FINAL REPORT

Understanding the value of Impromy

A research impact assessment for the Health & Biosecurity Business Unit of the CSIRO

Prepared for
The CSIRO

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THE CENTRE FOR INTERNATIONAL ECONOMICS
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Abstract

- **Impromy targets a significant public health issue in Australia, with the prevalence of overweight and obesity among Australians steadily increasing for the past 30 years.**
- **Impromy embodies a unique multi-strategy approach to address the problem of obesity and overweight in Australia, with few other programs using the combination of weight loss strategies it offers.**
- **The role of the CSIRO in developing Impromy and shoring up its adoption and retention is substantial. CSIRO has been instrumental to its substantiation, uptake, consumer retention, and improved program design.**
- **While the results are preliminary and early, consumers of Impromy are understood to be realising weight loss of 4.5 to 6.6 kilos.**
- **Given that most customers of Impromy have health risk factors outside the healthy range, achieving weight loss for this group should be expected to reduce disease risk and the burden of disease associated with overweight and obesity.**
- **According to latest evidence from the Australian Bureau of Statistics, diseases that are most profoundly impacted by overweight and obesity include diabetes, uterine cancer, hypertensive heart disease, and osteoarthritis, for which 45-53 per cent of the disease burden is due to overweight and obesity.**
- **Relatively small changes such as losing as little as 3 kilograms or maintaining existing weight have been found to have a significant effect in reducing the health impact of overweight or obesity in Australia.**
- **High level costings on potential health cost savings are conservatively estimated at $3.5-$6.6 million for the existing cohort of Impromy customers to date (since 2014). This relates only to *avoided complications* associated with Type 2 diabetes (as opposed to avoided Type 2 diabetes). This assumes that complications are avoided for Impromy customers that are at 'high risk' of diabetes, who achieve clinically significant weight loss, and for whom overweight and obesity is the primary cause of the burden of Type 2 diabetes. Hence it is a very conservative estimate.**
- **Positive impacts on other health states, including disease avoidance, would avoid substantially more costs. Individuals and workplaces would also benefit from the improved status of health that Impromy delivers.**

1 An overview of Impromy

'Impromy' is a multi-strategy approach to addressing the problem of obesity and overweight in Australia. It is delivered via a partnership between the CSIRO and Probiotec, with CSIRO being instrumental to its substantiation, uptake, consumer retention, and improved program design.

The prevalence of overweight and obesity among Australians has been steadily increasing for the past 30 years. In 2011–12, around 60 per cent of Australian adults were classified as overweight or obese, and more than 25 per cent of these fell into the obese category.[1]

Health problems related to excess weight impose substantial economic burdens on individuals, families and communities. Data from the Australian Diabetes, Obesity and Lifestyle (AusDiab) study indicate that the total direct cost for overweight and obesity in 2005 was $21 billion ($6.5 billion for overweight and $14.5 billion for obesity). The same study estimated indirect costs of $35.6 billion per year, resulting in an overall total annual cost of $56.6 billion.[2]

Weight management strategies generally focus on energy restriction and/or altering macronutrient profiles (low fat/carbohydrate or high protein/fat diets). However, these are prone to challenges with ongoing compliance, which is known to prevent meaningful weight loss over the medium to longer term for certain individuals.[3]

The use of additional strategies to improve compliance and guide individual choices can improve the sustainability of weight loss outcomes. Keogh et al found that the use of meal replacements over 3 months led to greater reductions in body mass in type 2 diabetics than the use of only a commercially available diet book in a community setting.[4]

'Impromy' is an attempt to take a multi-strategy approach to achieving the sustainability of weight loss goals. It combines the CSIRO Total Wellbeing Diet Book with commercial meal replacement, in-pharmacy and online support to maximise user interaction.

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1 ABS (2012) *Australian health survey: First results, 2011–12.* ABS cat. no. 4364.0.55.001. Canberra: Australian Bureau of Statistics.

