

# THE WATER INDUSTRY'S ROLE IN HEALTH AND WELLBEING

## INSIGHTS FROM CONTEMPORARY PUBLIC HEALTH STUDIES IN VICTORIA

F Pamminger

### ABSTRACT

The water industry has always had a strong focus on public health. Maintaining water quality is fundamental to our existence, and is one of our most important functions. Beyond this, however, are a range of contemporary public health and wellbeing challenges, to which our industry could make a more meaningful contribution – but to make this contribution, the water industry will need to expand how it thinks. This paper addresses ways in which we can gain new insights by considering how the public health industry is addressing the challenges of today.

Public health experts estimate that Victoria is presently experiencing approximately 1,500 avoidable deaths each year. When relative populations are considered, this magnitude has parallels to the crisis Victoria faced in the 1890s, when the state suffered 400 deaths a year from typhoid – a serious public health issue that was also recognised as avoidable.

In the 1890s the water industry's roles in resolving the public health crisis was clear – construct sewers to improve sanitation and reduce the spread of typhoid. But today, when the leading causes of death include heart disease, cancer and respiratory disorders, the role of the water industry is much less obvious.

An insight from public health analysts can provide the water industry another lens to look at what it does. Public health analysts see a seven-year difference in life expectancy between the state's best and worst municipalities, and a 17-year difference in disability-free life years. These gaps exert an economic burden of between \$3 billion and \$5 billion a year on the state of Victoria, which impacts us all.

By unbundling the differences in health and wellbeing between municipal regions, public health experts have found that the largest determinants to health and wellbeing are socioeconomic (40%), behavioural (30%), clinical (20%) and the physical environment (10%). These insights provide us with a different lens to see how the water industry can potentially contribute to health and wellbeing. They move us from thinking about just providing safe water and sanitation services to considering aspects such as our vulnerability programs, education programs and our role in encouraging more people to replace sugary drinks with water.

Importantly, these insights also pave the way to provide us with a material measure to quantify a water company's relative contribution to health and wellbeing, letting us prioritise activities that deliver the greatest social capital to the community.

**Key words:** Water industry, health, wellbeing

### INTRODUCTION

As an industry, we are very proud of our contribution to health and wellbeing. Anecdotally, young civil engineers are told that their profession has saved more lives (through the provision of reticulated water and sanitation services) than modern medicine.



The motto of the Melbourne Metropolitan Board of Works (MMBW), which was responsible for Melbourne's water and sanitation services from 1890 to 1995, was 'Publica Mercessalus Mea':

'Public health is our reward'.

In 1995, the MMBW was disaggregated into four water companies whose purpose statements include such ideals as: 'enhancing life and liveability', 'contributing to health and wellbeing', and 'healthy water for life'. The theme of contributing to community health remains strong throughout the Victorian metropolitan water industry.

In the late 19th century, the water industry's connection to public health was straightforward. During the 1890s, about 400 Melbourne residents died of typhoid each year. Approximately one in every ten people contracting the

disease died from it, and people could die within three weeks of becoming sick. Typhoid patients were congesting hospitals, causing a major problem for both the medical system and the city of Melbourne's overall public health.

We need to remember that in the early 1890's Melbourne was still learning what typhoid was, and that the disease could be prevented by building sewers. Once that was recognised, it brought strong impetus for public action, leading to the establishment of the MMBW to construct sewers throughout the city.

Thinking back to the 1890s, it is easy to see how the 'public health is our reward' motto created meaning for the water industry of the day. Back then, the industry's contribution

to health and wellbeing could be easily measured by the reduction in deaths attributed to typhoid.

But now that the sewers have been built, and Australia has eliminated typhoid along with a host of other water and waste borne diseases, do we have a wider role in public health than just maintaining water quality?

In this article, I propose that we in the water industry should expand our connection to community health and wellbeing to go beyond our role in maintaining water quality. We now need to determine what our role should be by looking at the biggest health and wellbeing challenges we face today.

My organisation, Yarra Valley Water, has never measured the health and wellbeing of its customers, let alone the individual contribution our company makes to maintaining or improving their health and wellbeing. Even the concept is entirely new to us. The closest the water industry has come to quantifying its contribution to public health is a 2012 World Health Organization (WHO) report that attributed health benefits to the provision of water and sanitation in countries that had not yet met the UN's Millennium Development Goals.

