

Deloitte Access Economics

# Valuing Medical Innovation

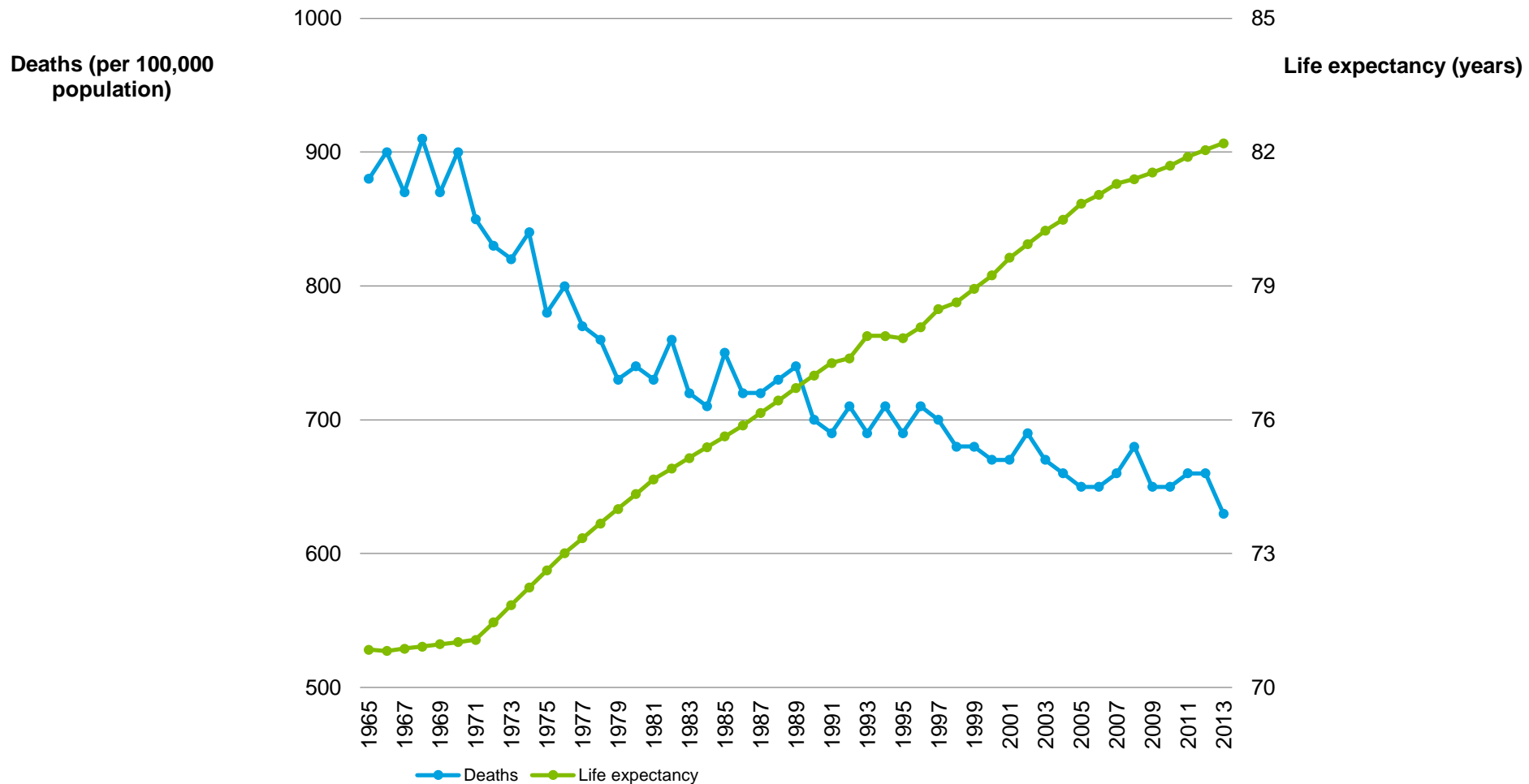
*Perspectives matter*

Lara Verdian  
10 September 2015



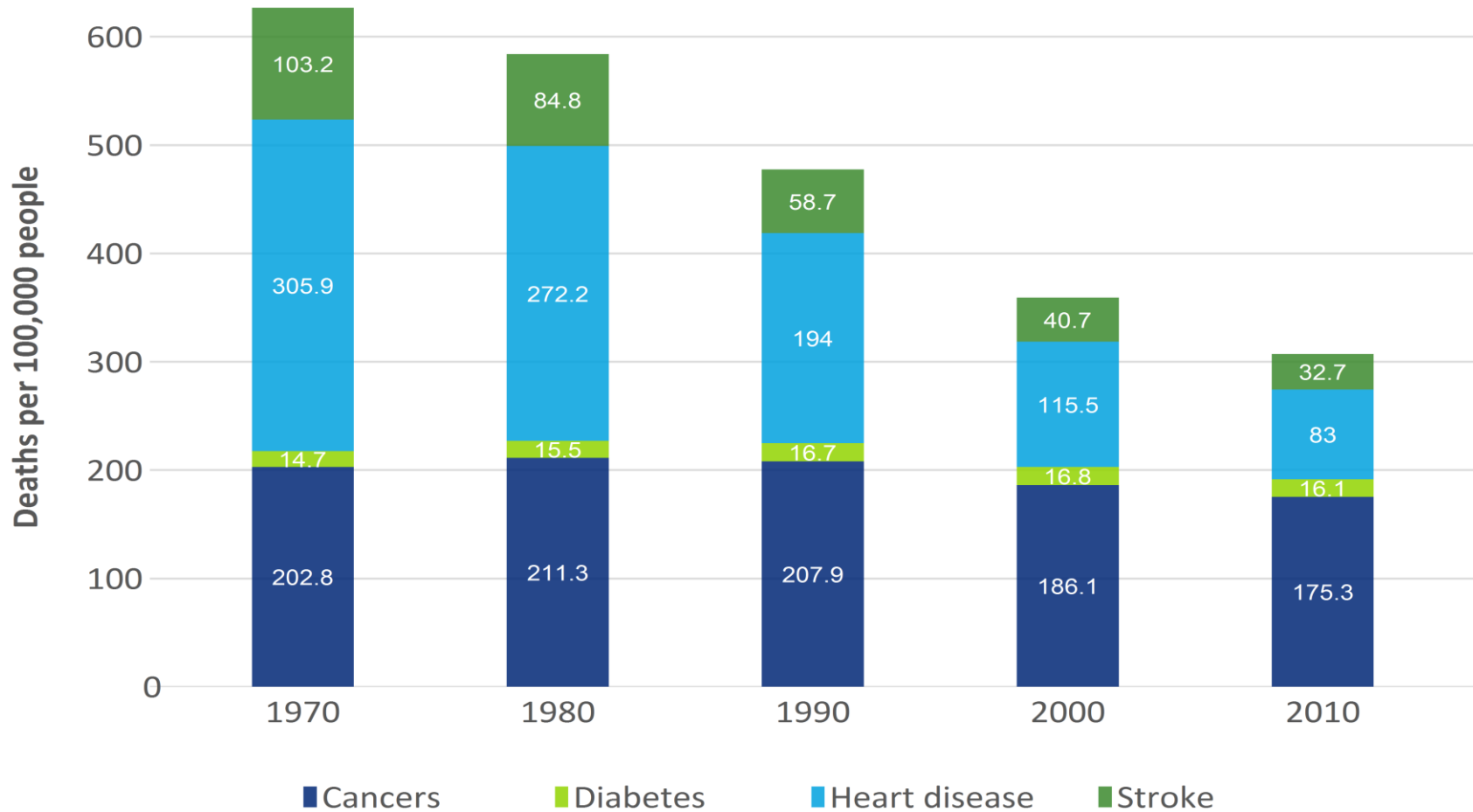
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# Longer life through better medicines



Source: World Bank, ABS, World Development Indicators 2015 (Australia)

