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

**Tuesday, 6th September 2016**

09:45 - 10:45

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**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** | |

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Pause for thought…

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

<table>
<thead>
<tr>
<th></th>
<th>Intervention A</th>
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<tbody>
<tr>
<td>Incremental QALYs</td>
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<td>↓ 10%</td>
<td>↑ 30%</td>
</tr>
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<td>Presenteeism</td>
<td>↓ 15%</td>
<td>↑ 25%</td>
</tr>
<tr>
<td>Disability/early retirement</td>
<td>No change</td>
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- Which would you choose?
Pause for thought…

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• Which would you choose?

Productivity costs in health policies: relevant or not?

Ken Redekop
September 6, 2016

Institute of Health Policy & Management
Erasmus University Rotterdam
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?

COMPARISON OF:
1) Health status afterwards
2) Costs (Initial costs and downstream costs)

Frequency of economic evaluations (2012-14)

<table>
<thead>
<tr>
<th>Country</th>
<th>High income</th>
<th>Upper-middle-income</th>
<th>Low and lower-middle-income</th>
</tr>
</thead>
<tbody>
<tr>
<td>USA</td>
<td>813</td>
<td>35%</td>
<td>116 30%</td>
</tr>
<tr>
<td>UK</td>
<td>478</td>
<td>20%</td>
<td>71 18%</td>
</tr>
<tr>
<td>Netherlands</td>
<td>183</td>
<td>8%</td>
<td>56 14%</td>
</tr>
<tr>
<td>Canada</td>
<td>162</td>
<td>7%</td>
<td>36 9%</td>
</tr>
<tr>
<td>Spain</td>
<td>136</td>
<td>6%</td>
<td>31 8%</td>
</tr>
<tr>
<td>Germany</td>
<td>109</td>
<td>5%</td>
<td>28 7%</td>
</tr>
<tr>
<td>Australia</td>
<td>100</td>
<td>4%</td>
<td>28 7%</td>
</tr>
<tr>
<td>Italy</td>
<td>98</td>
<td>4%</td>
<td>24 6%</td>
</tr>
<tr>
<td>Sweden</td>
<td>74</td>
<td>3%</td>
<td>23 6%</td>
</tr>
<tr>
<td>France</td>
<td>57</td>
<td>2%</td>
<td>23 6%</td>
</tr>
<tr>
<td>Japan</td>
<td>45</td>
<td>2%</td>
<td>18 5%</td>
</tr>
<tr>
<td>Belgium</td>
<td>42</td>
<td>2%</td>
<td>17 4%</td>
</tr>
<tr>
<td>Denmark</td>
<td>33</td>
<td>2%</td>
<td>14 4%</td>
</tr>
<tr>
<td>Korea, Rep.*</td>
<td>31</td>
<td>1%</td>
<td>14 4%</td>
</tr>
<tr>
<td>Norway, Seychelles</td>
<td>31</td>
<td>1%</td>
<td>14 4%</td>
</tr>
<tr>
<td>Greece</td>
<td>29</td>
<td>1%</td>
<td>13 3%</td>
</tr>
<tr>
<td>Ireland</td>
<td>27</td>
<td>1%</td>
<td>12 3%</td>
</tr>
<tr>
<td>Switzerland</td>
<td>24</td>
<td>1%</td>
<td>12 3%</td>
</tr>
<tr>
<td>Finland*</td>
<td>24</td>
<td>1%</td>
<td>11 3%</td>
</tr>
<tr>
<td>Taiwan</td>
<td>23</td>
<td>1%</td>
<td>10 3%</td>
</tr>
<tr>
<td>High-income countries</td>
<td>2350</td>
<td>100%</td>
<td>391 100%</td>
</tr>
</tbody>
</table>

*Equal ranking with country above and/or below.

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?