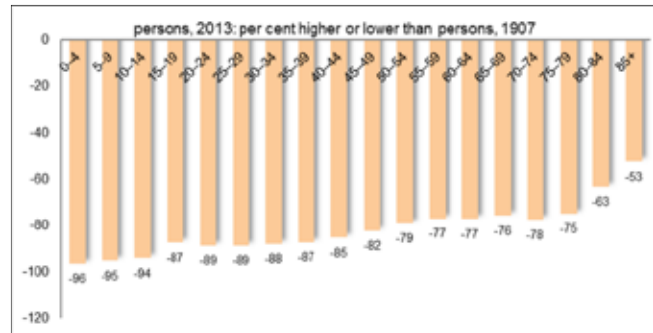
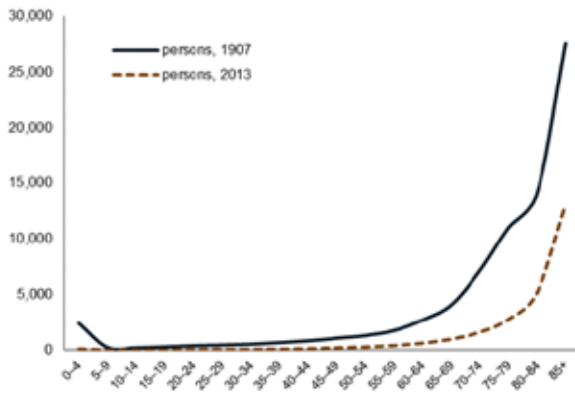
The public health industry, by contrast, does measure health and wellbeing. I believe we can learn a lot from the way the public health sector makes these measurements, as well as the strategies it uses to address contemporary public health challenges.

### METHODS USED TO MEASURE PUBLIC HEALTH

Life expectancy is one of the simplest metrics the public health sector uses to measure health.

There is no doubt that humans are living longer than ever before. Historians estimate that the average life expectancy throughout history, from the Palaeolithic era right through until 1900, was about 30 years. It was only in the 1950s that the global average life expectancy rose to 48 years. In 2013 it was 71.5 years, according to Wikipedia.

The average life expectancy of Australians born between 2013 and 2015 is now 80.4 years for men and 84.5 years for women, according to the Australian Institute of Health and Welfare (2017). Most of the life expectancy advances in our country have only been achieved in the last 100 years – Australian men and women born between 1881 and 1891 only lived to 47.2 years and 50.8 years respectively.



**Figure 1. Change in life expectancy over the last 100 years, ABS (2015)**

When we contemplate ways to further improve life expectancy, it is interesting to reflect on where the advances over the past 100 years have come from. By analysing life expectancy data between 1907 and 2013 (see Figure 1) we can see that two characteristics stand out. Firstly, the most vulnerable populations – children and older people – are now recording significantly fewer deaths. Secondly, the past century has delivered a relatively uniform 80% reduction in deaths across all other age groups.

Three factors have contributed the most to increasing life expectancy over the past century. Better nutrition, advances in medicine, and improvements in public health from the provision of reticulated water and sanitation services.

When thinking about how public health can be improved, we naturally look at the most common causes of death today. The top three causes of death in the western world are heart and circulatory disorders, cancer, and respiratory disorders (see Figure 2).

The concepts of life expectancy and leading causes of death are well used and understood today, but these measures only represent the beginning of the work being done in the field of improving public health and wellbeing.

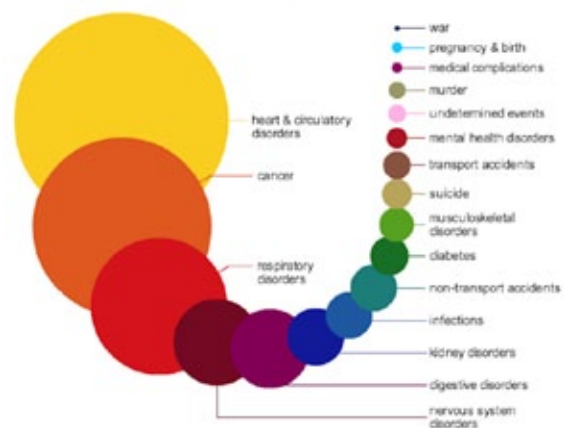
In Victoria, the Department of Health and Human Services, the Australian Bureau of Statistics and VicHealth regularly measure the health and wellbeing of our community, with the most recent population survey completed in 2016. Results are available down to the municipal level, and in some cases even recorded down to a suburb level.