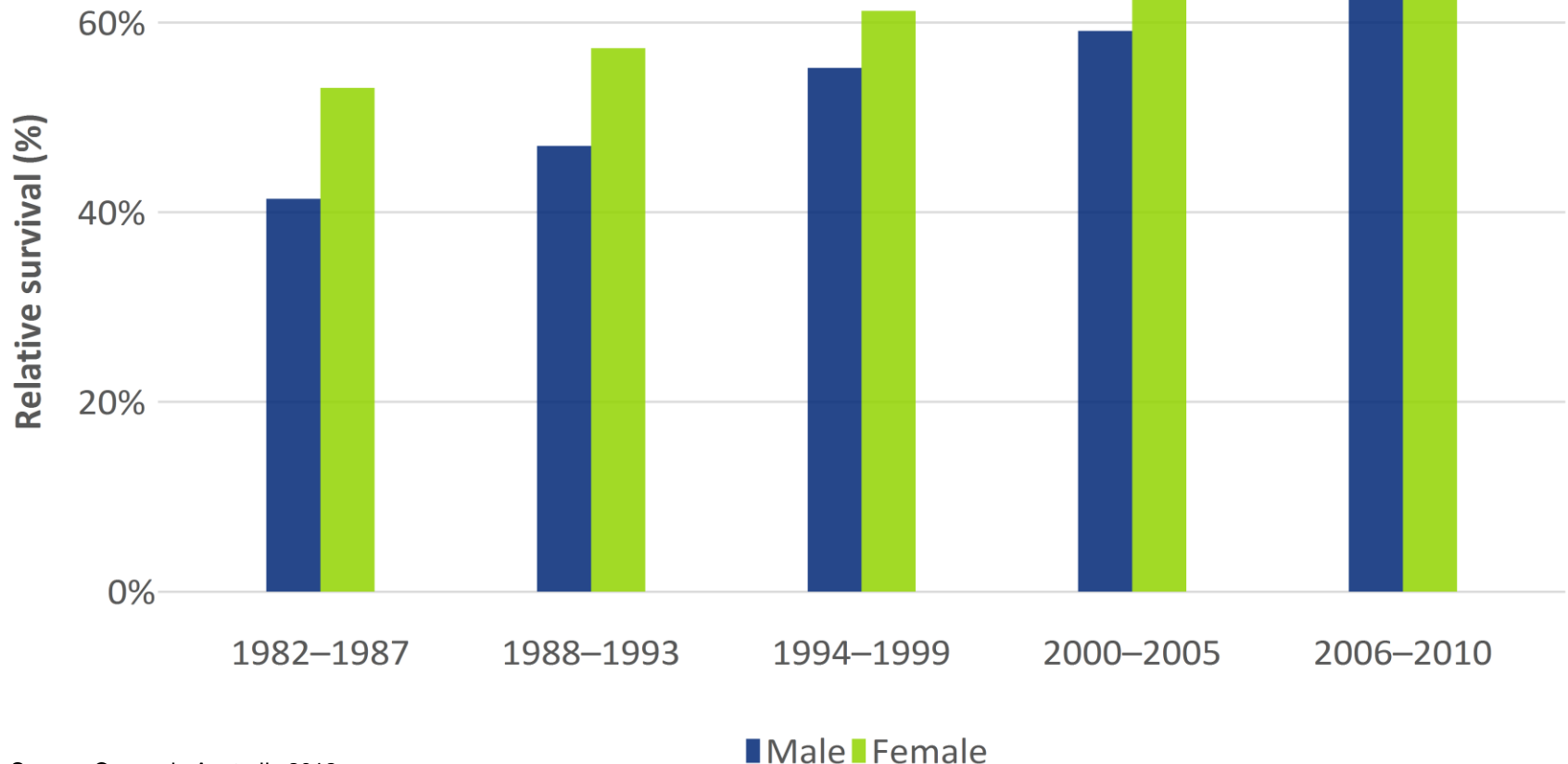
# Decline in death rates from leading causes 1970-2010



Source: AIHW Australia's Health 2014

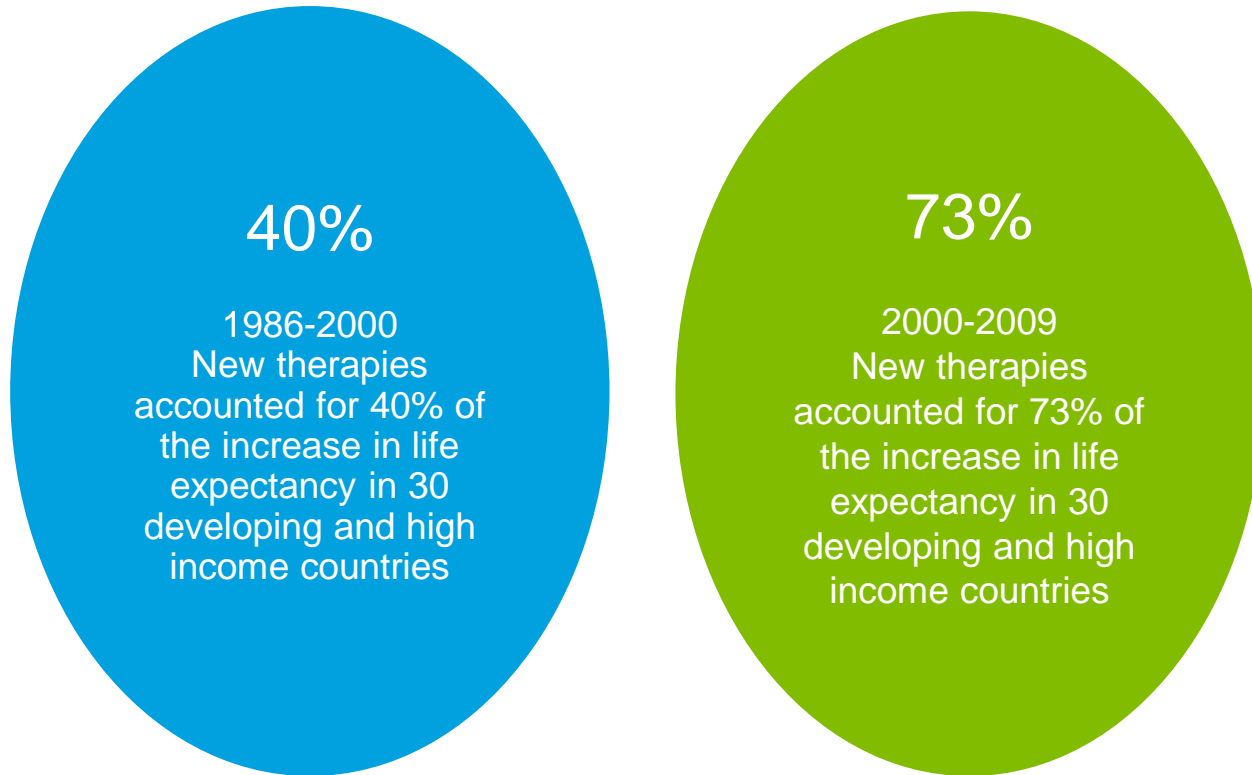
# Cancer-related death rates have declined since 1980 as cancer patients live longer

