Valuing Medical Innovation

*Perspectives matter*

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Longer life through better medicines

Deaths (per 100,000 population)

Life expectancy (years)

Source: World Bank, ABS, World Development Indicators 2015 (Australia)
Decline in death rates from leading causes 1970-2010

Source: AIHW Australia’s Health 2014
Cancer-related death rates have declined since 1980 as cancer patients live longer.

Source: Cancer in Australia 2012
New medical innovations are the largest contributor to improvements in life expectancy

40%
1986-2000
New therapies accounted for 40% of the increase in life expectancy in 30 developing and high income countries

73%
2000-2009
New therapies accounted for 73% of the increase in life expectancy in 30 developing and high income countries


Controlled for fixed country and year effects, real per capita income, the unemployment rate, mean years of schooling, the urbanisation rate, real per capita health expenditure, DPT immunisation rate among children ages 12-23 months, HIV prevalence rates, and TB incidence.
Australian innovations such as the HPV vaccine have improved the health of people globally

- Cancer of the cervix is a serious disease and the second biggest killer of women worldwide.
- HPV is a known cause of over 70% of cervical cancers worldwide.
- Prophylactic HPV vaccination programmes have been implemented in over 40 countries.
- The quadrivalent HPV vaccine was found to confer statistically significant protection against cervical abnormalities in young women who had not started screening before the implementation of the vaccination programme in Queensland, Australia.
- Over 100 + million doses have been distributed around the world.
- Gardasil continues to dominate the global HPV vaccine market with blockbuster sales (>1 Billion/year)
Compelling need for industry to build upon these achievements and continue to innovate

Australia has the highest age-standardised incidence of cancer in the world, resulting in significant disease and economic burden. On average, one in every two Australians will develop cancer in their lifetime.

It is estimated that the number of Australians with dementia will increase to 533,285 by 2030 and 942,624 for 2050.

Diabetes has now reached epidemic proportions in Australia with 280 people developing diabetes every day, and over 1.7 million Australians currently living with the disease.

Diabetes remains a major public health concern globally, with increased antibiotic resistance.

Cancers

Dementia

Diabetes

Infectious diseases

Deloitte Access Economics Reports: The economic impact of diabetic macular oedema (2015); Access to cancer medicines in Australia (2013); Dementia Across Australia (2011); WHO: Health Statistics Unit Queensland Health
Understanding the value of innovation requires understanding the burden of disease

- **Health system expenditure**
  - Hospital, MBS, pharmaceuticals, allied healthcare etc.

- **Transfer costs**
  - Dead weight losses of govt. transfers e.g. taxation revenue forgone, welfare and disability payment

- **Non-financial costs**
  - Pain, suffering, premature death

- **Productivity costs**
  - Productivity losses e.g. temporary absenteeism, long term employment impacts, unpaid work, premature mortality and value of informal care

- **Other financial costs**
  - Govt. and non-govt. programs, out of pocket expenses e.g. travel, formal care, aids etc., and funeral costs
# Example: The Economic Impact of Stroke in Australia

## Costs of stroke in Australia, 2012 ($m)

<table>
<thead>
<tr>
<th></th>
<th>Individuals</th>
<th>Family/ Friends</th>
<th>Federal Govt</th>
<th>State Govt</th>
<th>Employers</th>
<th>Society/ Other</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health system costs</td>
<td>161</td>
<td>1</td>
<td>376</td>
<td>233</td>
<td>0</td>
<td>111</td>
<td>881</td>
</tr>
<tr>
<td>Productivity costs</td>
<td>1,742</td>
<td>0</td>
<td>838</td>
<td>0</td>
<td>407</td>
<td>0</td>
<td>2,987</td>
</tr>
<tr>
<td>Carer costs</td>
<td>0</td>
<td>149</td>
<td>73</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>222</td>
</tr>
<tr>
<td>Other costs</td>
<td>388</td>
<td>11</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>398</td>
</tr>
<tr>
<td>DWL</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>491</td>
<td>491</td>
</tr>
<tr>
<td>Transfers</td>
<td>-92</td>
<td>-94</td>
<td>186</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total financial cost</strong></td>
<td><strong>2,198</strong></td>
<td><strong>67</strong></td>
<td><strong>1,474</strong></td>
<td><strong>233</strong></td>
<td><strong>407</strong></td>
<td><strong>602</strong></td>
<td><strong>4,979</strong></td>
</tr>
<tr>
<td>Burden of disease</td>
<td>49,319</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>49,319</td>
</tr>
</tbody>
</table>

**Total cost** | 51,517 | 67 | 1,474 | 233 | 407 | 602 | 54,299

‘The biggest impact on stroke is not the financial costs it causes, but the loss of healthy life.’
Example: The economic impact of Hepatitis C virus (HCV) in Japan