2 Colagiuri S, Lee CMY, Colagiuri R et al. (2010) *The cost of overweight and obesity in Australia*. Med J Aust 192: 260–64.

3 Naude, C. E., et al., 'Low carbohydrate versus isoenergetic balanced diets for reducing weight and cardiovascular risk: a systemic review and meta-analysis', PloS one, 2014, 9(7): p. e100652.

4 Keogh, J. B and Clifton, P. M., 'Meal replacements for weight loss in type 2 diabetes in a community setting', Journal of Nutrition and metabolism, 2012.

Our understanding of Impromy

Impromy is delivered via a commercial partnership between CSIRO and Probiotec called the Impromy Health and Weight Management Program, and was developed collaboratively between the two parties.

Impromy is offered through pharmacies, and provides a package of meal replacements or 'shakes' (for breakfast and lunch), high protein meals and ongoing support by trained pharmacy staff.

The role of the CSIRO

The CSIRO has been important to the early stage development of Impromy, and continues to be involved in shoring up consumer adoption, consumer retention, and improving program design.

For instance, CSIROs role has included:

- developing the program protocols, including meal planning, consultation process, recipe profiles, communication guidelines and many relevant tools
- conducting a clinical trial on the efficacy of the Impromy Program in advance of the programs launch, which:
  - validated the efficacy of the program
  - provided a strong marketable claim around clinically-tested results, and
  - provided valuable information on participant feedback, which was used to inform retail development
- developing technical training documentation, which was used to train pharmacy staff on the program and how to interact with members, and
- publicly discussing the research behind the program to contribute to Program credibility, which includes the recent development of video materials featuring CSIRO staff explaining the genesis of the program and research basis behind it.

CSIRO also has a continuing role in program and product development.

The agreement between CSIRO and Probiotec includes a research royalty to fund further research to identify better ways to provide existing programs, underpinning future consumer offerings (including the Flexi Program, which is launching now).

The diet itself

Impromy is underpinned by the scientific substantiation that a high protein, lower carbohydrate diet is safe and effective in diabetes and weight loss management for patients without renal and kidney impairment. For instance, a systematic review by Hession et al in 2008 found that weight loss was significantly greater among individuals with a low carbohydrate/high protein diet after 6 and 12 months compared with a low fat

high carbohydrate diet. In addition, FSANZ states that formulated meal replacements are safe for replacing one to two meals per day.[5]

It is also supported by research that shows that meal replacements, when a part of a supported program, provide an effective form of weight loss and health improvement, including cholesterol, blood pressure and blood glucose.[6]

In 2016, Brindal et al showed that a program of meal replacements combined with point-of-care health testing, personalised support from a trained consultant and a phone app (designed to reflect the Impromy program) increased weight loss efficacy. The study suggested that weight loss was higher than under the baseline at week 24. Other health markers of blood pressure, cholesterol levels and weight loss were also improved compared to the baseline.[7]

- In 2014, the Look AHEAD[8] Research Group found that 50 per cent of the intensive intervention participants maintained more than 5 per cent of weight loss for 8 years.
- The Look AHEAD trial also found that weight loss in the first year was strongly related to weight change at year 4, whereby the larger the participants' weight loss in the first year, the larger their loss at year 4.[9]

Few other programs use the combination of weight loss strategies offered by Impromy.[10]

There is no fixed time for using Impromy, and each 'member' is assigned a personalised program based on their individual characteristics. If a member is close to their target weight, they may complete their program in 2 weeks, and for those that are further from their target weight, the program may be recommended for a more extended period.

Irrespective of the required duration on the program, each member transitions across the 3 phases of (i) motivate, (ii) advance, and (iii) sustain.

Each stage progressively reduces the use of formulated products and moves members to a healthier, balanced diet and eating plan, with continuing access to Impromy meal planning tools, compliance rewards (online virtual medals) and Impromy recipes.

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5 The CSIRO, undated. Meal replacement programs — Evolution to new evidence. Presentation by Manny Noakes, Program Director of Nutrition and Health at the CSIRO.