Five-year relative survival from all cancers combined  
(1982–2010)



Source: Cancer in Australia 2012

# New medical innovations are the largest contributor to improvements in life expectancy



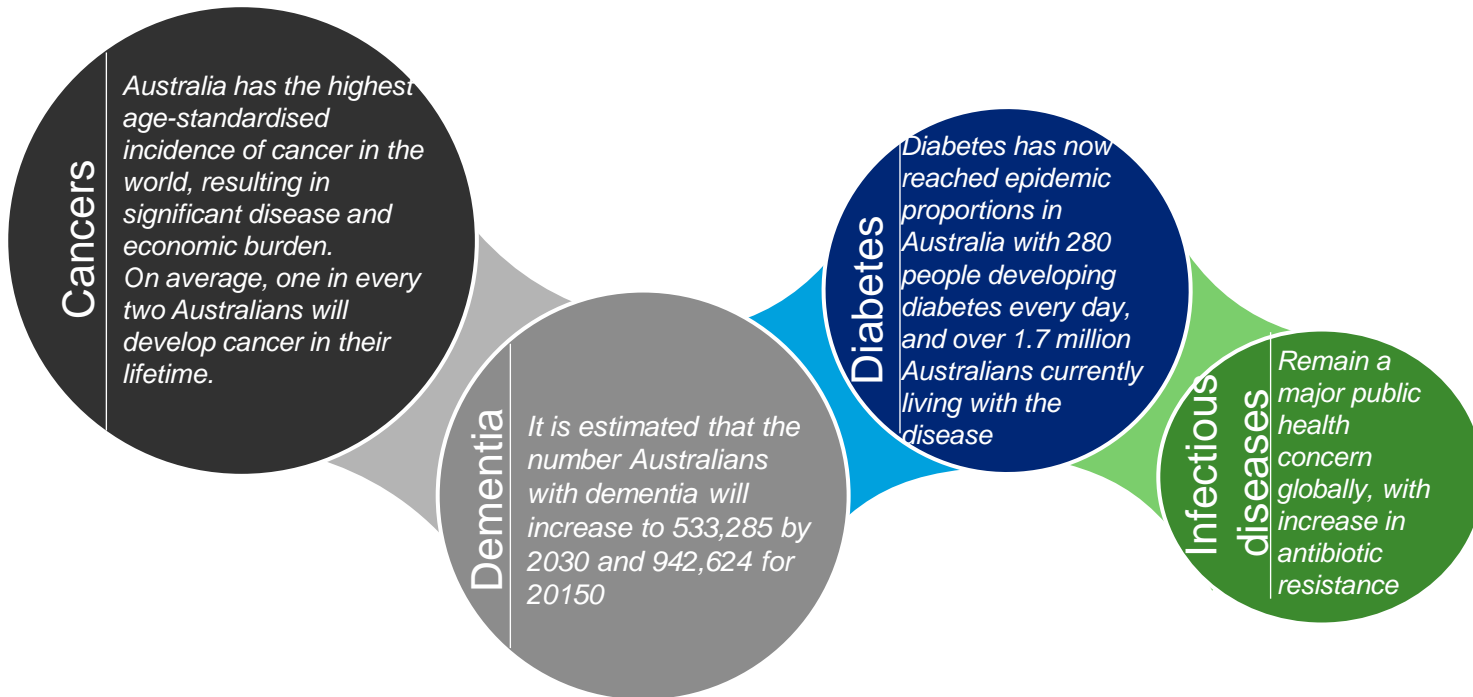
Lichtenberg F.R. Pharmaceutical Innovation and Longevity Growth in 30 Developing and High-income countries, 2000-2009. *NBER working paper 19235* 2012.

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 (>\$1Billion/year)

