

## Feature article

# Our journey towards environmental sustainability in a dental practice.

**Our practice should have 50,000 less items of plastic than last year dumped into our landfill. It's not as difficult as you'd think.**

**In the last 12 months our practice decided that we wanted to look at our environmental footprint. This is the story of why and how we went about this and what we have done so far. My hope is by understanding more about the impact we have as a profession, readers will have greater awareness and hopefully make similar changes.**

My environmental awareness at work started over twenty years ago as a summer worker in Health, Safety and Environmental monitoring at the Tiwai Point aluminium smelter. I had the duties of testing air and water quality which impressed upon me their importance and necessity of caring for the environment within the context of a massive industry. Somehow though this awareness became disconnected with my chosen career as a dentist where plastic wrapping became my norm.

In fact my recent restorative setup consisted of the following. A plastic backed bib and two plastic backed tray and surfaces liners, a plastic rinse cup and barriers to cover the headrest, handpiece motors, triplex, control panel, light handles and all non-processable semi-critical items such as the curing light. A dozen items of plastic costing around 65 cents.

Those of a 'certain age' may remember when dentistry was a multi-use low landfill profession. Admittedly our cross infection control and health and safety may not have measured up to today's standards, but our bins were not overflowing in the streets.

Change, backed by good evidence and policy brought many needed improvements to patient care and workplace safety. But change driven by convenience, efficiency and marketing has progressed alongside. Single use barriers, bibs, impressions trays, mixing tips, cups, suction tips, all quicker and cheaper than ever before. In all the years that have passed though the environmental impact of dentistry has rarely crossed my mind. I did not consider the types of materials we used or their disposal.



by **Dr Sarah Kelly, BDS**



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This apathy to the environmental impact of the dentistry is reflective of the wider economic and social changes which have taken place over recent decades. We have been witnesses to the growth of throwaway culture driven by the demand for greater convenience. This demand has been met effectively by emerging growth economies and has enabled the production of large scale disposable products at increasingly lower costs.

As global climate change and carbon emissions engaged the public's gaze, the slow creep of single use and disposable products was less noticeable. Individually wrapped fruit appeared in supermarkets and two dollar stores flourished.

### The turning tide.

My turning point started in 2017 as I eagerly awaited the return of the Blue Planet documentary series with Sir David Attenborough. Unlike the beautiful and inspiring original this sequel turned out to be anything but calming and relaxing for myself or patients lying in the chair to watch on the ceiling monitor. Continuous images of turtles, whales, birds and fish struggling with our plastic pollution and haunting scenes of once pristine oceans and beaches spoilt by our obsession with convenience and inattention to the consequences of single use plastic. The scale of the problem leaves Sir David Attenborough to deliver a powerful call to action for us all to do more to protect the environment.



Image BBC earth

However the realisation I experienced watching Blue Planet 2 was already very much evident in the increasing action taken globally for single use plastics. British Prime Minister Theresa May links this documentary series to some of her government's recent environmental policies including her decision to back a plastic tax<sup>1</sup>, and create a single use plastic bottle deposit recycling scheme<sup>2</sup>. She was also part of the British parliamentary move to replace all single use plastics from Westminster with compostable or reusable alternatives after 2019 including straws, drinks containers and plastic bags<sup>3</sup>.

In Australia, a similar bottle deposit scheme is now spreading to all states based on the South Australian scheme which was established in 1977. This has resulted in an 80% return rate of containers and has seen community groups raise \$60 million last year through clean-up projects<sup>4</sup>.

Even 'demon drink' Coca Cola is moving towards a more sustainable goals with a "World Without Waste" packaging vision, which includes collecting and recycling a bottle or can for every item it sells globally by 2030 and renewing its focus on the entire packaging lifecycle<sup>5</sup>.

It was also a year of change for New Zealand companies such as Countdown and New World moving to rid themselves of single use plastic bags and beginning to provide recycling of soft plastics. Additionally these supermarkets are developing better use of plastics within themselves and from their suppliers. As social responsibility pressure becomes greater companies are moving ahead of legislation with examples like Air New Zealand taking out a top 3 awards for corporate social responsibility in 2017.<sup>6</sup>

Most recently in March 2018 the New Zealand government signed up to United Nations' Clean-Seas campaign pledge. This pledge requires signatories to significantly reduce the production and use of non-recyclable and single-use plastic by 2022.<sup>7</sup> This pledge could lead to major legislative changes in New Zealand soon.

Sustainable Business Council Executive Director Abbie Reynolds believes that there is an ever increasing amount of New Zealand companies integrating sustainability practices into their business.

*"Every year I see more and more New Zealand businesses report and share their financial, social and environmental plans and performance. These survey results are in line with a global shift toward greater transparency – many businesses recognise this is global best practice".*

So we can see that the tide is definitely turning on single use plastic, but what about in dentistry?