<table>
<thead>
<tr>
<th>Perspective</th>
<th>Australia/Canada</th>
<th>France</th>
<th>Germany</th>
<th>Sweden/Netherlands</th>
<th>England/United Kingdom/States of America</th>
<th>China Mainland</th>
<th>South Korea</th>
<th>Taiwan</th>
<th>Thailand/Malaysia</th>
</tr>
</thead>
<tbody>
<tr>
<td>N/A</td>
<td>The 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, F7C can define the perspective in its commission of RWGs. 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 perspective. Report unrelatable medical costs in 45 years gained separately.</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>Provider or Funder. Patient and societal perspective are encouraged.</td>
</tr>
</tbody>
</table>


Which perspectives are used in pharmacoeconomic guidelines?

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?

<table>
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<td></td>
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<tr>
<td>Caregiver/family</td>
<td></td>
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<tr>
<td>Others</td>
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Possible argument: content of the healthcare system should be based on improving the patient’s health.
Which elements should be included in an economic evaluation?

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

Which elements should be included in an economic evaluation?

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

```mermaid
graph LR
    Disease --> Health
    Health --> Productivity
    Productivity --> GDP
    Prevention/Treatment --> Healthcare budget
```

```mermaid
graph LR
    Disease --> Health
    Health --> Productivity
    Productivity --> GDP
    Prevention/Treatment --> Healthcare budget
```
Should productivity costs be considered?

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

Human Capital vs Friction Cost Approach
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

\[
\text{Friction Period (6 months)} \times \text{Discounted Gross Wages} = \text{Lost Productivity due to mortality, permanent or long term disability}
\]

FCA - Concept

• Four possible scenarios for short-term illness

- Sick worker does unpaid overtime to make up for lost productivity
  Lost productivity = 0

- Unable to find a replacement
  Lost productivity = Friction Period * Gross Wage

- Temporary worker gives similar productivity or sick worker does paid overtime to make up for lost productivity
  Lost productivity = Friction Period * Gross Wage of Temp Worker or Gross Overtime Wage of Sick Worker

- Temp Worker is less productive
  Lost productivity = Friction Period * Gross Wage of Temp Worker
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

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
Factors influencing productivity costs

Paid labour
- Absenteeism
- Presenteeism
- Compensation mechanisms
- Multiplier effects

Unpaid labour
- Household activities
- Volunteer work
- Caring for child / elderly
- etc

Krol et al., How to Estimate Productivity Costs in Economic Evaluation, Pharmacoeconomics 2014; 32:335-344
Presenteism 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

<table>
<thead>
<tr>
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<th>UE</th>
<th>S. KOREA</th>
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<tr>
<td>Total nb hours worked</td>
<td>35.2</td>
<td>44.8</td>
</tr>
<tr>
<td>Nb hours missed* - mean, (SD)</td>
<td>11.5 (15.3)</td>
<td>9.1 (21.6)</td>
</tr>
<tr>
<td>Nb hours worked - mean, (SD)</td>
<td>23.7 (21.3)</td>
<td>35.7 (30.5)</td>
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*due to depression

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

Long working hours culture  
Limited sickness benefits  
Stigma wrt mental health

There are numerous Instruments to Measure/Value Presenteeism

Selecting an appropriate instrument among those available is challenging

AR-LWQ  
MIDAS  
VOLP  
S/A HAPO  
P&DQ  
EWPS  
MWPLQ  
WHI  
HPQD  
WPSI  
HLQ  
Osterhaus technique  
WPAI  
WRFQ  
WHO-HPQ  
SPS-6/13  
LEAP

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)

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”

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
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 (e.g., 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 (e.g., 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?

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
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.

Conclusions & Take-aways

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<th>Unpaid work</th>
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<td>• Considerable impact on productivity, particularly for certain diseases and in regions like Asia</td>
<td>• Should be considered where the caregiving displaces potential employment time (i.e. the opportunity cost)</td>
</tr>
<tr>
<td>• Many instruments to measure, no “gold standard”, uncertainty regarding measurements</td>
<td>• Is a particular issue in ageing societies with strong cultural traditions of family care (China, Japan, Korea, Singapore, etc)</td>
</tr>
<tr>
<td>• Friction cost approach is difficult to value presenteeism; human capital approach is widely used</td>
<td>• Tools to measure unpaid work and methods to value it are underdeveloped</td>
</tr>
</tbody>
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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.
What do you think?

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

Yes  No

Thank you!