6 Ibid.

7 Brindal E, Wittert G. (2016) The weight balancing act and allostasis: Commentary on the homeostasis theory of obesity. Health Psychology Open

8 The LOOK AHEAD trial examined over 5000 overweight/obese adults with type 2 diabetes randomised to usual care or an intensive lifestyle intervention that included use of meal replacements.

9 Wadden T.A., West D.S., Neiberg R.H., Wing R.R., Ryan D.H., Johnson K.C., Foreyt J.P., Hill J.O., Trence D.L., Vitolins M.Z. One-year weight losses in the Look AHEAD study: Factors associated with success. Obesity. 2009;17:713–722. doi: 10.1038/oby.2008.637.

10 Griffith University, 2015. Leveraging online and in-pharmacy support to enhance weight loss: a population based analysis. By Professor Lauren Williams and Professor Allan Cripps. April 2015.

Adoption to date

Since its inception, 45 998 members have joined the Impromy Classic (In-Store Consultation) Program.

The profile of new member acquisitions and in-store consultations is set out in table 1.1, which shows a steady upward movement in the average number of in-store consultations per new member.

Forty–eight per cent of members that choose to report their age are between 41 and 60 years of age (table 1.2).

Most members that report their gender are female (85 per cent).

1.1 New member activity for Impromy

	2014	2015	2016	2017[a]
New members	12 157	13 966	12 217	7 636
In-store consultations	49 083	124 126	120 156	82 060
Average consultations per new member	4.04	8.89	9.84	10.75

[a] Year to date to the end of July 2017. Pro-rated to December 2017, total new members would be 13 146, and total instore consultations would be 141 282.

Note New member data excludes members that 're-start' their program, and excludes members who have joined the Flexi Program or used the Metabolic C12 product.

Source: CSIRO, unpublished.

1.2 Age distribution of members

Age profile	16-20	21-31	31-40	41-50	51-60	61-70	71-80	81+
No. of members	564	2757	4312	6512	6984	4930	1845	311
Per cent of total	2.0	9.8	15.3	23.1	24.8	17.5	6.5	1.1

Note: Includes only those members that declare their age, which is 61 per cent of all members.

Source: CSIRO, unpublished.

2 Expected outcomes and impacts

While the results are preliminary and early, consumers of Impromy are understood to be realising weight loss of 4.5 to 6.6 kilos.

Given that most customers of Impromy have health risk factors outside the healthy range, achieving weigh loss for this group should be expected to reduce disease risk and the burden of disease associated with overweight and obesity.

Weight loss outcomes to date

Impromy has been in place for nearly three years, with early reported results including:

- weight loss
- lower glucose levels, and
- blood pressure stabilisation.

Probiotec's website for Impromy suggests that the average weight loss across Impromy members is **4.5 kilograms**.

This includes all members, whether they have been on the program for one week, or for 12 or more weeks.

Those that stay with the program for 12 weeks are said to achieve a weight loss of **6.6 kilograms.**

This is based on an unpublished paper by Williams and Cripps of Griffith University found that 'inclusions of online and pharmacy support as used in Impromy has additional benefits for weight loss to the use of the TWD (both the traditional and online version) or meal replacement individually'. The 12-week trial involving 3 814 individuals showed:

- an average weight loss of 7 per cent, on average, at 12 weeks or 4 kilograms
- a reduction in glucose levels, however, this requires confirmation over a larger cohort
- an overall reduction in blood pressure, including a reduction in systolic blood pressure for those with higher blood pressure, and
- an improvement in cholesterol of 7.2 per cent over 8-12 weeks.[11]

Similarly, Brindal et al (2016) undertook a randomised control trial of a prototype version of the Impromy Program, which suggested that the average weight loss was between 5 and 6 kilograms. Of all starters, 33.5 per cent lost a clinically significant amount of weight. Other studies have reported similar success in weight loss for Partial

[11] Griffith University, 2015, unpublished.