Financial costs of HCV infection amounted to JPY409 billion in 2013

Non-financial costs of HCV infection amounted to JPY12.25 trillion in 2013

Deloitte Access Economics. Estimate of the economic losses due to Hepatitis C virus in Japan: Potential and remaining challenges for reducing the economic and social burden through higher anti-viral treatment rates. 2014
Example: The economic impact of diabetic macular oedema in Australia

Summary of estimated indirect economic costs of DME in Australia

<table>
<thead>
<tr>
<th>Cost type</th>
<th>Total cost</th>
<th>Distribution of indirect financial costs only</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total indirect costs (a)</td>
<td>$624.30 million</td>
<td>Other indirect, $0.37 million, 0%</td>
</tr>
<tr>
<td>Productivity losses</td>
<td>$570.0 million</td>
<td>DWL, $53.93 million, 9%</td>
</tr>
<tr>
<td>Other indirect</td>
<td>$0.37 million</td>
<td></td>
</tr>
<tr>
<td>DWL</td>
<td>$53.93 million</td>
<td></td>
</tr>
<tr>
<td>Loss of wellbeing (b)</td>
<td>$1,445.5 million</td>
<td></td>
</tr>
<tr>
<td>Total indirect economic cost (a) + (b)</td>
<td>$2,069.80 million</td>
<td></td>
</tr>
</tbody>
</table>

NOTE: Productivity losses: lower workforce participation, absenteeism from paid and unpaid work, and premature deaths associated with visual impairment among people with DME. DWLs: deadweight losses associated with the inefficiency of transfer payments (e.g. raising taxes to pay for public services).

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Medical innovation can have an enormous impact on economic growth

• In 2003 we reported that the return on investment medical R&D lie between 1 and 5 times R&D expenditures.

• In 2008 we updated our analysis to show that for every dollar invested in Australian health R&D, $2.17 in health benefits is returned.

• The past 50 years, medical innovation has been the source of > 50% of the growth of the US economy.

• Gains in life expectancy from 1970-2000 added about $3.2 trillion per year to national wealth, with half of the gains due to progress in heart disease alone.

• A 1% reduction in cancer related deaths is expected to be worth $500 billion (US).

• Over $127 billion (US) of productivity gain is attributed to 15% reduction in cancer death rates from 2001-2011.

• And for every dollar spent on innovative medicines, total health care spending is reduced by $7.20.

Deloitte Access Economics. Exceptional Returns The Value of Investing in health R&D in Australia, 2003 and 2008
Lichtenberg F. Benefits and costs of newer drugs: an update. NBER working paper 8996. 2002
Investing in innovation pays off

Example: Public investment in the Human Genome Project resulted in 141:1 ROI in terms of economic output

Govt. investment $3.6 billion

Human Genome Project

Economic output $796 billion

Tax revenue $78.4 billion

310,000 jobs in 2010


Investing in innovation pays off
Example: Returns on NHMRC funded R&D across 5 diseases ($2.2 billion 2000-2010)

Gains in wellbeing
The aversion of 98,426 (DALYS) valued at $6 billion

Avoidance in direct health care costs
The avoidance of $581 million on direct health system expenditure

Combined net benefit

Reduction in indirect costs
Aversion of $385 million in indirect costs, including productivity losses through premature mortality and morbidity related reductions in workforce participation

Commercialisation
The estimated commercial benefits across 5 disease groups of $1.6 billion

Deloitte Access Economics. Returns on NHMRC funded research and development.2011
Industry value to the Australian economy

• Over **50 pharmaceutical** companies and **400 locally owned medical biotech firms** operate in Australia, employing approximately **40,000** highly skilled Australians

• **Over 500 medical technology firms** operate in Australia employing approximately **19,000** Australians

• The pharmaceutical, biotech and medical technology companies are estimated to export goods to the value of **over $5 billion**

Medicine Australia 2015, MTAA facts and figures 2014
Global value of the life sciences industry

- Worldwide prescription drug sales are expected to reach almost one trillion dollars by 2020 (CAGR: 4.8% between 2014 and 2020)
- Globally the medical technology market was valued at US$357 billion in 2012 and is forecasted to grow to US$467 billion in 2018 (CAGR 5% 2013-2012)
Returns from pharmaceutical innovation

Key drivers: size, TA focus and external assets

Companies that focus on fewer therapy areas (TAs) are delivering higher R&D returns

- 8.5% under 4 TAs
- 7.5% 5 TAs
- 4.4% 6 TAs
- 4.2% 7 TAs
- 6.5% over 8 TAs

Projected peak sales for externally sourced assets are higher:

- +6% for all externally sourced assets
- +20% for breakthrough assets
- +54% for orphan drugs

Number of assets progressed and launched since 2010

- 236 assets progressed with projected lifetime revenues of $1,171bn
- 143 products launched with projected lifetime revenues of $955bn

Deloitte Centre for Health Solutions, Measuring the return from pharmaceutical innovation 2014. Turning a corner?
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