There are currently about 100,000 deaths a year in

Victoria. In 2014, 2,500 of these deaths were premature (the Department of Health and Human Services considers any death occurring before the age of 75 to be premature). Our health department considers that about 60% of these deaths (or 1,500 deaths) were avoidable.

To put that into context, Melbourne recorded about 400 deaths a year from typhoid during the 1890s (Dingle *et al.*, 1991). In 1887 there were so many people presenting to Melbourne’s hospitals with typhoid that many had to be turned away. Some hospitals, such as the Alfred, set up tents to house the influx of extra patients.

After 1887, deaths from typhoid were considered preventable when it became widely accepted that reticulated sewerage systems could eliminate the disease.



**Figure 2. Leading causes of death in perspective, MedCityNews (2014)**

The population of Victoria in 1890 was about 20% of what it is today, meaning that the relative magnitude of preventable deaths from typhoid back then is similar to the number of preventable deaths we now face in 2017. A hundred years ago, public health in the western world focused on eliminating communicable diseases, including typhoid. By contrast, the leading causes of death today are non-communicable, and many of them are due to affluence rather than not enough food.

On a global scale, obesity now kills more people than hunger (The Times, 2012). Today's diseases of affluence and related health conditions (such as heart disease, cancer and diabetes) are now putting a significant load on our hospitals and medical system. And yet, the public does not give these health challenges the same emotional importance as communicable diseases such as typhoid. It is therefore difficult to gain enough support to drive change. Without insight into the problem, it is understandable that the public response

to diseases with a sudden and severe outcome might be more pronounced than for those that take a long time to develop. A person can die from typhoid within three weeks – by contrast, the diseases of today, attributed to affluence, take many years to develop. However, regardless of their onset, these current public health challenges are seen by our health authorities as of equal magnitude to the serious disease outbreaks of the 19th century.

In 1854, John Snow mapped the location of cholera deaths in London, discovering that the greatest concentration occurred around the Broad Street pump. His discovery led to the construction of sewerage systems, both in London and around the world. More recently, Professor Michael Marmot (2010) from University College London also used mapping to advance the way we study today's health problems – research that many public health experts consider to be ground-breaking work.