Looking outside my plastic wrapped surgery walls I was fortunate to be able to talk to those in the organisation I work for, Lumino the dentists. For some time a systematic review of infection control and the materials used within the hundreds of practices in New Zealand and Australia had been taking place. Two assessments stood out. Firstly the staggering amount of plastic barrier such a large company is responsible for contributing to landfill and secondly what a large variance there was within the group from those who used no barriers to those like myself who go to town.

In order to highly standardise the groups infection control practices and reduce the environmental damage of the current scale. Steven Casci co-author of the standard and Clinical advisor felt that these non-recycleable single use plastics could be decreased by two thirds within 18 months.

I decided to go back to my 'plastic start' at dental school, so also decided to talk to Otago Dental School Clinical Director, Don Schwass, who pointed out they too were having similar conundrums. How does a large group best balance infection control, consistency and convenience with environmental sustainability?

He had not quite found the answers but indicated they are trying autoclave multi use items as much as possible and moving away from barriers whenever possible. Their issues are slightly different being a school / hospital environment instead of general dental practice but he hopes to be able to tell us more in a year when the school is finished process creation.

One trial and error story he mentioned was the new school dental tunics. The dental school had interpreted the Dental Council Infection Prevention and Control Practice Standard 2016 to mean that they must replace previous laundered tunics with waterproof alternatives. They initially chose single use recyclable plastic gowns for each patient they were soon horrified with the amount of plastic used (and sweaty mess). Since they have searched hard and found a Dunedin supplier who can provide launder-able multi use waterproof gowns and they will be ready for the 2019 year.

Closer to home our newly graduated hygienist also pointed out the hygiene school and DHB were moving away from blanket use of plastic barriers too!



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### Our Path to Change

So how did we start making changes? Firstly we started by all meeting together and asking why?



Image wastelandrebel.com

Why do we use these products? What would a zero waste practice look like? Where did our current best practice fall down environmentally? Many of the staff, patients and clinicians were able to share ideas, knowledge and concerns about the case for change. Engaging all staff member is a must and especially those tasked with ordering materials who will be instrumental in managing changes.

Brain storming such ideas is useful, however in order to produce effective change that could be measured a structured approach was put in place to with the clear goals of:

- Reducing our landfill contribution e.g. reducing single use and non-recyclable consumables, increasing recycling
- Reducing our internal and external pollution. e.g. wastewater, volatile organic compounds

Identify key areas



Audit and quantify



Investigate sustainability opportunities and obtain feedback



Implement sustainability measures



Assess and report on sustainability measures

This process was followed with care not to ignore the potential negative effects such as increased cost and labour and impact on clinical practice and standards of care.

This table displays those areas identified in both clinical and non-clinical areas. Priority areas reflected situations where significant reductions would be possible and where acceptable alternatives existed

Table 1.

	Area	Sustainable measures
<b>Clinical</b>	Use of disinfectant and detergent wipes	Replaced with spray and cloth protocols
	Patient bibs / drapes / tray & surface liners	Reduce use Replace with paper bibs and liners Use plastic only for risk procedures e.g. RCT & surgery
	Plastic barriers	Limit use to only non-sterilisable semi-critical items e.g. intraoral camera
	Plastic cups	Reduce use and replace with biodegradable paper cups
	Autoclave wrapping & pouches	Replace majority with reusable wrapping Potentially separate pouches for soft recycling
	General waste rubbish bags	Replace with compostable bags
	Suction tips	Investigate viability for metal reuseable
	Mixing tips, impression trays	Reduce use Digital scanning
	Amalgam disposal	Installation of separators Review of disposal measures and companies
	Watercooler cups	Replace with biodegradable paper cups
<b>Non-clinical</b>	Administrative paper use	Email invoices/receipts Paperless office
	Electricity Use	Energy efficient appliances
	Energy efficient appliances	Digital scanning, standardised material ordering





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### Refuse, Reduce, Reuse, Recycle



The most powerful changes to consider by are those to reduce usage. Not only does reducing most likely imply reductions in cost and labour but inevitably leads to simplification of existing procedures. Reducing does however carry with it the greatest concern about reducing quality of patient care.

Reusing, again brings with it great potential to reduce waste and also cost. Inconvenience and increased labour are key adverse factors along with the real and perceived quality of care by patients.

Increasing recycling is by far the least attractive sustainability option. General Manager of recycling company Green Gorilla, Elaine Morgan, was happy to give me an idea of where recycling stands with respect to dental products and the news wasn't good. Because of the mixer paper/plastic nature of liners, bibs and wrapping no options exist in New Zealand for the majority of our non-biodegradable dental waste. Some solutions do exist for soft and hard plastics however as highlighted in recent news recycling these in reality was simply adding it to the 15 million tonnes of plastic to China each year. As this export of this waste has now stopped, the growing stored mountains of plastic have revealed the current limitation of our recycling abilities.