Meal Replacement Programs (PMRPs). Approximately 65 per cent of participants remained involved at 12 weeks and, after 24 weeks, and overall 58 per cent of people who started the program remained involved.

These weight loss outcomes and reduced health risks are important, given that Probiotec reports that approximately 55 per cent of customers have one or more 'health risk factors' including blood glucose, cholesterol or blood pressure readings 'at risk' or outside the healthy range.

Evidence of sustained weight loss

At this stage, it is unclear how many members continue to use Impromy for the full duration of their individual program (up to 12 weeks), or what outcomes might be achieved after program completion.

Indeed, the CSIRO has advised that at this time, there are no sustained weight loss results for members at 12, 24, 36, or 52 weeks.

A full review of all performance aspects of the Impromy program has been commissioned from Griffith University, which is expected to be completed in the first half of 2018. This should provide the necessary information to enable some more robust quantification of outcomes at that time.

Drivers of economic value of Impromy

The following analysis highlights the expected value drivers and points to the type and quantum of benefits that could be expected as a result of Impromy. It is recommended that these elements are included in any future economic evaluation of the Impromy Program.[12]

Reducing the burden of disease associated with overweight and obesity

There is clear evidence that overweight and obesity contributes to the burden of disease in Australia, and that weight loss has a positive impact on reducing this burden.

[12] It has not been possible to undertake a net economic impact assessment of Impromy at this time, due to the lack of evidence of actual weight loss, and how weight loss is sustained over time, as well as the lack of available information on program costs from CSIRO or Probiotec, the latter of which does not share of publish investment or expense information on a divisional basis.

The Australian Bureau of Statistics (ABS) has recently reported the diseases that are most profoundly impacted by overweight and obesity, which include:

- **diabetes**, for which around half of diabetes burden (53 per cent) is due to overweight and obesity
- **uterine cancer and hypertensive heart disease,** for which 46 per cent of the disease burden is due to overweight and obesity
- **osteoarthritis**, for which 45 per cent of the disease burden is due to overweight and obesity
- **gout,** for which 39 per cent of the disease burden is due to overweight and obesity
- **oesophageal cancer** and **chronic kidney disease**, for which 38 per cent of the disease burden is due to overweight and obesity
- **coronary heart disease**, **gallbladder cancer** and **kidney cancer**, for which 25 per cent of the disease burden is due to overweight and obesity.[13]

Across all impacted diseases, the ABS found that overweight and obesity accounts for 7.0 per cent of the total health burden in Australia in 2011.

It also found that relatively small changes such as losing as little as 3 kilograms or maintaining existing weight could have a significant effect in reducing the health impact of overweight or obesity in Australia.[14]

In particular, the report found that if Australians that are overweight and obese reduced their weight by just one Body Mass Index (BMI) point, the overall health impact of excess weight would be reduced by 14 per cent in 2020.[15]

This is consistent with the broader literature that links weight loss to reduced diabetes and cardiovascular disease risk and improved health status.

Key findings from the diabetes literature include the following:

- data from the Diabetes Prevention Program (DPP) suggests that the risk of diabetes is reduced by 16 per cent for every kilogram of weight loss in individuals at a high risk for diabetes as a result of impaired glucose tolerance at the baseline[16]
- a recent meta-analysis confirms a clinically significant reduction in the risk factors or indicators for diabetes such as blood trigluceride blood glucose, and HbA1c levels and risk of developing Type 2 diabetes associated with a 3 per cent to 5 per cent sustained

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13 Australian Bureau of Statistics 2017, *Impact of overweight and obesity as a risk factor for chronic conditions: Australian Burden of Disease Study,* ABS Canberra, p. 17.

14 Australian Bureau of Statistics 2017, *Impact of overweight and obesity as a risk factor for chronic conditions: Australian Burden of Disease Study,* ABS Canberra.

