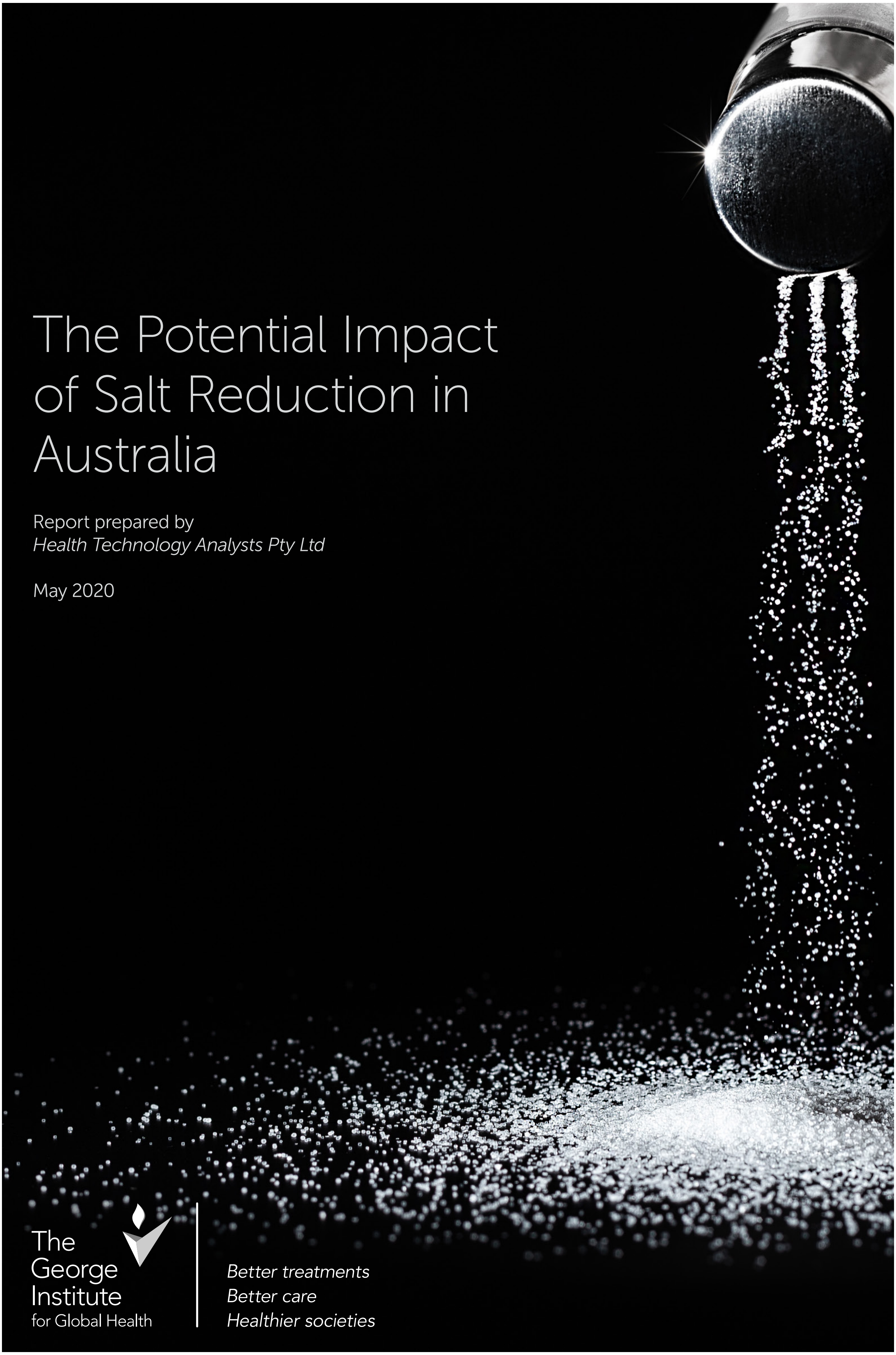

The Potential Impact of Salt Reduction in Australia

Report prepared by
Health Technology Analysts Pty Ltd

May 2020

The George Institute for Global Health

Better treatments
Better care
Healthier societies

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The George Institute acknowledges the Gadigal people of the Eora Nation as the First Custodians of the land on which our Australian office is situated. We pay our respect to Elders past, present and emerging.

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Executive Summary

Increasing constraints on public resources have led to increased accountability requirements to demonstrate the value-for-money of healthcare and community funding decisions.

Social Return on Investment (SROI) frameworks go beyond traditional economic valuation methods, to assess the broader socio-economic impact of a program. The goal of these analyses is to encapsulate the costs and impacts of a program and translate them into a digestible and meaningful language for a non-academic audience.

The purpose of this report is to examine the social impact and return on investment of implementing mandatory or voluntary policies or community interventions to reduce salt in Australia.

The relationship between dietary salt intake and blood pressure is well established. According to the World Health Organization (WHO), more than half of all strokes and coronary heart disease (CHD) events are attributable to high blood pressure. Salt reduction is widely recognised as one of the most cost-effective means for preventing non-communicable diseases around the world.