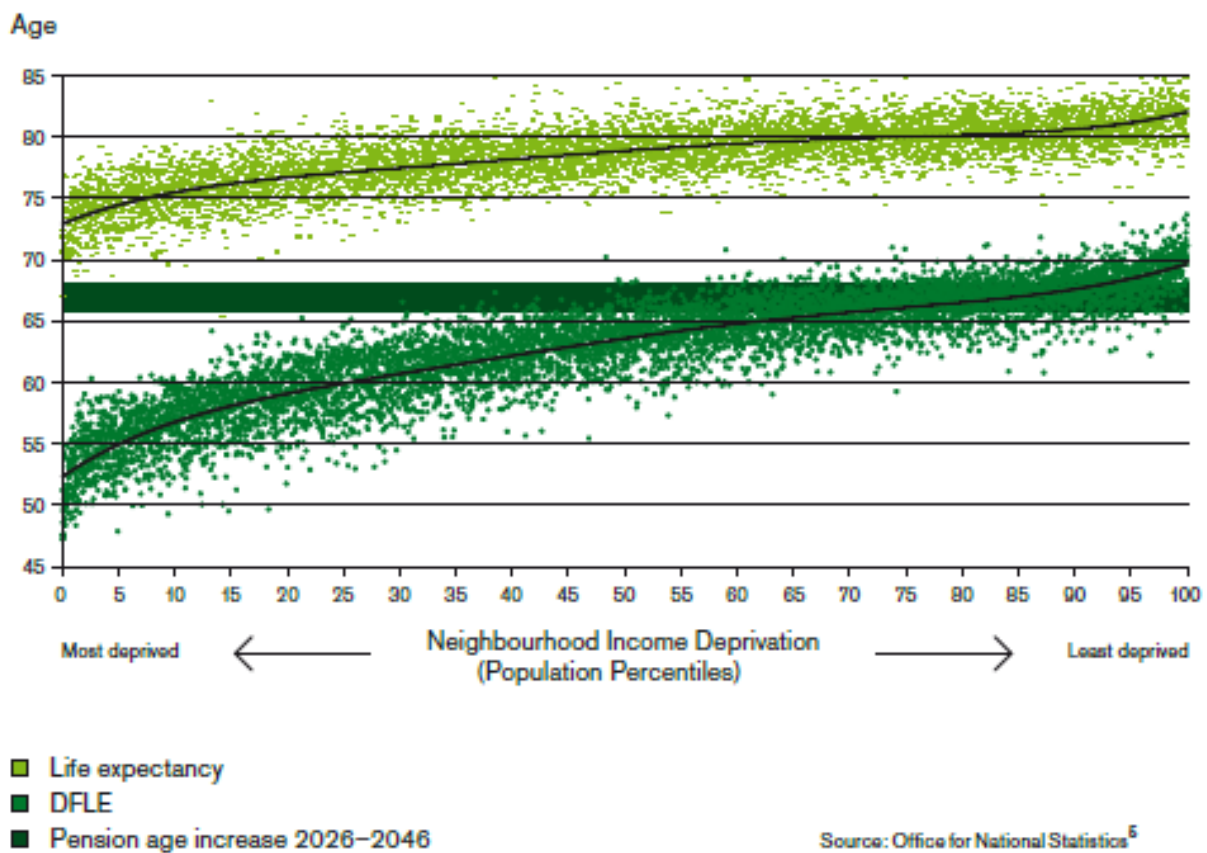


Figure 3. Life expectancy and disability-free life expectancy across England; Marmot (2010)

Marmot measured health and wellbeing across England using life expectancy and disability-free life expectancy respectively, identifying a correlation between health and wellbeing and socio-economic status. Marmot (2010) highlighted a seven-year difference in life expectancy between England's most deprived and least deprived neighbourhoods, together with a 17-year difference in wellbeing, determined by the difference in disability-free life years between the most deprived and least deprived neighbourhoods (see Figure 3).

Marmot's research introduced the concept of the 'cause of the cause' as a variable. This means that, in addition to considering poor diet as a factor that contributes to an increase in heart disease, we need to consider that lower socioeconomic groups will be the largest group with poor diets, and that these groups are clustered together in similar municipal regions.

Marmot's research has had a significant influence on Victoria's strategy to improve public health and wellbeing.

## LOCAL HEALTH AND WELLBEING DATA

Yarra Valley Water has undertaken an analysis using measures of socioeconomic status and health and wellbeing for each of the municipal regions in its business area.

Socioeconomic status was measured using the Socio-Economic Indexes for Areas (SEIFA) dataset developed by the Australian Bureau of Statistics. Based on data collected in the national census every five years, SEIFA ranks areas in Australia according to relative socioeconomic advantage and disadvantage.

Health and wellbeing data was taken from the Victorian Population Health Survey (2016). This health and wellbeing data was obtained from qualitative surveys.

The results for each municipal region in Yarra Valley Water's service area are shown in Figure 4. Trend lines have been added to highlight general patterns, keeping in mind that municipal regions may have large variations in socioeconomic status.