# Compelling need for industry to build upon these achievements and continue to innovate



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

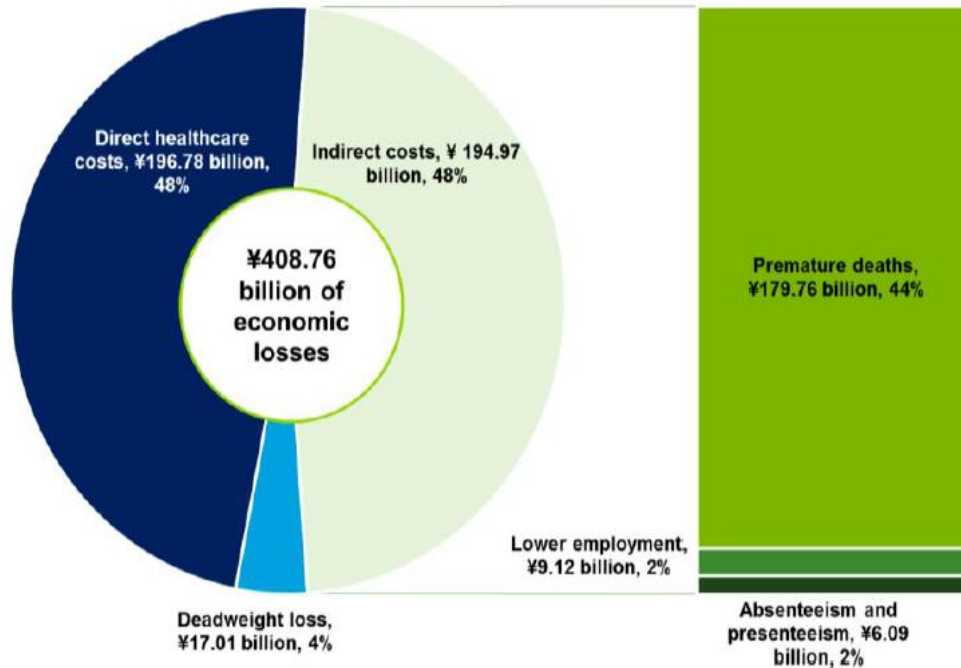
## Costs of stroke in Australia, 2012 (\$m)

	Individuals	Family/ Friends	Federal Govt	State Govt	Employers	Society/ Other	Total
Health system costs	161	1	376	233	0	111	881
Productivity costs	1,742	0	838	0	407	0	2,987
Carer costs	0	149	73	0	0	0	222
Other costs	388	11					398
DWL	0	0	0	0	0	491	491
Transfers	-92	-94	186	0	0	0	0
<b>Total financial cost</b>	<b>2,198</b>	<b>67</b>	<b>1,474</b>	<b>233</b>	<b>407</b>	<b>602</b>	<b>4,979</b>
Burden of disease	49,319	0	0	0	0	0	49,319
<b>Total cost</b>	<b>51,517</b>	<b>67</b>	<b>1,474</b>	<b>233</b>	<b>407</b>	<b>602</b>	<b>54,299</b>

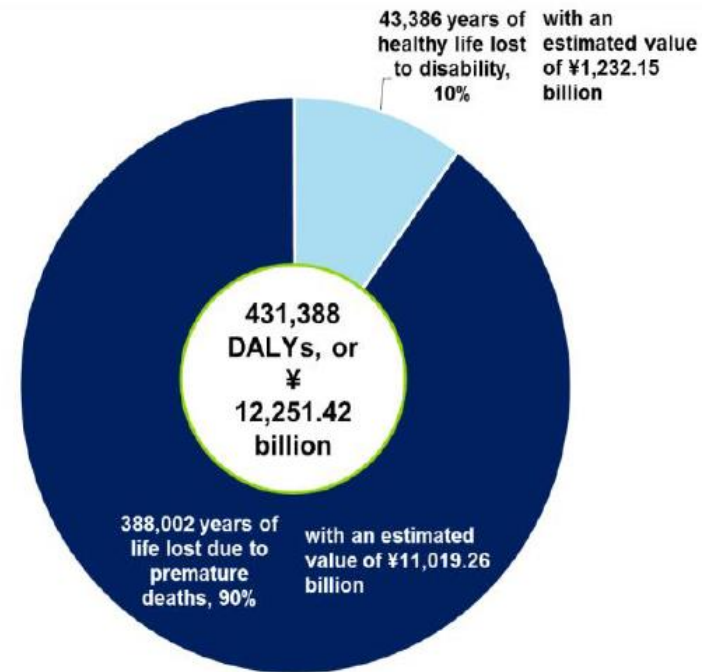
***‘The biggest impact on stroke is not the financial costs it causes, but the loss of healthy life.’***

# 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

Cost type	Total cost	Distribution of indirect financial costs only												
<b>Total indirect costs (a)</b>	<b>\$624.30 million</b>	<p>Detailed description: A pie chart titled 'Distribution of indirect financial costs only' showing three segments. The largest segment is green, representing 'Productivity losses, \$570.00 million, 91%'. The second largest is dark grey, representing 'DWL, \$53.93 million, 9%'. The smallest is light blue, representing 'Other indirect, \$0.37 million, 0%'.</p> <table border="1"> <caption>Distribution of indirect financial costs only</caption> <thead> <tr> <th>Category</th> <th>Cost (million)</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>Productivity losses</td> <td>\$570.00</td> <td>91%</td> </tr> <tr> <td>DWL</td> <td>\$53.93</td> <td>9%</td> </tr> <tr> <td>Other indirect</td> <td>\$0.37</td> <td>0%</td> </tr> </tbody> </table>	Category	Cost (million)	Percentage	Productivity losses	\$570.00	91%	DWL	\$53.93	9%	Other indirect	\$0.37	0%
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<b>Loss of wellbeing (b)</b>	<b>\$1,445.5 million</b>													
<b>Total indirect economic cost (a) + (b)</b>	<b>\$2,069.80 million</b>													

