



Appendix

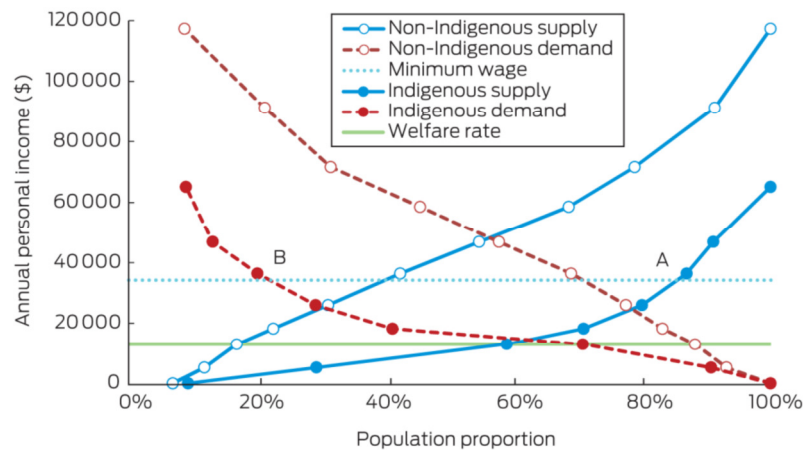
**This appendix was part of the submitted manuscript and has been peer reviewed.
It is posted as supplied by the authors.**

Appendix to: Zhao Y, Vemuri SR, Arya D. The economic benefits of eliminating Indigenous health inequality in the Northern Territory. *Med J Aust* 2016; 205: 266-269. doi: 10.5694/mja16.00215.

Appendix: Estimation of the Indirect Costs and Sensitivity Analysis for Costing Indigenous Health Inequality in the Northern Territory

Method of calculating indirect costs

Calculation of indirect costs (productivity loss) covered excess welfare payment by the governments, missed tax revenue for the governments and lost efficiency for the economy due to inadequate human capital development and inadequate human resources utilisation. The fortnight welfare payment was estimated to be AU\$500 per adult.¹ The excess welfare cost was based on the current Indigenous welfare payments deducted by the proportion of the non-Indigenous people on welfare. Taxation revenue was calculated according to the individual income tax rates and Medicare levy.² Missed taxation revenue was derived from the difference in income distribution between the two populations. Because productivity loss may be underestimated using absenteeism data due to lower Indigenous participation,³ we modelled the productivity loss by applying a what-if scenario with an assumption of shifting the Indigenous workforce supply and demand curve to the same levels as that of the non-Indigenous Territorians.⁴ The inefficiency cost was based on deadweight loss (the surplus lost due to the poor employment policy distorted labour market, see Figure 1).⁴ Responsiveness (Elasticity) of supply and demand was investigated for the responses of Indigenous and non-Indigenous workforce to incremental changes in income. The minimum wage was \$17 per hour.⁵ The indirect costs for the study period were extrapolated using the 2011 estimates and 3% general inflation rate. Sensitivity analysis was performed on 0% and 5% general inflation.



Results

Using the 2011 Census data, the annual mean personal income was estimated \$19,749 for an Indigenous person, 61% below the non-Indigenous peers (\$51,172) before tax.⁶ Based on the workforce supply-demand models illustrated in Figure 1, at the minimum wage (dotted line),⁵ approximately 85% (point A) of the Indigenous working-age population would be willing to supply labour compared to a demand for Indigenous labour of only 22% (point B). The equilibrium of Indigenous workforce supply-demand was 70% below the non-Indigenous counterpart, 58% below the minimum wage,⁵ slightly above the welfare rate.¹

Welfare payments

Estimated excess welfare payment = annual welfare payment per person \times extra people on welfare =
 $\$13,040 \times 27,510 = \358.7 (M)

Missed taxation revenue

Estimated missed tax revenue = expected tax revenue – actual tax revenue = $\$352.5 - \$60.0 = \$292.5$ (M)

Lost efficiency (deadweight loss)

Estimated difference in employment between Indigenous and non-Indigenous = 37.8%

Estimated difference in annual personal income between Indigenous and non-Indigenous = $\$41,200$

Estimated working age Indigenous population = 33,100

Estimated deadweight loss = $37.8\% \times \$41,200 \times 33,100 = \515.4 (M)

Total indirect costs

Total indirect costs = welfare payments + missed taxation revenue + lost efficiency = $\$358.7 + \$292.5 + \$515.4 = \$1,166.6$ (M)

Sensitivity analysis

The costing results remained intact (changes were $<0.2\%$ in total cost) when the discount rate was changed between 0% and 5%. The total costs were somewhat sensitive to the value of a statistical life-year (VSLY) assumed, driven by the dominance of intangible costs. The uncertainty in total costs was –25% to +7%, when the VSLY was changed from $\$50,000$ to $\$140,000$.

References

1. Department of Human Services. Payments for Indigenous Australians. Canberra: Department of Human Services; 2015. <http://www.humanservices.gov.au/customer/subjects/payments-for-indigenous-australians> (accessed Dec 2015).
2. Australian Taxation Office. Individual income tax rates. Canberra: ATO; 2015. <https://www.ato.gov.au/rates/individual-income-tax-rates/> (accessed Dec 2015).
3. Deloitte Access Economics. Economic benefits of closing the gap in Indigenous employment outcomes. Sydney: Deloitte Access Economics; 2014. <http://www2.deloitte.com/au/en/pages/economics/articles/economic-benefits-closing-gap-in-indigenous-employment-outcomes.html> (accessed Mar 2016).
4. Mankiw NG. Principles of macroeconomics. Mason: South-Western, Cengage Learning; 2012.
5. Fair Work Ombudsman. Minimum wages. Canberra: Australian Government; 2015.
6. Australian Bureau of Statistics. Census 2011 Australia. Canberra: ABS; 2013. <http://www.abs.gov.au/websitedbs/censushome.nsf/home/quickstats?opendocument&navpos=220> (accessed Dec 2015).