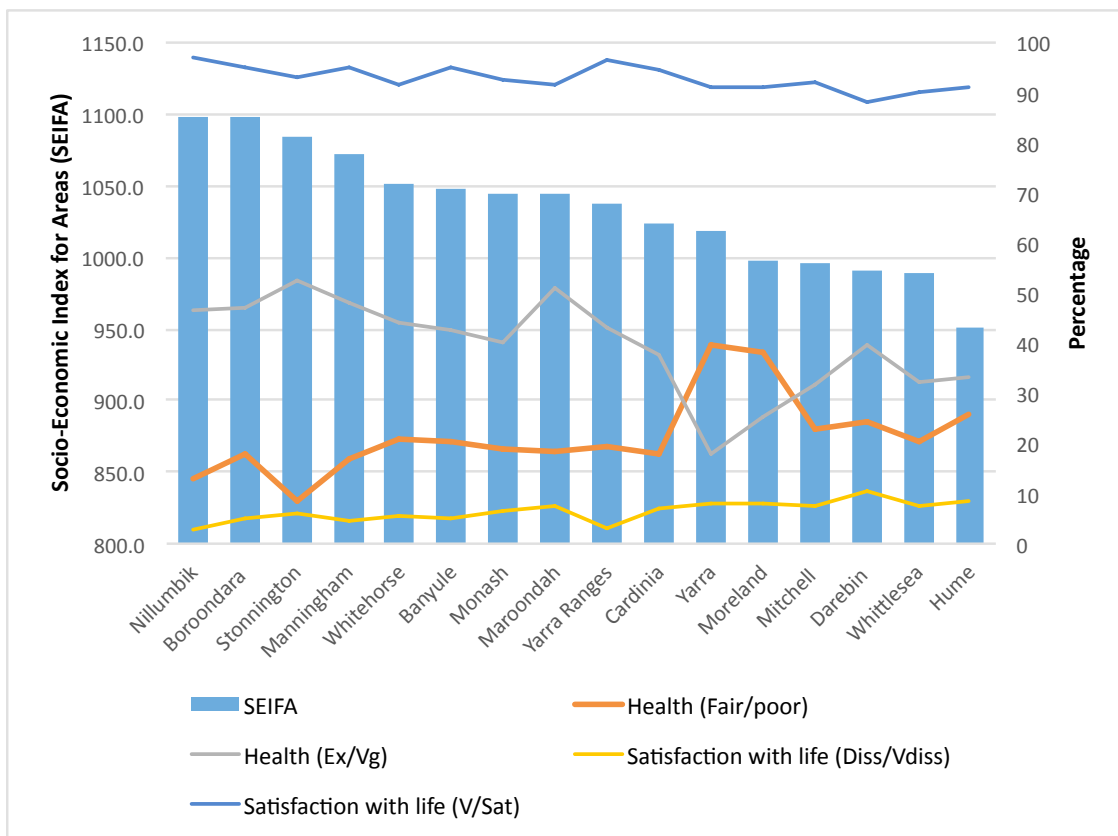


Figure 4. Health, wellbeing and Socio-Economic Indexes for Areas (SEIFAs) for municipal regions



Our Melbourne results mirror the key findings of Marmot's English study - that health and wellbeing are directly correlated with socioeconomic status. The higher a population's socioeconomic status, the better its collective health and wellbeing is. VicHealth (2016) has also measured wellbeing in Victoria, and its findings mirror these trends as well.

The Victorian Department of Health and Human Services (2015) reports a seven-year gap in life expectancy between Victoria's best and worst performing local government regions - the same gap that Marmot identified between England's most and least privileged neighbourhoods.

The Department of Health and Human Services analysis also highlights significant differences in life expectancy between cultural groups. In particular, Aboriginal Australians are expected to live ten years less than non-Indigenous Australians.

Applying Marmot's location analysis to Victoria, it is clear that 'socioeconomic factors have the largest impact on health, accounting for up to 40% of all influences compared with health behaviours (30%), clinical care (20%) and the physical environment (10%)', as shown in Figure 5; Department of Health and Human Services (2015; page 2).

Marmot's (2010) research also measures the economic cost of health inequalities. By extrapolating his England-specific results, we can get a rough idea of

the economic impact on Victoria's GDP. We estimate that health inequalities cost Victoria around \$5 billion in annual productivity as well as \$3-5 billion in lost taxes and increased welfare payments. These amounts represent 2-3% of Victoria's GDP. In addition, some of these costs are forecast to increase. In particular, current trends indicate that the annual cost of treating obesity-related illnesses in Victoria are forecast to increase from \$300 million to \$750 million by 2025.

When one reflects on these statistics it is easy to see why VicHealth (2016) has set itself a state target of ensuring that one million Victorians have better health and wellbeing by 2023.