This project assessed the benefits of implementing the salt reduction programs throughout the whole of Australia, leading to the prevention of stroke and CHD events, reduction in healthcare need, informal care and productivity costs. These benefits are compared with the cost of implementing the three different salt reduction programs.

The model explores the effect of varying levels of salt reduction through three types of salt reduction programs: (1) mandatory salt reduction legislation, which requires food manufacturers to comply with maximum salt targets across a wide range of processed foods, (2) voluntary participation of food manufacturers in limiting salt use in processed foods, and (3) a community health program for the prevention of cardiovascular diseases.

The base case salt reduction target was set at 1 gram (g) reduction per day, over a year. Results showed reducing salt intake by 1g per day for a year would potentially prevent 2,526 heart attacks and 2,626 strokes resulting in 1,364 lives saved and between $120m–$154m in reduced costs to society. Taking into account the cost of the different programs, the SROI was estimated to be 2.4, 5.7 and 10.1 for community, voluntary and mandatory programs respectively. In other words, for each dollar invested in a salt reduction program, $2.40 are returned to society for community program, $5.70 for a voluntary program, and $10 for a mandatory program.

These findings demonstrate investment in a mandatory salt reduction program is likely to yield the best social return on investment for the prevention of cardiovascular events.

Introduction

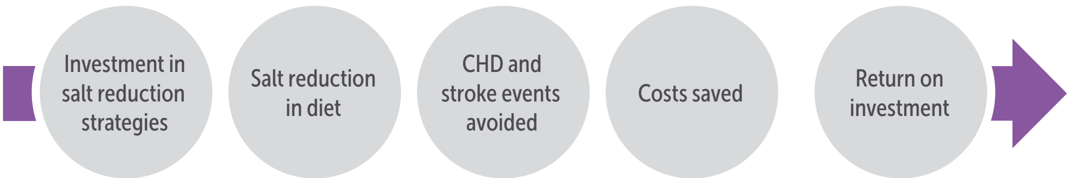
Cardiovascular diseases (CVDs) are the major cause of death among people aged over 60 and second among those aged 15-59.[1] According to the World Health Organization (WHO), 62% of all strokes and 49% of coronary heart disease events are attributable to high blood pressure.[2] The direct causal relationship between dietary salt intake and blood pressure is well established,[3] with salt reduction widely recognised as one of the most cost-effective means for preventing non-communicable diseases around the world[4,5,6,7,8,9,10,11] and in Australia.[12,13]

The direct relationship between salt intake and blood pressure is well documented in the literature and it has been the subject of intense research.[14,15,16,17,18] Reduction of dietary salt intake is considered an effective measure to reduce blood pressure, with the WHO recommending the consumption of less than 5g of salt per day as a population nutrient intake goal[19] and urging its member states to take action at a population level to reduce dietary salt intake.[20] This report and accompanying analysis aim to demonstrate the economic value of implementing population-wide salt reduction programs across Australia.

Objectives and scope

The objective is to investigate the social benefit of implementing different salt reduction programs in Australia. The approach adopted in this analysis is outlined in the linkage logic map reported in Figure 1.

Figure 1 Linkage logic map



Abbreviations: CHD, Coronary Heart Disease

An Excel model was developed to assess the benefit of a salt reduction strategy at an Australian population level. These benefits are realised through reductions in stroke and CHD events and corresponding reductions in healthcare use and productivity costs, as well as the need for informal care, compared with the cost of implementing such a program.

It is acknowledged this analysis does not include any other confounding factors that may affect blood pressure levels and the associated risk of stroke or CHD events.