15 Ibid.

16 Hamman, R., et al. 2007. 'Effect of weight loss with lifestyle intervention on risk of diabetes'. *Diabetes Care*. 2006. September; 29(9): 2102-2107.

weight loss.[17] The 'effect sizes' ranged from small, at 0.17, to medium, at 0.65, across the different measures,[18] and

- patients with diabetes that achieve intentional weight loss that is sustained over an average follow up of 13 years have been found to receive **a 25 per cent reduction in total mortality**.[19]

Key findings from the cardiovascular disease (CVD) include the following:

- on average, the self-reported prevalence of cardiovascular disease is 14.5 per cent for adults with normal weight, 24.6 per cent for overweight adults and 39.8 per cent for obese adults. A meta-analysis of studies assessing the impact of body weight on CVD suggests there was a 29 per cent increase in CVD for each 5-unit increase in BMI[20]
- a fall in blood pressure and stabilisation of blood lipid levels and lipoproteins, including HDL cholesterol and triacylglycerols, as a result of weight loss, has been shown to improve CVD risk factors,[21] and
- in a systematic review of randomised controlled trials by Semlitsch et al in 2016 of patients with primary hypertension, systolic blood pressure was found reduced by a mean of 4.5 mmHg (95 per cent CI -7.2 to -1.8 mm Hg) and diastolic blood pressure by 3.2 mmHg (95 per cent CI -4.8 to -1.5 mm Hg) in patients assigned to weight loss compared to the corresponding control interventions (non-dietary interventions).[22]

However, the Royal Australian College of General Practitioners states that the research does not (yet) provide evidence that weight loss in high risk groups results in a reduction in cardiovascular events.[23]

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17 Sun, Y., You, W., Almeida, F., Estabrooks, P., and Davy, B. 2017. 'The effectiveness and cost of lifestyle interventions including nutrition education for diabetes prevention: A systematic review and meta-analysis'. *Journal of the Academy of Nutrition and Dietetics*, March 2017, Volume 117, Number 3.

18 Sun et al, 2017.

19 See Aucott, L. Poobalan, A., Smith, W., Avenell, A., Jung, R., Broom, J., Grant, A. 2004. Weight loss in obese diabetic and non-diabetic individuals and long-term diabetes outcomes – a systematic review. Diabetes, obesity and metabolism. Volume 6, Issue 2, Pp 85-94.

20 Bogers, R., Bemelmans W., Hoogenveen R., Boshuizen H., Woodward, M., Knekt, P., van Dam, R., Hu F., Visscher T., Menotti, A., Thorpe RJ Jr, Jamrozik K, Calling, S., Strand, B., Shipley, M., 2007. 'Obesity, weight reduction, and cardiovascular disease', Centre for Prevention and Health Services Research, National Institute for Public Health and the Environment, PO Box 1, 3720 BA Bilthoven, The Netherlands.

21 The American Heart Association confirmed this in 2006 in their statement that 'strong evidence indicates that weight loss in overweight and obese individuals reduces risk factors for diabetes and CVD'.

22 Semlitsch, T., Jeitler, K., Berghold, A., Horvath, K., Posch N., Poggenburg S., Siebenhofer A., 2016. *Longer-term effects of weight-reducing diets in people with hypertension*. Cochrane Database Syst Review. 2016 March 2, 3.

23 National Vascular Disease Prevention Alliance, 2012. *Guidelines for the management of Absolute cardiovascular disease risk*. Available at: https://www.heartfoundation.org.au/images/uploads/publications/Absolute-CVD-Risk-Full-Guidelines.pdf

The longevity of CVD gains is more uncertain, with questions remaining around the impact of weight loss on blood pressure beyond 18 months.[24]

Reducible health system costs

There are discernible healthcare costs required to address the burden of disease associated with overweight and obesity, and genuine gains to health and wellness when overweight and obesity is reduced.