## DISCUSSION

Now that we have a better understanding of the magnitude of health and wellbeing inequalities across our business region, and recognise that much of this inequality is avoidable, the previously aspirational concept of improving health and wellbeing is more tangible. We can move from thinking of health and wellbeing as an abstract concept to exploring how we can make a positive impact on it in our day-to-day decisions.

During the typhoid challenge of the 19<sup>th</sup> century, our role was to construct a sewer system - the challenges we face to improve health and wellbeing in the 21<sup>st</sup> century will require more complex solutions involving more variables and stakeholders.

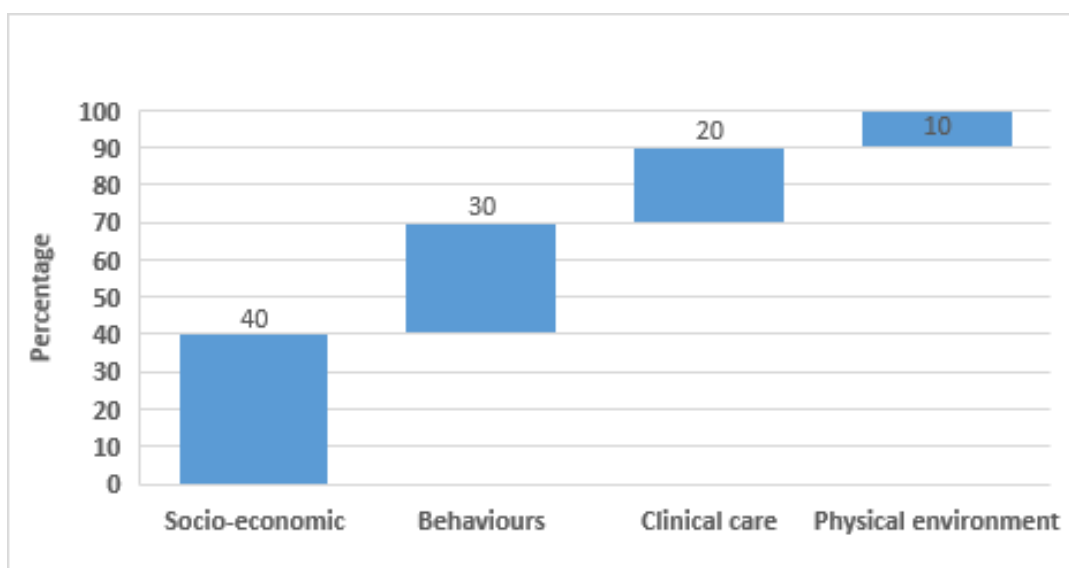


Figure 5. Factors impacting health

Faced with such an immense challenge, it would be easy to decide that it is simply not our problem. But if everyone refuses to take responsibility, the problem is only going to get worse.

At Yarra Valley Water, we believe that water companies do have an important role to play. Our industry can influence health and wellbeing in ways that go far beyond the provision of reliable water and sanitation services. Many of our business decisions have the potential to impact social equity, public health, affordability, public amenity, the workforce and our local community. By becoming aware of the social determinants of health and wellbeing, we can ask ourselves how our decisions will potentially impact our customers' health and wellbeing, and which decisions are most likely to improve these measures.

There are many examples where the water industry has already been involved in programs to improve community health and wellbeing beyond our primary water quality functions. We have programs to help the more vulnerable pay their bills, education programs to inform the public how to conserve water, and we install drinking water fountains to promote healthy drinking practices. But to date, we have mostly relied on intuition to select such projects that we think will deliver the most value.

Before we can advance our industry's commitment to action, we need a way to measure the relative contribution to health and wellbeing of everything we do. Once we do that, we will suddenly see many different possibilities to achieve a step change in the health and wellbeing of Victoria.

Measuring life expectancy and disability-free life years is a great way to assess cumulative community impacts on health and wellbeing. However, these measures are difficult to disaggregate into individual stakeholder contributions – what impact does Yarra Valley Water have on health and wellbeing compared to, say, government policies or initiatives from the community sector? To quantify and maximise our individual impacts, we need to find an easier way to measure our relative contribution.

We can find such a method by looking to the large economic impact that health and wellbeing inequalities have on Victorians. By considering our positive and negative social impacts in purely economic terms, we can start to measure the contribution of individual projects.