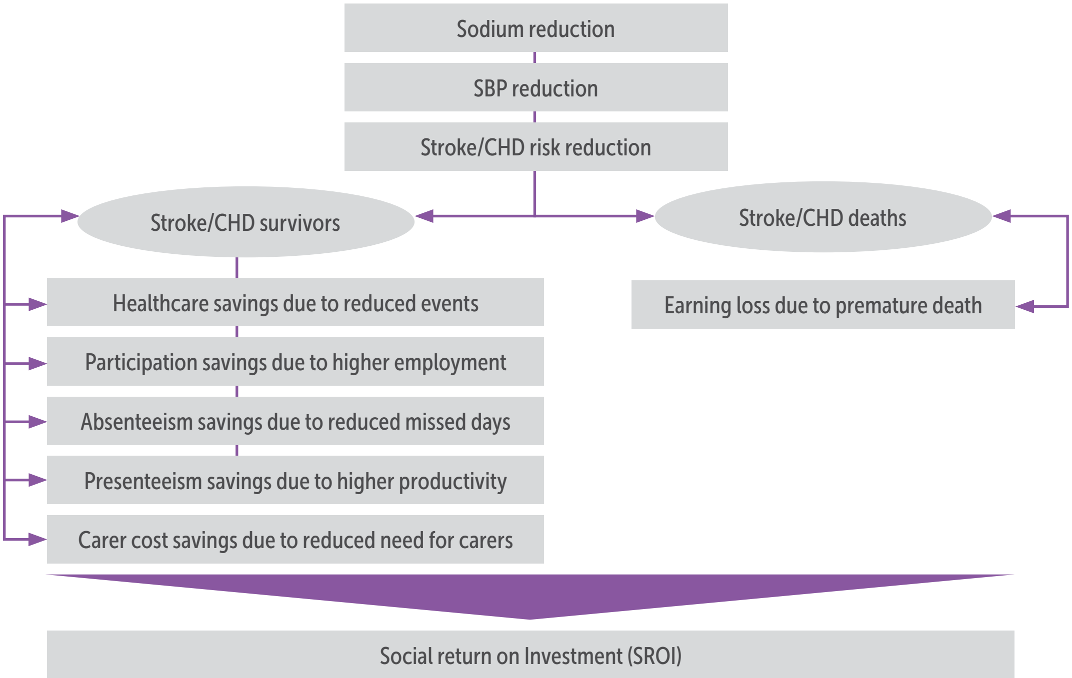
Methodology

The current average daily salt intake in Australia is estimated to be approximately 9.6g per day,[21] much higher than the WHO recommended levels of 5g/ day.[22] The model explores the effect of varying levels of reduction of population salt intake: 0.2g/day, 0.5g/day, 0.8g/day, 1g/day, 2g/day, 3g/day and 4.6g/day.

The impact of dietary salt reduction on blood pressure changes was estimated through a linear regression model published by Law et al.[23] The new estimated blood pressure levels were then associated with lower incidence of stroke and CHD, based on results from a network meta-analysis by Law et al.[24] The reduction in stroke and CHD events and deaths were associated with healthcare costs, productivity changes (including participation, absenteeism and presenteeism for the person affected by the event) and informal care requirements.

A schematic of the methodology developed for this analysis is shown in Figure 2.

Figure 2 Flowchart of the methodology of this analysis



Abbreviations: CHD, coronary heart disease; SBP, systolic blood pressure; SROI, social return on investment.

The model only takes into consideration the incident population of stroke and CHD for the year of analysis, therefore ignoring the long-term consequences of people who experienced an event in the previous years. Moreover, costs and savings shown by this analysis are accrued for one year only. The assumptions and limitations of the model and analysis are covered in more detail in Section 6 and Appendix I.

The model uses the cost and saving results to calculate the social return on investment (SROI) of the intervention. The SROI is a method to measure values not traditionally reflected in financial analysis, to assess the creation of value for the community. Within this framework, inputs are applied to service activities to produce outputs, from which outcomes are derived, which result in the overall impact. The purpose of SROI is to examine the relationship between inputs and impact to assess the social value an activity creates in a robust and rigorous way. SROI puts social impact into the language of 'return on investment', a common language bridging sector-specific barriers.

The model assesses three types of salt reduction programs: (1) mandatory salt reduction legislation, which requires food manufacturers to comply with maximum salt targets across a wide range of processed foods, (2) voluntary participation of food manufacturers in limiting salt use in processed foods, and (3) a community health program for the prevention of cardiovascular diseases. The model assumes different costs to achieve the same level of salt reduction, in order to calculate their SROI. The efficacy of the three programs and the details of the strategies required to ensure such reduction are not part of this analysis.

This model has the potential to be further adapted to either incorporate additional health programs such as sugar reduction or to assess the impact of salt reduction in other countries.

The analysis uses an SROI-informed methodology, but it does not claim to be a complete SROI evaluation; the term SROI is thereby used for simplicity of understanding.

Model input

Incidence and distribution of stroke and CHD

The incidence of strokes (2015) and CHD events (2013) was sourced from the Australian Institute of Health (AIHW) CVD data tables.[25] The age distribution of strokes (2012) was obtained from a 2013 Deloitte report[26] and the age distribution of CHD hospitalisation (2015) was obtained from the AIHW CVD data tables.[25] These assumptions were then applied to the incidence populations to estimate the number of stroke and CHD events, stratified by age group. Similarly, stroke (2012)[26] and CHD mortality rates (2015)[25] were applied to the number of stroke and CHD events to derive the number of stroke and CHD deaths in each age group.

Salt intake and blood pressure

A linear regression model developed by Law[23] is used to estimate blood pressure changes attributable to salt intake levels. The model assumes no other factors affect blood pressure.[23] Using the estimated mean salt intake of 9.6g/day, a baseline measurement of systolic and diastolic blood pressure, stratified by age group was estimated. Table 1 shows the predicted blood pressure by age group at 0.2g/day, 0.5g/day, 0.8g/day, 1.0g/day, 2.0g/day, 3.0g/day and 4.6g/day reductions in daily salt intake. The reduction in blood pressure associated with each gram of sodium intake reduction is not linear across age groups, therefore the impact of the intervention has differing effects across the age groups.