Looking just at diabetes where the clinical evidence on weight loss and reduced disease risk is particularly conclusive, 68 per cent of adults with diabetes will die of heart disease or stroke, and the risk for stroke is 2 to 4 times higher. Sixty-seven per cent of adults with diabetes have high blood pressure.[25]

Type 2 diabetes is estimated to cost Australia $6 billion annually in healthcare costs, carer costs, and Commonwealth Government subsidies, with Type 1 diabetes costing another $570 million annually.[26]

Different studies that have estimated costs per person consistently show that costs increase dramatically for people with complications. A 2012 study funded by Diabetes Australia estimated that average comparative treatment costs are $9 645 and $4 025 comparing those with and without micro and macrovascular complications for Type 2 diabetes, and $16 698 and $3 468 for Type 1 diabetes for those with and without micro and macrovascular complications (table 2.1).

2.1 Average annual healthcare cost of diabetes per person

	Type 1 diabetes	Type 2 diabetes
	$	$
No complications of diabetes	3 468	4 025
Microvascular complications only	8 122	7 025
Macrovascular complications only	12 105	9 055
Micro and macrovascular complications	16 698	9 645

Source: Colagiuri, S., Colagiuri, R., Conway, B., Grainger, D., 2003, DiabCost Australia: assessing the burden of Type 2 diabetes in Australia, Canberra, Diabetes Australia, and Colagiuri, S., Brnabic, A., Gomez, M., Fitzgerald, B., Buckley, A., Colagiuri R.2009, DiabCost Australia: assessing the burden of Type 1 diabetes in Australia, Canberra, Diabetes Australia.

This is consistent with evidence that a one per cent sustained reduction in HbA1c, to which weight loss contributes, reduces the cumulative incidence over 5 years of:

- end stage kidney disease by 40 per cent
- amputation by 21 per cent

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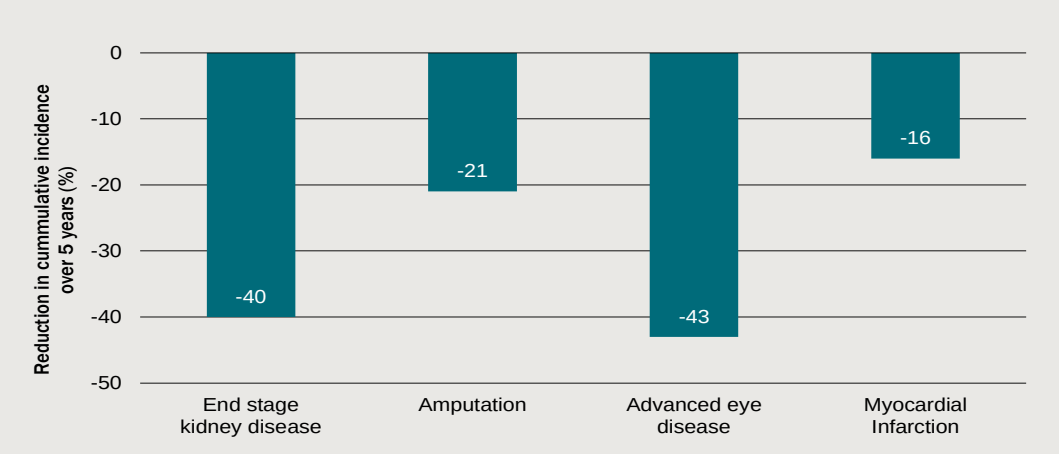
24 Semlitsch et al, 2016.

25 National Diabetes Fact Sheet, Centres for Disease Control and Prevention (CDC), 2011.

26 Baker IDI Heart and Diabetes Institute (2012), Diabetes, the silent pandemic and its impact on Australia, Melbourne, see http://www.diabetesaustralia.com.au/Documents/DA/What's%20New/12.03.14%20Diabetes%20management%20booklet%20FINAL.pdf.

- advanced eye disease (proliferative retinopathy) by 43 per cent, and
- myocardial infarction by 16 per cent (chart 4.3).