One way this can be achieved is through an Integrated

Profit and Loss (IP&L) report (GIST Advisory and Trucost, 2016). An IP&L report evaluates the social value an organisation delivers, of which health and wellbeing is a subset. It lets the company determine whether a proposed project or initiative will add social value, and allows it to understand the relative difference between options. If we start applying the IP&L approach to all our decisions, we will be able to identify the options that contribute the greatest relative value to health and wellbeing.

At Yarra Valley Water, we started the process with our inaugural IP&L report, published in 2016. We are now assessing a range of potential initiatives to determine the projects and contributing variables that will make the largest material contribution to social value.

Once we measure social value in the same way we track financial success, we will be able to translate our purpose – to enhance health and wellbeing – from an aspirational objective into concrete, actionable outcomes.

## CONCLUSION

Health and wellbeing has always been important to the water industry. But for much of the past century, it has not been clear exactly how we should be translating this commitment into day-to-day decision-making past our core function of maintaining water quality.

The way recent public health studies measure health and wellbeing presents us with an opportunity to change this. By measuring health as life expectancy, and wellbeing as disability-free life years, we can see that regions with a lower socioeconomic status have worse levels of health and wellbeing than more privileged areas. This provides us with a new direction in which to focus our efforts.



The motivation for action comes from realising that significant health and wellbeing impacts of today are considered avoidable by public health experts. And that if we do nothing we will incur the large economic burden of a lower GDP, lower taxes for state services, and higher insurances.

To effectively translate our aspirational intent to improve health and wellbeing into day-to-day actions, we need to determine the material contributions we make to health and wellbeing. These contributions can be measured as social value using methods such as IP&L reporting.

Our society has reached a point where it can eliminate the health and wellbeing impacts caused by socioeconomic status. As a provider of essential services to every member of the community, the water industry is in a position to make a significant contribution. We provide social value with our health promotion campaigns to encourage people to drink water, education programs to conserve water, and programs to help vulnerable customers pay their bills.

If we can reduce socioeconomic inequality to improve health and wellbeing, it will go down in history as a public health achievement of a magnitude that matches the elimination of communicable diseases such as cholera and typhoid.

### THE AUTHOR



#### **Francis Pamminger**

(email: Francis.Pamminger@yvw.com.au) is the Manager Strategic Research at Yarra Valley Water, Melbourne.

### REFERENCES

Australian Bureau of Statistics (2015) *Underlying causes of death (Victoria)*

Australian Institute of Health and Welfare (2017) <http://www.aihw.gov.au/deaths/life-expectancy/> (Accessed 6 March 2017)

Data 360 <https://data360.wordpress.com/2014/10/13/leading-causes-of-death-compared/> (Accessed 6 March 2017)

Department of Health and Human Services (2015) *Health and wellbeing status of Victoria. Victorian public health and wellbeing plan 2015-2019 companion document*

Department of Health and Human Services

(2016) *Victorian Population Health Survey*

Dingle T., Rasmussen C., (1991) *Vital Connections. Melbourne and its Board of Works 1891-1991.* Penguin Books, Ringwood, Victoria, Australia

GIST Advisory and Trucost (2016) *Yarra Valley Water Integrated Profit and Loss (IP&L) Report.* November 2016

Marmot M. (2010) *Fair Society, Healthy Lives. The Marmot Review. Strategic Review of Health Inequalities in England post-2010*

MedCityNews (2014) <http://medcitynews.com/2014/09/risk-analysis-death-put-graphic-perspective/> (accessed 2 February 2017)

The Times 14th December (2012). <http://www.thetimes.co.uk/tto/health/news/article3630642.ece> (Accessed 2 March 2017)

VicHealth (2016) *VicHealth Action Agenda for Health Promotion. 2016 Update.*

WHO (2012) *Global costs and benefits of drinking-water supply and sanitation interventions to reach the MDG target and universal coverage.* WHO/HSE/WSH/12.01 World Health Organisation

Wikipedia [https://en.wikipedia.org/wiki/Life\\_expectancy](https://en.wikipedia.org/wiki/Life_expectancy) (Accessed 7 March 2017)