Table 1 Blood pressure levels (mmHg) to salt intake (g/day) by age

Age	0.2g/day reduction		0.5g/day reduction		0.8g/day reduction		Baseline (9.6g/day)		1.0g/day reduction		2.0g/day reduction		3.0g/day reduction		4.6g/day reduction	
	SBP	SBP	SBP	DBP	SBP	DBP	SBP	DBP	SBP	DBP	SBP	DBP	SBP	DBP	SBP	DBP
15-19	121.33	70.16	121.08	70.06	120.83	69.97	121.50	70.22	120.66	69.91	119.81	69.61	118.97	69.31	117.62	68.82
20-29	124.77	73.52	124.53	73.39	124.28	73.26	124.94	73.61	124.11	73.17	123.29	72.74	122.46	72.30	121.14	71.59
30-39	127.73	78.56	127.45	78.41	127.17	78.26	127.91	78.66	126.98	78.15	126.06	77.65	125.13	77.14	123.64	76.33
40-49	131.77	81.81	131.44	81.63	131.10	81.45	131.99	81.93	130.88	81.33	129.77	80.72	128.65	80.11	126.87	79.14
50-59	139.90	84.46	139.43	84.22	138.96	83.98	140.21	84.62	138.65	83.82	137.10	83.03	135.55	82.24	133.06	80.97
60-69	150.24	85.72	149.72	85.50	149.20	85.29	150.59	85.87	148.85	85.14	147.11	84.42	145.37	83.69	142.59	82.53
70+	150.24	85.72	149.72	85.50	149.20	85.29	150.59	85.87	148.85	85.14	147.11	84.42	145.37	83.69	142.59	82.53

Abbreviations: DBP, diastolic blood pressure; mmHg, millimetre of mercury; SBP, systolic blood pressure

Source: Law [23]

A network meta-analysis conducted by Law[22] estimated a 6.3% reduction in the incidence of stroke and 3.4% reduction in the incidence of CHD for every 1% change in systolic blood pressure.[24] As described above, since the relationship between salt intake and blood pressure is different depending on age, the absolute risk reduction in stroke and CHD incidence also differs across the age groups.

The reduction in stroke and CHD event incidence as a result of a reduction in systolic blood pressure, is applied to the baseline number of stroke and CHD events to derive the new incidences of stroke and CHD events, with the salt reduction intervention.

Economic input

All costs included in the model have been indexed to 2018 values using Reserve Bank of Australia inflation calculator.

Cost of salt reduction program

The model assesses three types of cost reduction programs: mandatory, voluntary and community health. Each program has specific associated costs, obtained from Cobiac.[15]

The cost of a mandatory program is estimated to be \$0.49 (2008 AU\$) per person per year, including the cost of legislative changes and enforcement for the program based on the WHO CHOICE unit costs in Australia and resource use.[27]

The cost of implementing a voluntary program is estimated to be \$0.81 (2008 AU\$) per person per year. This cost was estimated using a Heart Foundation program as a proxy,[27] calculated as the proportion of products participating and the annual fee per product.[28]

The cost of a community health program is calculated to be \$2.37 the first year and \$1.60 in subsequent years (2008 AU\$). For the purposes of this analysis, the ongoing cost of the program was used. These costs are based on the bottom-up costing of the Hartslag Limburg cardiovascular prevention project, a large-scale community programme that consisted of many interventions to prevent cardiovascular diseases conducted in the Netherlands.[29]

Healthcare costs

The healthcare costs associated with each stroke and CHD event are \$23,581 and \$12,921, respectively (2008 AU\$). These estimates are consistent with a cost-effectiveness model conducted by Cobiac.[15] Healthcare costs are applied to those who survived a stroke or a CHD event.

Productivity costs

Productivity costs can be split into three main categories: participation, presenteeism and absenteeism.

Participation

A study by Hannerz et al.[30] reported that 62.1% of working age people recovering from stroke are gainfully employed after the event, compared to 79.1% of the working age population in Australia that did not experience a stroke.[26,30] Therefore, 78.5% (0.621/0.791) of people who experienced a stroke will gainfully be employed relative to non-stroke sufferers. Similarly, 52.8% of CHD victims are reported to be gainfully employed after an event, resulting in 66.8% of CHD victims being gainfully employed (0.528/0.791) relative to their non-CHD counterparts.[31]

Absenteeism

Even if a significant proportion of people can return to work after a stroke or CHD event, their condition increases the amount of sick days taken throughout the year. It is estimated that people recovering from stroke will request 26 additional days from work per year compared to those without stroke.[32] Similarly, those who suffered a CHD event are estimated to take an additional 23 days off work per year compared to the average population.[33]

Despite not being employed in a paid job, the same number of days are estimated to be lost for those who are unemployed from lost household productivity. Average household productivity is valued at 30% of the average Australian wage rate.[26] This productivity estimate is applied to those stroke and CHD survivors who are not employed in a paid job.

Presenteeism

Stroke and CHD events can significantly affect a person's ability to function effectively while at work. A meta-analysis of presenteeism studies in the United States found that workers with heart disease averaged 13.5% lower productivity than those who did not suffer heart disease.[34] This rate is applied to both stroke and CHD survivors.

Informal carer costs

Informal care costs are those costs associated with the value of the care provided by friends or family carers. While informal care is provided free of charge, there is an economic cost, as time spent caring is time that cannot be directed to other activities such as paid work, unpaid work (such as housework or yard work) or leisure. For simplicity, informal carer cost is limited to productivity losses for the purposes of this model.