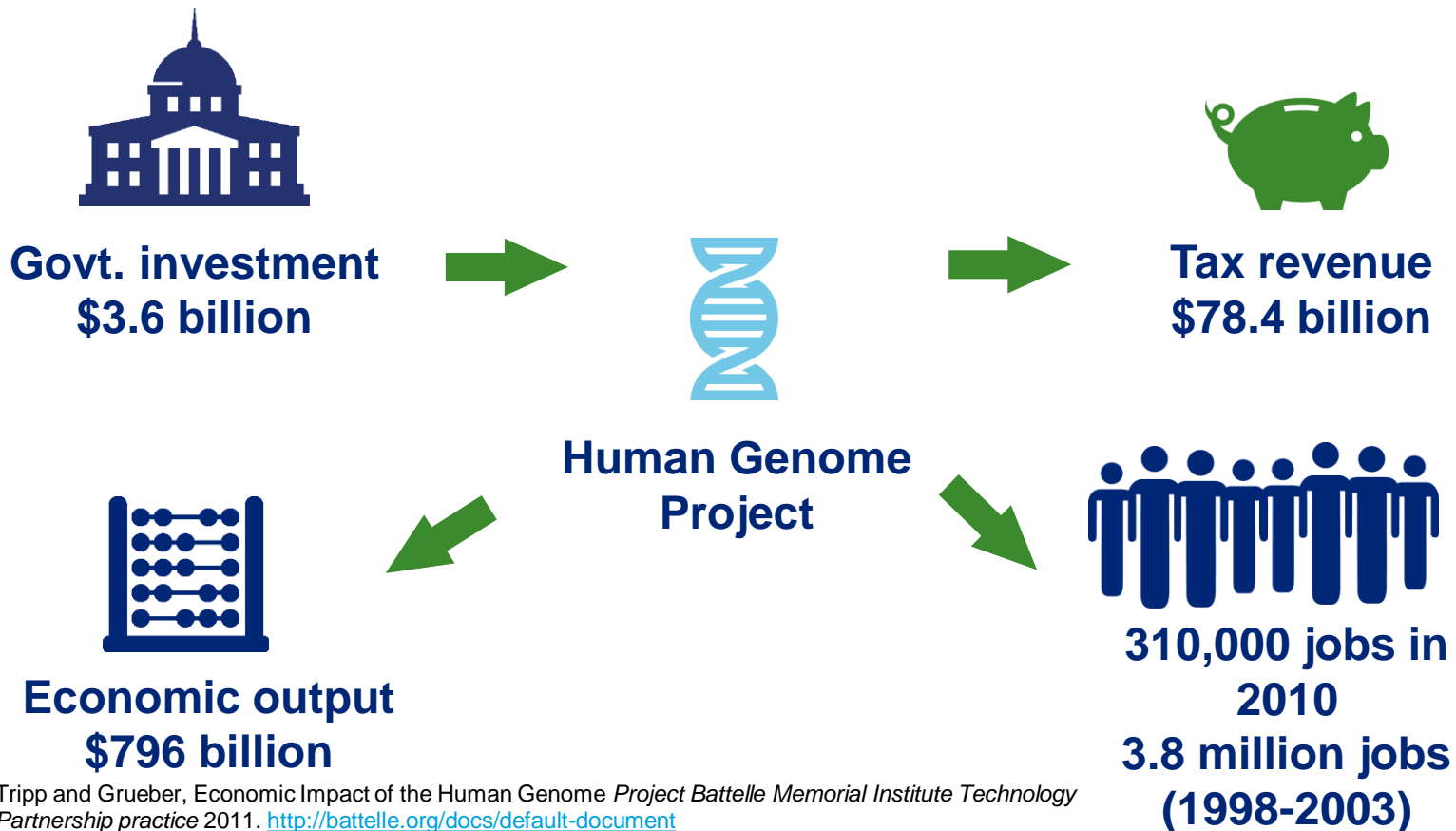
**NOTE: Productivity losses:** lower workforce participation, absenteeism from paid and unpaid work, and premature deaths associated with visual impairment among people with DME. **DWLs:** deadweight losses associated with the inefficiency of transfer payments (e.g. raising taxes to pay for public services).

