different wages in paid work (for same quality of unpaid work)
  - Which value to consider ?
  - Case of unemployment?
- Proxy good approach
  - Value of lost unpaid work based on the value of closest market substitute (eg professional housekeeper)
  - Value of 1hr unpaid work differs with the form of unpaid work – although advised to use 1 fixed cost price
  - Which value to consider?

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## Which tools are available?



- Patients are asked to state
  - how many days there were forced to do less unpaid work due to health problem
  - how much time a substitute **would need** to perform the tasks they were not able to do
- Includes both replaced unpaid work and lost unpaid work
- Patients are asked to state
  - how many hours they **actually** received help with unpaid work due to health problems
- Includes only replaced unpaid work

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## Challenges in Evaluating Unpaid Productivity

- Lack of **awareness** and limited **understanding** therefore largely omitted from evaluations
- Few tools, none translated for Asia
- **Limited experience** and **limited guidance**
- Similar challenges as for presenteeism, with more **difficulties in identifying** both unpaid work and changes in its productivity
- Potential issue of **double counting** when including costs related to both unpaid work and informal care

As a consequence, decision-makers have concerns about the validity of estimates of productivity costs in economic evaluations

Improving these instruments should be a focus of research

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## Conclusions & Take-aways

<b>Presenteeism</b>	<ul style="list-style-type: none"><li>• Considerable impact on productivity, particularly for certain diseases and in regions like Asia</li><li>• Many instruments to measure, no “gold standard”, uncertainty regarding measurements</li><li>• Friction cost approach is difficult to value presenteeism; human capital approach is widely used</li></ul>
<b>Unpaid work</b>	<ul style="list-style-type: none"><li>• Should be considered where the caregiving displaces potential employment time (i.e. the opportunity cost)</li><li>• Is a particular issue in ageing societies with strong cultural traditions of family care (China, Japan, Korea, Singapore, etc)</li><li>• Tools to measure unpaid work and methods to value it are underdeveloped</li></ul>

Presenteeism and unpaid work should be considered as part of health economic evaluations. However, more work is required to have consensus on approaches and methodologies.

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## What do you think?

Do you think that productivity losses due to illness should be included in health economic evaluations?

**Yes**

**No**



Thank you!