The cost of lost productivity is measured in the model by the estimated potential wages of carers, had they been in the workforce. This is determined by the average wage for someone of the same age and gender who is still in the workforce. As half the carers are over 55, and two thirds of them are female, the average hourly rate was estimated to be $13. However, as most of this group may not re-join the workforce in the absence of caring for a stroke survivor, the weighted average of employment in matching age and gender groups was calculated to be 31%. The Survey of Disability, Ageing and Carers reported that 68% of carers spent 40 hours or more per week caring for people with stroke. Assuming this cohort spent an average of 50 hours a week, the weighted average for all carers would be 41 hours per week. Thus, the average cost of lost productivity was estimated to be $8,425 (2012 AU$) per carer of a stroke patient.[26]

The same approach was followed to estimate the cost of informal care for CHD patients. In a British study of carers for patients experiencing coronary heart disease, it was observed that carers spent an average of 280 hours per year caring for their loved ones.[31] Thus, the average cost of lost productivity was estimated to be $1,128 (2012 AU$) per carer of a CHD patient.

An estimated 6.27% of stroke survivors require full time care calculated by taking the prevalent population of stroke (2012) divided by the number of stroke carers as reported in a published report.[26] The figure of 6.27% is also assumed to be applicable for CHD survivors in the absence of CHD-specific data.

Premature death cost

The cost associated with premature death is estimated by calculating the lost earnings of those who were employed before their stroke or CHD event for one year. Each person who dies is assumed to accrue lost earnings for the whole year.

Impact

Base case

The impact of reducing the intake of salt by 1g/day in the Australian population for each type of intervention is reported in Figure 3.

Figure 3 Impact of 1g/day reduction in salt intake

	Mandatory program		Voluntary program		Community health program	
	Strokes	CHD	Strokes	CHD	Strokes	CHD
N. events avoided	2,626	2,526	2,626	2,526	2,626	2,526
N. deaths avoided	600	764	600	764	600	764
Healthcare cost savings	$59,007,812	$28,111,616	$59,007,812	$28,111,616	$59,007,812	$28,111,616
Participation savings	$6,172,833	$9,607,187	$6,172,833	$9,607,187	$6,172,833	$9,607,187
Absenteeism savings	$3,901,554	$2,986,731	$3,901,554	$2,986,731	$3,901,554	$2,986,731
Presenteeism savings	$3,044,115	$2,603,803	$3,044,115	$2,603,803	$3,044,115	$2,603,803
Carer cost savings	$1,201,640	$42,137,603	$1,201,640	$42,137,603	$1,201,640	$42,137,603
Earning loss avoided	$5,079,694	$6,429,107	$5,079,694	$6,429,107	$5,079,694	$6,429,107
Salt reduction program cost	$15,353,609		$25,380,456		$50,134,234	
TOTAL SAVINGS PER YEAR	**$154,930,087**		**$144,903,240**		**$120,149,462**	
SOCIAL RETURN ON INVESTMENT	**10.09**		**5.71**		**2.40**	

These results are consistent with the effectiveness of salt reduction programs found in other analyses. Indeed, a mandatory approach to sodium reformulation has been demonstrated to be twice as cost-effective and avert twice as much of the burden of disease compared to a voluntary approach.

Sensitivity analysis

The sensitivity of the model to the level of salt reduction was tested. Results of the analyses are shown in Figure 4, Figure 5 and Figure 6, based on the type of program.

Figure 4 Impact of different levels of salt reduction (mandatory program)

Mandatory program	0.2 g		0.5 g		0.8 g	
	Strokes	CHD	Strokes	CHD	Strokes	CHD
N. events avoided	525	505	1,313	1,263	2,101	2,021
N. deaths avoided	120	153	300	382	480	612
Healthcare cost savings	$11,801,562	$5,622,323	$29,503,906	$14,055,808	$47,206,250	$22,489,293
Participation savings	$1,234,567	$1,921,437	$3,086,417	$4,803,594	$4,938,267	$7,685,750
Absenteeism savings	$780,311	$597,346	$1,950,777	$1,493,365	$3,121,243	$2,389,384
Presenteeism savings	$608,823	$520,761	$1,522,057	$1,301,902	$2,435,292	$2,083,043
Carer cost savings	$240,328	$42,025,659	$600,820	$42,067,638	$961,312	$42,109,617
Earning loss avoided	$1,015,939	$1,285,821	$2,539,847	$3,214,554	$4,063,755	$5,143,286
Salt reduction program cost	$15,353,609		$15,353,609		$15,353,609	
TOTAL SAVINGS PER YEAR	**$52,301,268**		**$90,787,075**		**$129,272,882**	
SOCIAL RETURN ON INVESTMENT	3.41		5.91		8.42	

Mandatory program	2.0 g		3.0 g		4.6 g	
	Strokes	CHD	Strokes	CHD	Strokes	CHD
N. events avoided	5,252	5,052	7,878	7,578	12,079	11,620
N. deaths avoided	1,200	1,529	1,799	2,293	2,759	3,517
Healthcare cost savings	$118,015,624	$56,223,232	$177,023,436	$84,334,849	$271,435,935	$129,313,435
Participation savings	$12,345,667	$19,214,374	$18,518,500	$28,821,562	$28,395,034	$44,193,061
Absenteeism savings	$7,803,108	$5,973,461	$11,704,662	$8,960,192	$17,947,148	$13,738,961
Presenteeism savings	$6,088,229	$5,207,607	$9,132,344	$7,811,410	$14,002,927	$11,977,496
Carer cost savings	$2,403,280	$42,277,532	$3,604,920	$42,417,462	$5,527,544	$42,641,350
Earning loss avoided	$10,159,388	$12,858,214	$15,239,083	$19,287,322	$23,366,594	$29,573,893
Salt reduction program cost	$15,353,609		$15,353,609		$15,353,609	
TOTAL SAVINGS PER YEAR	**$283,216,109**		**$411,502,132**		**$616,759,769**	
SOCIAL RETURN ON INVESTMENT	18.45		26.80		40.17	