2.2 Impact on diabetes complications of reducing HbA1c by 1 per cent



Data source: PALMER, A. J., ROZE, S., VALENTINE, W. J., MINSHALL, M. E., FOOS, V., LURATI, F. M., LAMMERT, M. & SPINAS, G. A. 2004a. Validation of the CORE Diabetes Model against epidemiological and clinical studies. Curr Med Res Opin, 20 Suppl 1, S27-40.

Studies that have compared the costs of prevention programs to costs of Type 2 diabetes have found them to be cost-saving or extremely cost effective, with Australian estimates ranging from $2 600 to $5 300 per life year.[27]

This excludes the positive impacts that would also accrue in terms of enhanced productivity and workforce participation when better health is achieved.

[27] Segal L, Dalton AC, Richardson J. Cost-effectiveness of the primary prevention of non-insulin dependent diabetes mellitus. Health Promotion Int. 1998;13:197–209, and Palmer AJ, Roze S, Valentine WJ, Spinas GA, Shaw JE, Zimmet PZ. Intensive lifestyle changes or metformin in patients with impaired glucose tolerance: modelling the long-term health economic implications of the diabetes prevention program in Australia, France, Germany, Switzerland, and the United Kingdom. Clin Ther. 2004;26:304–32.

3 High level estimates of value from Impromy

High level costings on potential health cost savings are conservatively estimated at $3.5-$6.6 million for the existing cohort of customers to date.

Drawing on what is known about Impromy to date, and based on various *high-level assumptions* about impacts on health outcomes related to diabetes management, it is estimated that Impromy to date has generated avoided healthcare costs in the order of **$3.5-$6.6 million** relating to improved diabetes management alone (chart 3.1).

This assumes that:

- 55 per cent of members are at risk of diabetes[28]
- 33 per cent of members achieve clinically significant weight loss results[29]
- 14 per cent of members experience a reduced diabetes burden (burden that is due to overweight and obesity, and falls due to the reduction in body mass),[30] and
- the value of reduced diabetes risk and disease burden can be valued as the difference in health care costs associated with diabetes *with* and *without* complications.[31]

This relates to the cohort of consumers up until June 2017. While CSIRO advises that uptake has been strong in the third quarter of 2017, no actual data is yet available for the most recent adopters.

The avoided cost estimate is considered to be very conservative, and serves only to highlight the impact pathway for Impromy where inputs, activities, and behaviours translate into tangible differences in health status, health outcomes, and consequently healthcare costs.

If weight loss were to have an impact on reduced CVD and cardiac events, the health cost savings would be considerable. For instance, patients presenting with chest pain in the Emergency Departments (ED) of hospitals around Australia is commonplace, and accounts for approximately 10 per cent of ED presentations, and 25 per cent of hospital admissions.[32]

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28 Based on Probiotec data on the proportion of members with risk factors outside the healthy range.

29 As found in the study by Brindley et al.

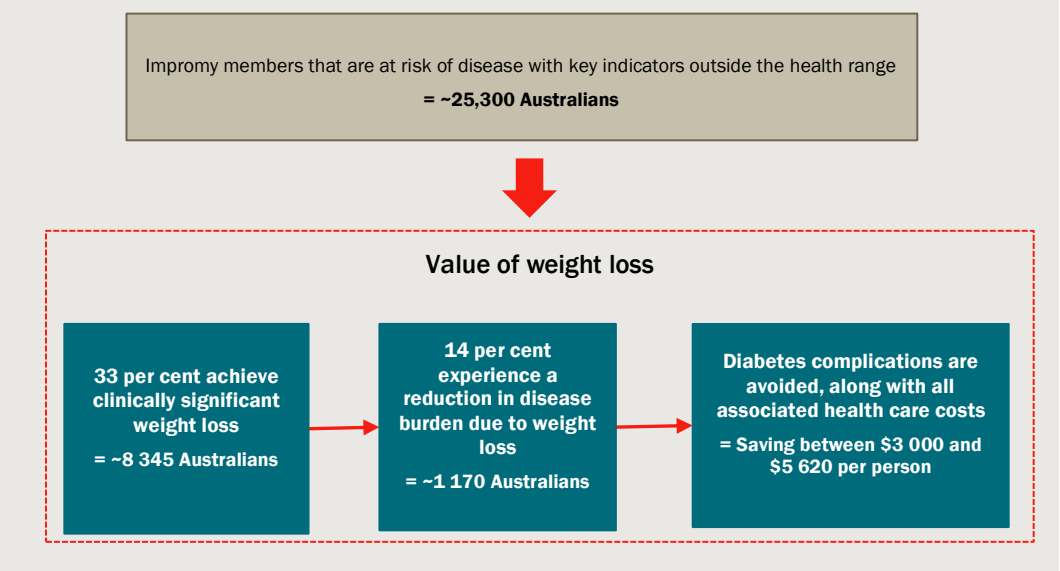
30 Based on findings from the ABS 2017 op. cit.