With this in mind, below are our main initiatives to change our environmental impact:

Plastic backed disinfectant wipes were to be replaced by sprayed disinfectant and complimentary lint free biodegradable wipes and paper towel application. We were aware of the decreased convenience of this decision but as the usage is infrequent the impact is not high. The annual landfill reduction of this change will be approximately 17000 items.

Plastic backed patient bibs, tray and surface liners were on average used at a rate of three per patient were reduced in number to two and replaced with paper only alternatives in situations which did not require high level protection e.g. RCT / surgery. Although unit costs are higher, lower usage made this change cost effective and labour saving. The annual non-biodegradable landfill of this change will be approximately 20,000 items.

Plastic cups were to be replaced both in surgery and the watercooler with biodegradable paper. Costs for the paper alternatives were equivocal, however finding a quality cup that would not leak after long periods was challenging. Per year 6000 plastic cups will be eliminated from landfill.

Reducing our use of autoclave wrapping proved to be more challenging than other consumables as no New Zealand suppliers provide biodegradable alternatives and recycling solutions for the both wraps and pouch plastic are not viable. To solve this we are currently trialling the use of reusable autoclavable pouches. In addition to reducing plastic landfill by up to 7500 items a significant cost saving will be made.

We did look at options to replace such clinical consumables as impression trays, mixing tips and applicators it became very obvious that the increased costs and inconvenience associated with reusable and biodegradable alternatives were significant. However the biggest factor is the advantages digital scanning will provide, not only to the reduction in consumables but also in the courier travel associated.

As plastic straws are very high profile in the world of ocean pollution we have also looked at reusable alternatives to disposable suction tips. In this case however initial costs are relatively high as is the inconvenience of reprocessing the items effectively. It would potentially save 2500 items per year but will need to be trialled to assess its effects.

We are also choosing to stay with Latex gloves as they are biodegradable and maintaining vigilance around anyone who is anaphylactic/ allergic to anything

There is a lot of interesting thoughts on becoming latex free, but just be aware that people are also allergic to nitrile gloves and with increasing allergies of all types there is arguments made that Nitrile gloves are non-recycleable and not biodegradable and that vigilance and education is an answer .

## Pollution

In addition to plastic waste our waste water was also important. We discussed and re-educated ourselves with regard to amalgam waste water management using Dental Council NZ standards. Basic filter separation and mass disposal was reinforced but although Auckland has a many major water quality issues neither the standards or the local councils require wastewater amalgam separators.

The cost of adding amalgam separation onto existing plant equipment can very prohibitive. Singular suction unit may be retrofitted with serviceable separators for several thousand dollars alone. Good design and use of non-serviced units however enabled our nine surgeries to be effectively served for under \$1700.

For volatile organic compounds we again used education around not mixing products and using only when needed, and choosing to use lots of water and reusable smart cloths for cleaning non clinical surfaces - So a healthier workplace. Honestly most staff understood these points better than the clinicians.

## Where to from here.

I believe that top down is the best way to deliver environmental policy. As part of this I hope the Dental Council and Dental Association will have a proactive approach with the Ministry of Health and the Ministry of the Environment.

It would be sad if NZDA could not lead as a profession, with our own sustainability council peopled by outside environmental help and with a wide variety of private and public leaders in dental healthcare. Through this we should be able to highlight areas to make greatest impact and make it simpler for practices in the long term.

As legislation moves forward like the Minamata Convention (treaty on Mercury) that New Zealand and Australia ratified in 2013 but has yet been signed into law, we will find decisions like the phase down in mercury/ dental amalgam has been made for us. So our wastewater will likely be cleaner.





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As well due to the 2018 New Zealand signing of the United Nations Clean Seas pledge to reduce single use plastics. We are likely to be forced to use less single use plastic.

A further bugbear was that while the work is not massive in itself, changing habits is and it was really infuriating for staff to make changes and see other companies send a massive box of plastic and cushions and cardboard to transport a tiny plastic container.

Finding out what is recyclable, compostable, and biodegradable should be easy as it should be on the safety data sheet, and packaging, but this is not always clear and following up with companies difficult. It would be great if clearly labelled in a simple manner.

But in the end we hope for 50,000 less items of plastic dumped into the environment from our practice per year. It's not as difficult as you'd think. We all just have to think about it.



Image AFP Getty images -A pilot whale has died in southern Thailand from hunger after it swallowed more than 80 plastic bags that filled its stomach. A post-mortem examination discovered bags weighing 7.7kg in the whale's stomach. <https://www.thetimes.co.uk/article/pilot-whale-died-after-eating-plastic-bags-tj8slptzk>

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### BIOGRAPHY

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Sarah has been part of the Newmarket, Auckland based Lumino Dental One team for the last four years. An elected Clinical Advisor at Lumino the Dentist since 2016.

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