Figure 5 Impact of different levels of salt reduction (voluntary program)

	Voluntary program					
	0.2 g		0.5 g		0.8 g	
	Strokes	CHD	Strokes	CHD	Strokes	CHD
N. events avoided	525	505	1,313	1,263	2,101	2,021
N. deaths avoided	120	153	300	382	480	612
Healthcare cost savings	$11,801,562	$5,622,323	$29,503,906	$14,055,808	$47,206,250	$22,489,293
Participation savings	$1,234,567	$1,921,437	$3,086,417	$4,803,594	$4,938,267	$7,685,750
Absenteeism savings	$780,311	$597,346	$1,950,777	$1,493,365	$3,121,243	$2,389,384
Presenteeism savings	$608,823	$520,761	$1,522,057	$1,301,902	$2,435,292	$2,083,043
Carer cost savings	$240,328	$42,025,659	$600,820	$42,067,638	$961,312	$42,109,617
Earning loss avoided	$1,015,939	$1,285,821	$2,539,847	$3,214,554	$4,063,755	$5,143,286
Salt reduction program cost	$25,380,456		$25,380,456		$25,380,456	
TOTAL SAVINGS PER YEAR	**$42,274,421**		**$80,760,228**		**$119,246,035**	
SOCIAL RETURN ON INVESTMENT	**1.67**		**3.18**		**4.70**	

	2.0 g		3.0 g		4.6 g	
	Strokes	CHD	Strokes	CHD	Strokes	CHD
N. events avoided	5,252	5,052	7,878	7,578	12,079	11,620
N. deaths avoided	1,200	1,529	1,799	2,293	2,759	3,517
Healthcare cost savings	$118,015,624	$56,223,232	$177,023,436	$84,334,849	$271,435,935	$129,313,435
Participation savings	$12,345,667	$19,214,374	$18,518,500	$28,821,562	$28,395,034	$44,193,061
Absenteeism savings	$7,803,108	$5,973,461	$11,704,662	$8,960,192	$17,947,148	$13,738,961
Presenteeism savings	$6,088,229	$5,207,607	$9,132,344	$7,811,410	$14,002,927	$11,977,496
Carer cost savings	$2,403,280	$42,277,532	$3,604,920	$42,417,462	$5,527,544	$42,641,350
Earning loss avoided	$10,159,388	$12,858,214	$15,239,083	$19,287,322	$23,366,594	$29,573,893
Salt reduction program cost	$25,380,456		$25,380,456		$25,380,456	
TOTAL SAVINGS PER YEAR	**$273,189,263**		**$401,475,285**		**$606,732,922**	
SOCIAL RETURN ON INVESTMENT	**10.76**		**15.82**		**23.91**	

Figure 6 Impact of different levels of salt reduction (community health program)

Community health program

	0.2 g		0.5 g		0.8 g	
	Strokes	CHD	Strokes	CHD	Strokes	CHD
N. events avoided	525	505	1,313	1,263	2,101	2,021
N. deaths avoided	120	153	300	382	480	612
Healthcare cost savings	$11,801,562	$5,622,323	$29,503,906	$14,055,808	$47,206,250	$22,489,293
Participation savings	$1,234,567	$1,921,437	$3,086,417	$4,803,594	$4,938,267	$7,685,750
Absenteeism savings	$780,311	$597,346	$1,950,777	$1,493,365	$3,121,243	$2,389,384
Presenteeism savings	$608,823	$520,761	$1,522,057	$1,301,902	$2,435,292	$2,083,043
Carer cost savings	$240,328	$42,025,659	$600,820	$42,067,638	$961,312	$42,109,617
Earning loss avoided	$1,015,939	$1,285,821	$2,539,847	$3,214,554	$4,063,755	$5,143,286
Salt reduction program cost	$50,134,234		$50,134,234		$50,134,234	
TOTAL SAVINGS PER YEAR	**$17,520,643**		**$56,006,450**		**$94,492,257**	
SOCIAL RETURN ON INVESTMENT	**0.35**		**1.12**		**1.88**	