# 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**.

# Investing in innovation pays off

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



Tripp and Grueber, Economic Impact of the Human Genome Project Battelle Memorial Institute Technology Partnership practice 2011. [http://battelle.org/docs/default-document-library/economic\\_impact\\_of\\_the\\_human\\_genome\\_project.pdf](http://battelle.org/docs/default-document-library/economic_impact_of_the_human_genome_project.pdf)

# 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

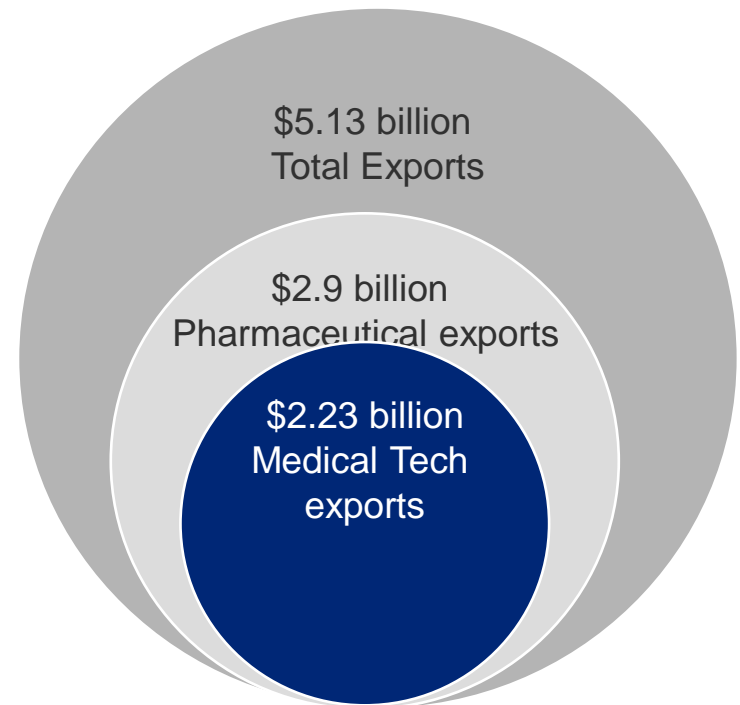
Aversion of **\$385 million** in indirect costs, including productivity losses through premature mortality and morbidity related reductions in workforce participation

### Commercialisation

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

# 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**

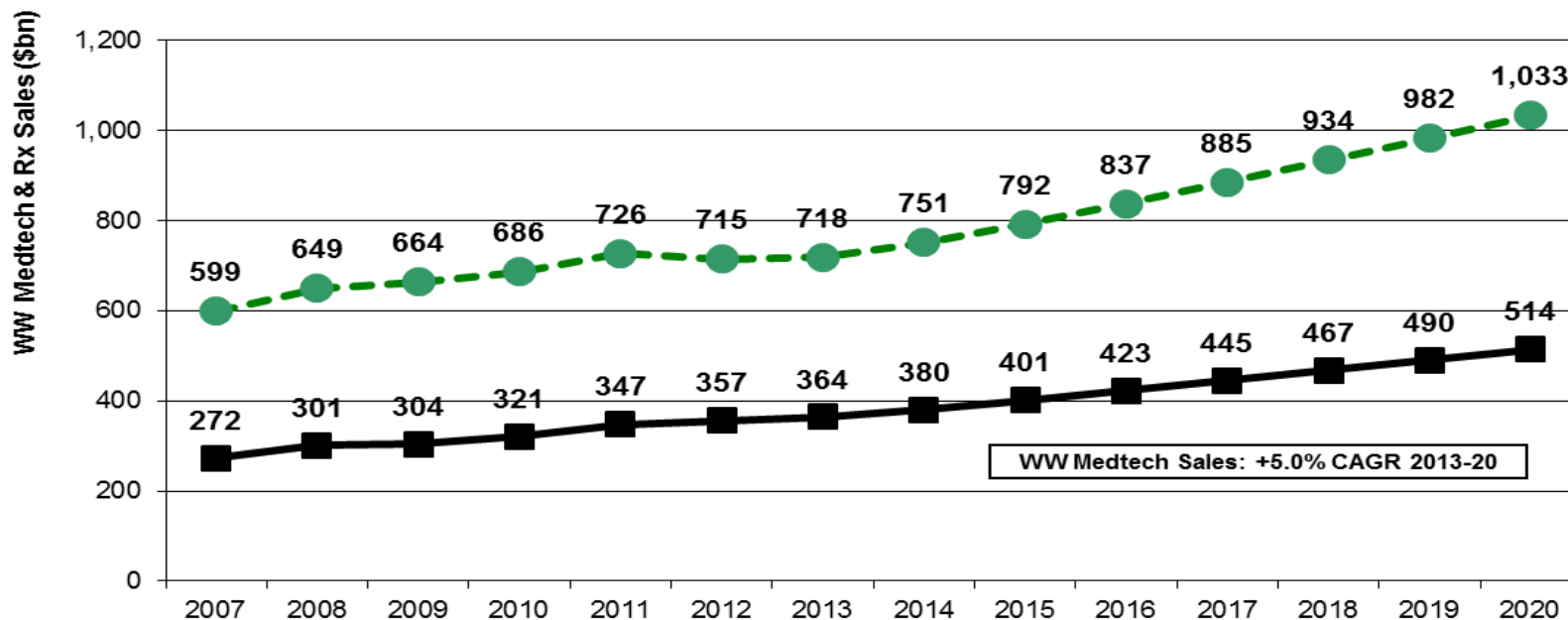


# Global value of the life sciences industry

- 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)