31 Lower bound estimates assumes microvascular complications only are avoided. Upper bound estimates assumes micro and macrovascular complications are avoided.

32 Than, M., Cullen, L., Aldous, S. et al 2012, '2 hour accelerated diagnostic protocol to assess patients with chest pain symptoms using contemporary troponins as the only biomarker', *Journal of the American College of Cardiology*, Volume 59, No. 23, 2012.

There are approximately 80 000 hospitalisations associated with heart attack and chest pain in Australia annually. The health care system costs associated with heart attack and chest pain are considerable, estimated to be $1.8 billion per annum, with a cost per separation of $22 000 for direct costs only.[33]

3.1 Estimating the avoided health care costs due to Impromy



Data source: CIE.

Attribution of outcomes to the CSIRO

It seems clear that the involvement of the CSIRO has positively contributed to program uptake, and retention, and that the abovementioned positive impacts are substantially attributable to CSIRO.

For instance:

- CSIRO has stated that consumer research suggests that the Impromy Program is perceived as being highly efficacious, due to the involvement (both from a development and endorsement perspective) of CSIRO
- web traffic and high levels of customer recruitment and engagement has occurred when CSIRO representatives have appeared in news media on behalf of the program:
  - exposure during the media launch on A Current Affair, in August 2014 led to a 600 per cent increase in web traffic to the Impromy website and high customer recruitment
  - exposure on Today Tonight in 2016 led to substantial increases in web traffic and customer recruitment, and

[33] Access Economics 2009, *The Economic Costs of Heart Attack and Chest Pain (ACS),* http://www.bakeridi.edu.au/Assets/Files/FullReport%20-%20the%20economic%20costs%20of%20heart%20attack%20and%20chest%20pain%20(emilable.pdf

  - media engagements during the initial launch of the Flexi program (May / June 2017), resulted in over 100 media touchpoints and a record amount of web traffic and customer engagement, and
- CSIRO's analysis of program data into member behaviour changed advice to stores and provided guidance on improving member retention, which more than doubled member retention from averaging 4 to over 8 weeks.[34]

However, there will still be a strong component of individual-level commitment, which will only partly be influenced by CSIRO's involvement. There are also likely to be outcomes that are more properly attributed to Probiotec and/or individual pharmacies rather than CSIRO.

For instance, the pharmacy visit interval appears to correlate with weight loss at 12 weeks, with weight loss averaging 8.9 kilogram for those visiting their pharmacy weekly, compared to 2.7 kilograms, if visits are more than 3 weeks apart. This may be owing to additional engagement by the individual, and/or the value of the interaction with the pharmacy support, as well as the cohort (for instance, they might have had a higher starting weight).

Aside from confirming a positive association between CSIRO and expected health outcomes associated with Impromy, this review is unable to estimate the attributable proportion of value for the CSIRO or any other input.

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[34] CSIRO reviewed member data and found that members who visited the pharmacy weekly (at that stage we recommended fortnightly visits) for an Impromy consult, were achieving substantially better results than those visiting fortnightly and monthly.

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