	2.0 g		3.0 g		4.6 g	
	Strokes	CHD	Strokes	CHD	Strokes	CHD
N. events avoided	5,252	5,052	7,878	7,578	12,079	11,620
N. deaths avoided	1,200	1,529	1,799	2,293	2,759	3,517
Healthcare cost savings	$118,015,624	$56,223,232	$177,023,436	$84,334,849	$271,435,935	$129,313,435
Participation savings	$12,345,667	$19,214,374	$18,518,500	$28,821,562	$28,395,034	$44,193,061
Absenteeism savings	$7,803,108	$5,973,461	$11,704,662	$8,960,192	$17,947,148	$13,738,961
Presenteeism savings	$6,088,229	$5,207,607	$9,132,344	$7,811,410	$14,002,927	$11,977,496
Carer cost savings	$2,403,280	$42,277,532	$3,604,920	$42,417,462	$5,527,544	$42,641,350
Earning loss avoided	$10,159,388	$12,858,214	$15,239,083	$19,287,322	$23,366,594	$29,573,893
Salt reduction program cost	$50,134,234		$50,134,234		$50,134,234	
TOTAL SAVINGS PER YEAR	**$248,435,484**		**$376,721,507**		**$581,979,144**	
SOCIAL RETURN ON INVESTMENT	**4.96**		**7.51**		**11.61**	

Assumptions and limitations

For the purposes of this model, salt reduction is assumed to be the only variable altering blood pressure and therefore stroke and CHD risk. While it is true that excess salt consumption is linked to other health issues such as chronic kidney disease and diabetes,[35,36] this analysis only captures the benefit of salt reduction measured through the reduction in stroke and CHD. Additionally, this analysis only looks at the effect of salt and blood pressure in isolation, therefore not considering any confounding factors.

For the purposes of this model, the cost of implementing a salt reduction program is assumed to be constant and not to be linearly correlated with the salt reduction target.

Another limitation of the current analysis is related to the population considered for the cost calculations. The model calculates the effect of the intervention on an incident population experiencing a stroke or CHD event in the analysed year. Therefore, costs associated with prevalent patients that experienced an event in previous years and still suffer the economic impacts through direct healthcare and indirect costs of that event are not considered in the model.

As this analysis only shows the savings expected for one year only, direct healthcare and indirect productivity cost savings accrued over future years are not captured.

Those who no longer die as a result of stroke or CHD will continue to contribute to the economy over their lifetime, but due to the nature of the analysis the long-term impact is not captured. Therefore, the cost savings and benefit of a mandatory reduction program as presented in this analysis are likely to be conservative.

From a methodological perspective, the analysis represents a simplified application of the SROI methodology. No SROI valuation filters such as deadweight, attribution or displacement metrics were used. so it cannot be wholly defined as a SROI analysis.

Conclusion

This project assessed the impact of salt reduction programs in Australia using a SROI framework. The results can be used to inform decision makers and demonstrate the value of investment in these programs.

This assessment found that by reducing salt intake by 1 g/day across Australia, the number of potentially saved lives each year is estimated to be 1,364, with an estimated 2,626 strokes and 2,526 CHD events avoided. The estimated SROI of implementing salt reduction programs across Australia was estimated to be 2.4, 5.7 and 10.1 for community, voluntary and mandatory programs, respectively. In other words, for each dollar invested in a salt reduction program, $2.40 for a community program, $5.70 for a voluntary program, and $10 for a mandatory program are returned to society

These findings demonstrate that whilst all programs produce a positive return on investment, the mandatory salt reduction program is likely to yield the best social return on investment from the prevention of cardiovascular events.

The SROI method is a recognised methodology for providing a holistic framework in its inclusion of broader social impact, with strong foundations in traditional economic evaluation. Whilst our approach has been modified it represents a scientifically sound and verifiable instrument to improve decision-making when allocating public health budgets.

Appendix I – Assumptions

Blood pressure modelling assumptions

Blood pressure effects are assessed in isolation of other factors, such as level of exercise, lifestyle factors, smoking status. Therefore, reduction in salt intake is assumed to be the sole factor in reducing blood pressure.

The effect of salt in reducing blood pressure is assumed to take full effect immediately, without a progressive ramp up.

As the linear regression model reported in Law[23] does not extend beyond individuals aged 70+, the relationship for the 60-69 age group is assumed to apply for the 70+ age bracket.

Incidence of stroke and CHD

Stroke incidence and mortality by age and gender obtained through The economic impact of stroke in Australia report[24] were transformed to fit the age groups used in the linear regression model reported in Law.[23] The data has been transformed under the assumption that stroke incidence is evenly distributed for each year within each age/sex group.

CHD incidence and mortality rates per 100,000 people by age and gender obtained from the AIHW CVD data tables[23] were transformed to fit the age groups used in the linear regression model reported in Law.[23] The data has been transformed under the assumption that CHD event incidence is evenly distributed for each year within each age/sex group.

A 1:1 ratio between events and individuals is assumed, therefore no individual can experience more than one stroke or CHD event in the year (in the model).

All stroke and CHD events are assumed to occur at the beginning of the year; therefore costs/savings are assumed to be accrued for a whole year (no half-cycle correction).

The model only takes into consideration the incident population of stroke and CHD for the year of analysis, therefore ignoring the long-term consequences of people who experienced an event in the previous years.

Cost assumptions

The cost of salt reduction program is assumed to be constant and not to be linearly correlated with the salt reduction target.

The cost of a community health program is $2.37 in the first year and $1.60 in each and subsequent year, both expressed as 2008 AU$.[13] For the purposes of this model, the ongoing cost of the program was used.

The model incorporates a household productivity loss for those individuals that are not employed. This is assumed to be valued at 30% of the average Australian wage rate. The value was obtained from the economic impact of stroke in Australia report[24] which specifically focuses on stroke. Nevertheless, there is no reason to believe this to be a stroke-specific value, as it assesses the productivity of the general population. Therefore, in the lack on CHD specific data, the stroke value was used.