**WW Medtech vs Prescription Drug Sales (2007-20)**

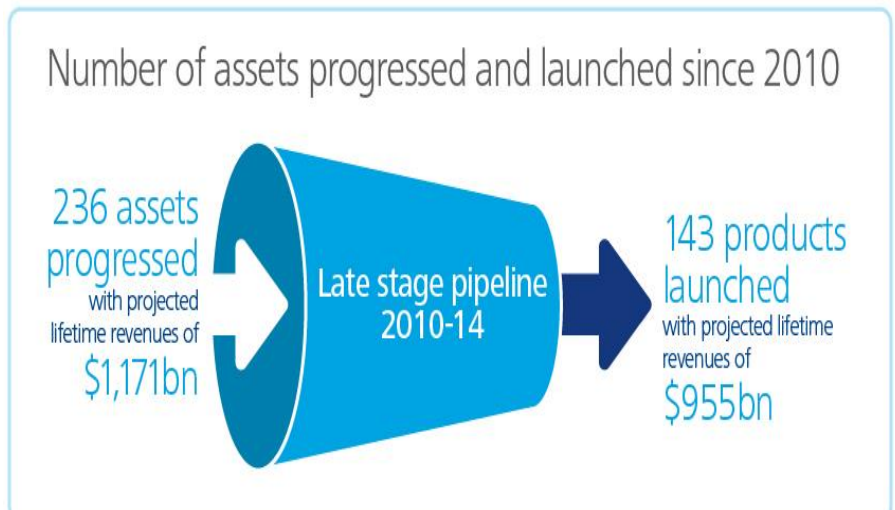
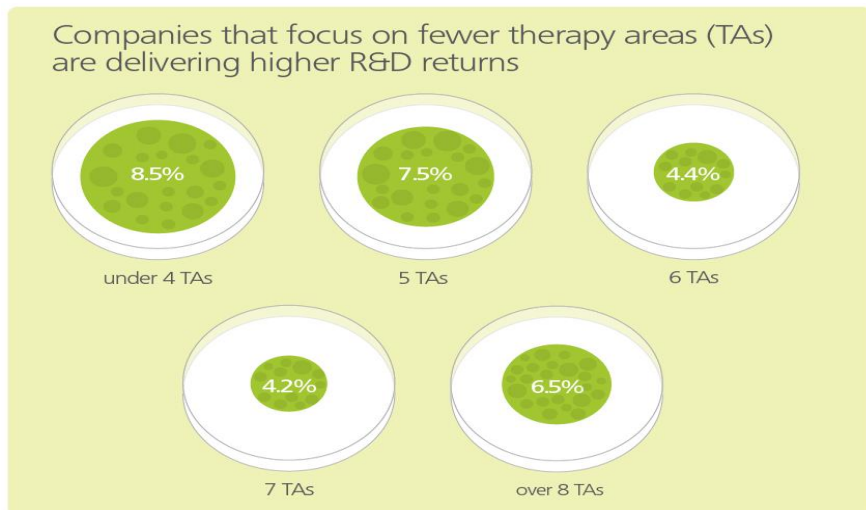
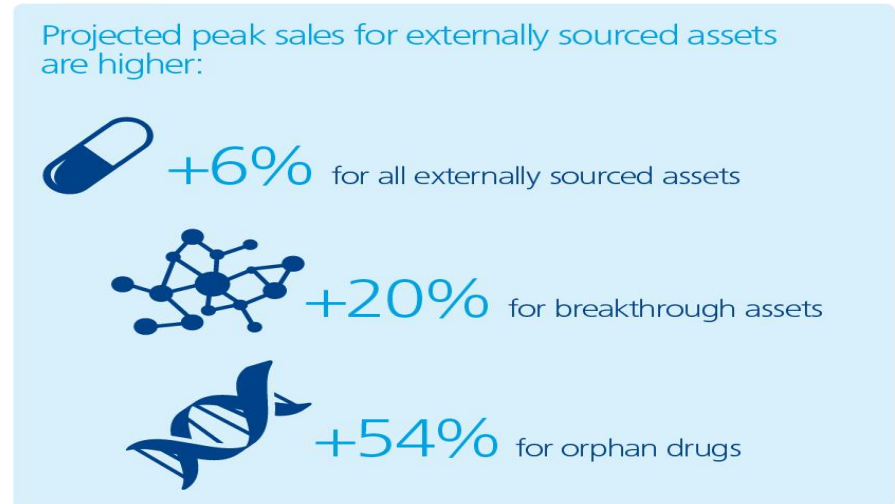
Source: EvaluateMedTech® and EvaluatePharma® (18 SEP 2014)





# Returns from pharmaceutical innovation

## Key drivers: size, TA focus and external assets





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