Deloitte Access Economics

Extrapolated returns on investment in NHMRC medical research

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1 Background

Deloitte Access Economics was commissioned by the Australian Society for Medical Research (ASMR) to undertake an extrapolation of the link between investment in NHMRC-funded medical research and financial and health returns on that investment. This analysis builds on a methodology presented in an earlier Deloitte Access Economics (2011a) report, which examined the benefit-cost ratio (BCR) of investment in NHMRC research across specific disease areas and found:

- for cardiovascular disease (CVD, including stroke) the BCR was 6.1;
- for cancer the BCR was 2.7;
- for asthma the BCR was 1.2;
- for sudden infant death syndrome (SIDS) the BCR was 1.1; and
- for muscular dystrophy (MD) the BCR was 0.7.

Costs comprised expenditure on NHMRC research for these conditions. The main benefits were gains in wellbeing measured as disability adjusted life years (DALYs) averted and converted to a dollar value using the value of a statistical life year (VSLY). However, only a proportion of these gains, in net present value (NPV) terms, can be attributed to NHMRC R&D, so the analysis depended on four parameters:

1. 50% of gains were attributed to R&D rather than other causes, such as improvements in environmental factors (e.g. sanitation) or public policies (e.g. health promotion);
2. 3.14% of R&D gains were attributed to Australian R&D rather than overseas R&D;
3. 25.04% were attributable to NHMRC R&D rather than other Australian R&D; and
4. the time lag between the mid-point of the R&D expenditure and the mid-point of the wellbeing gains, on average, was estimated as 40 years.

Other benefits were commercial returns measured through market capitalisation modelling, the value of avoiding direct health system expenditure, and the value of avoiding indirect costs (e.g. productivity gains from avoiding premature mortality, and avoiding the costs of informal care, aids and home modifications, and deadweight losses associated with government revenue foregone and welfare and disability payments.)

2 Methodology and findings

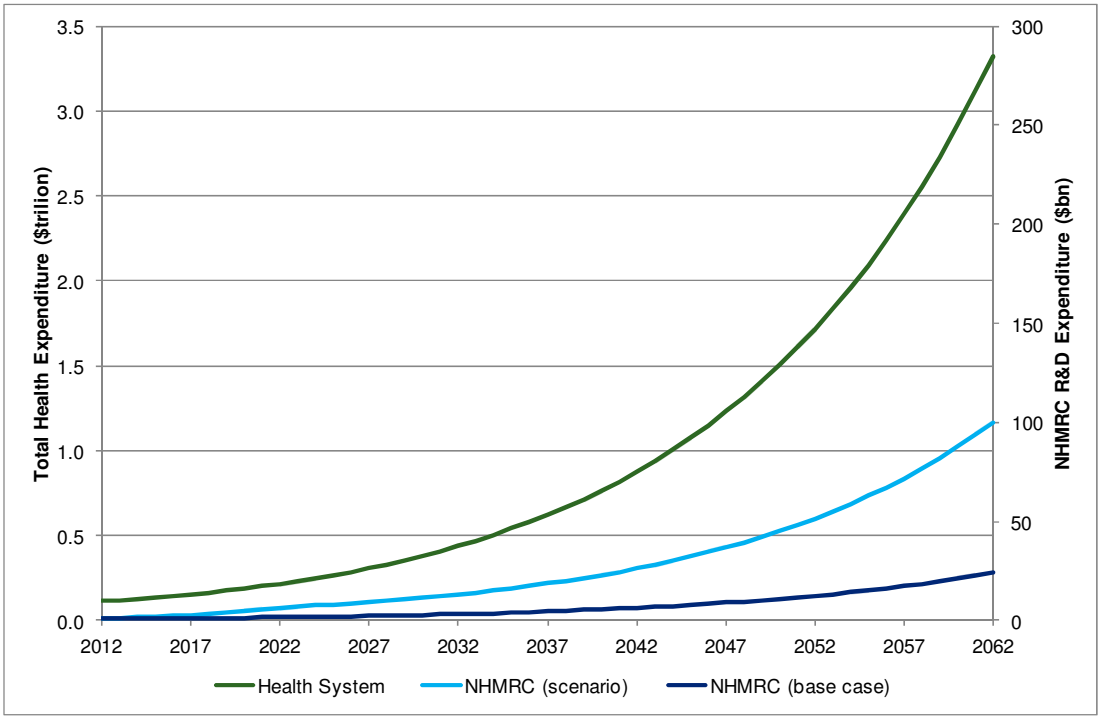
While Deloitte Access Economics (2011a) looked at historical NHMRC expenditure over 2000 to 2010 and its estimated returns, this current report examines prospective NHMRC expenditure from 2012 to 2022 (financial years or FYs). Two options are modelled:

- **Base case**: NHMRC R&D expenditure stays at its current proportion of health expenditure (0.73%); and
- **Scenario**: NHMRC R&D increases from 0.73% of health expenditure currently (2011-12) to 1.0% in 2012-13 and 3.0% by 2022-23 (i.e. increasing by 0.2% annually).

Since there will be a 40-year time horizon between when the NHMRC R&D changes occur and the estimate average point of when the benefits will be realised, the modelling was

undertaken out to 2061-62. Health system expenditure was modelled based on Inter Generational Report (IGR) projections, and the NHMRC R&D expenditure in each case was modelled based on the proportionalities listed in the base case and scenario above. Total Australian health system expenditure is projected to grow at an average of 6.92% per annum over the period (Deloitte Access Economics, 2011b, 2012), with nominal expenditure around $3.3 trillion by the out-year (Chart 2.1 and Table 2.1). In the base case, NHMRC R&D grows from around $800 million in 2011-12 to $24 billion by 2061-62, but to $100 billion under the scenario (Chart 2.1, Table 2.1).

Chart 2.1: Health system expenditure and NHMRC R&D (base case and scenario)



Source: NHMRC, 2010; Deloitte Access Economics. Notes: Nominal prices. Health system expenditure corresponds with the left y-axis, and NHMRC R&D with right y-axis. X-axis labels are FYs i.e. FY2012=2011-12.

Table 2.1: Health system expenditure and NHMRC R&D, $ billion (base case and scenario)

FY	2012	2022	2032	2042	2052	2062
NHMRC R&D (base case)	0.8	1.6	3.2	6.4	12.5	24.2
NHMRC R&D (scenario)	0.8	6.1	13.1	26.3	51.5	99.5
Health system expenditure (base case)	113	216	438	878	1,717	3,318

Source: Source: NHMRC 2012; Deloitte Access Economics. Notes: Nominal prices. FY2012=2011-12 etc.

Health system expenditure in the scenario was estimated based on the impact of the R&D investment, which starts in 2052-53. Access Economics (2011a) estimated the returns from five conditions which, together, represent approximately 40% of NHMRC expenditure. The combined health system savings from these conditions were thus multiplied by 10/4=2.5 to estimate the total savings from all NHRMC R&D investments. Implicitly this assumes that the BCR for all conditions is the weighted average of the BCR for the five conditions studied

previously. The dollar value of the return was factored up by the ratio of the higher R&D expenditure in the scenario.

The undiscounted value of the health expenditure saving was estimated as $25.9 billion for the period 2011-12 to 2062-63, which in NPV terms (with a 7% discount rate) was estimated as $1.0 billion, since the benefits only accrue in the model from 2052-53. In contrast, the NPV of the additional NHRMC expenditure over 2011-12 to 2022-23 was estimated as $14.4 billion.

> This means that for every dollar spent on additional NHRMC R&D, seven cents would be returned in health expenditure savings in the future. The BCR would naturally be much higher (and above unity) if other financial savings and the wellbeing gains were included.

Sensitivity analysis was conducted if the average time lag was reduced to 30 years, 20 years and 10 years. The findings are shown in Table 2.2, with the return increasing to 14.3 cents in the dollar with a time lag of 10 years.

Table 2.2: Health system expenditure savings (scenario analysis)

Time lag till benefits accrue (years)	40	30	20	10
Health system expenditure saving				
- undiscounted ($bn)	25.9	18.3	11.9	7.1
- NPV ($bn)	1.0	1.4	1.8	2.1
NPV of extra NHMRC expenditure ($bn)	14.4	14.4	14.4	14.4
cents returned on the dollar	7.0	9.7	12.4	14.3

Source: Source: NHMRC 2012; Deloitte Access Economics.

References

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