The model incorporates productivity loss as a result of presenteeism due to CHD i.e. the person's affected ability to function effectively while at work. This is valued at 13.5% of the average Australian wage. The value is obtained by a meta-analysis conducted by Goetzel[32] of presenteeism studies in the United States that found workers with heart disease averaged 13.5% lower productivity than their non-heart disease counterparts. Due to the lack of stroke specific data, this value was also used (as a proxy) for stroke sufferers.

As no data is available on the proportion of stroke patients requiring part-time vs. full-time care, the average full-time equivalent (FTE) care required by each person suffering a stroke was calculated as the number of carers who cared for people with stroke as their main condition, divided by the stroke prevalence, as reported in Deloitte Access Economics.[24] As no CHD specific data was available, the average full- time FTE care required by each person suffering a CHD event is assumed to be equal to that of a person suffering a stroke.

Only people who survive a stroke or CHD event are assumed to incur a healthcare cost.

Of those who die from stroke or CHD event, only those employed are assumed to incur a mortality cost i.e. lost wages/earnings that would have been earned by the person in the year.

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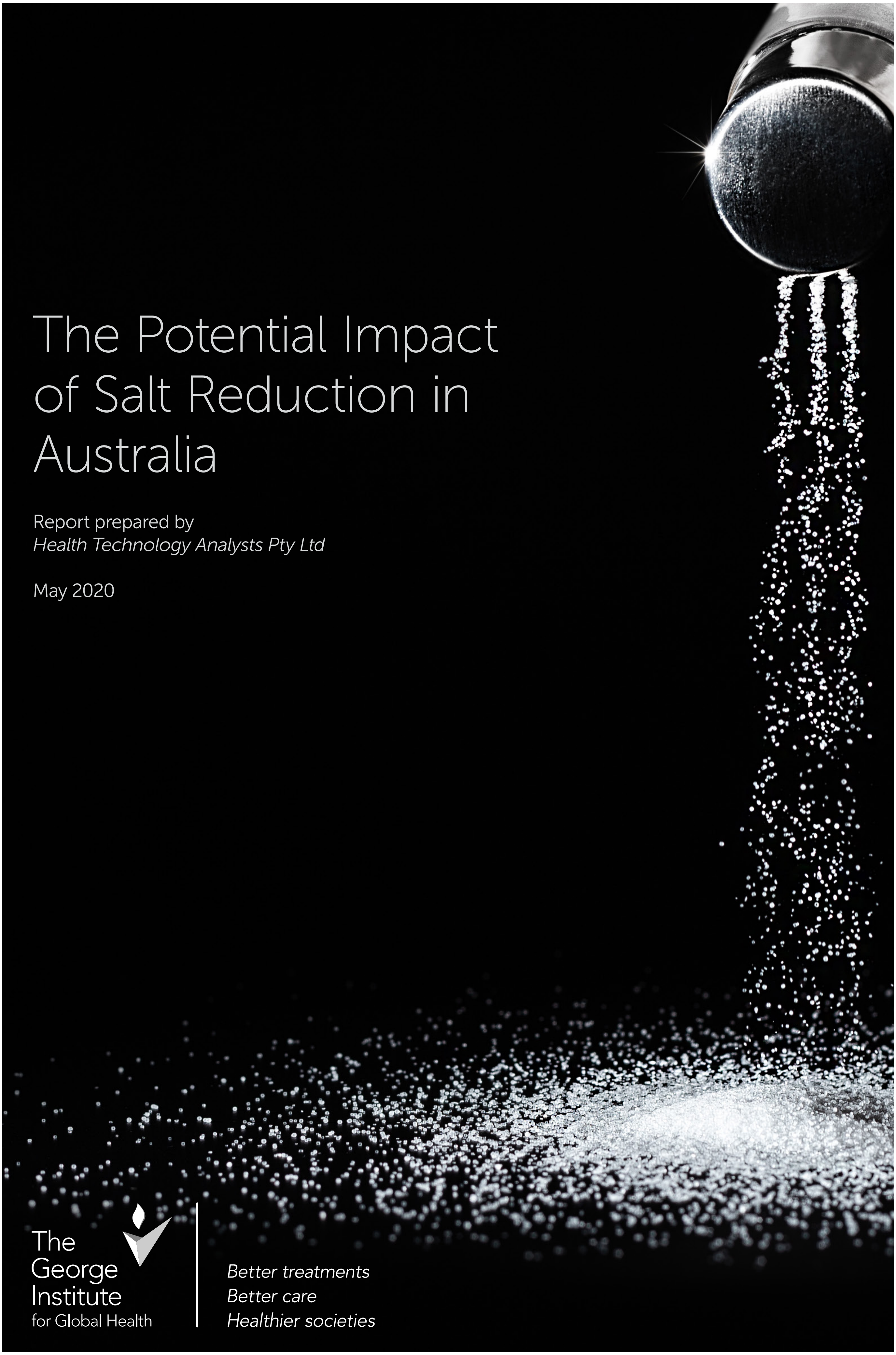

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Better treatments
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