NSW Circular

Plastics in Healthcare

The Case for Circularity

OCTOBER 2021

Acknowledgement to Aboriginal people

We acknowledge the traditional custodians of Country and pay our respects to Elders past, present and emerging. We recognise that our built environment and activities are on Aboriginal land and commit ourselves to thoughtful, inclusive and respectful ongoing management of these places.

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Glossary

CPRs	Commonwealth Procurement Rules
EU	European Union
HDPE	High Density Polyethylene
LDPE	Low Density Polyethylene
NHS	National Health System
NSW	New South Wales
PE	Polyethylene
PBS	Pharmaceutical Benefits Scheme
PET	Polyethylene Terephthalate
PP	Polypropylene
PPE	Personal protective equipment
PPWD	Packaging and Packaging Waste Directive
PVC	Polyvinyl chloride
SDU	Sustainable Development Unit

Executive Summary

Healthcare systems in Australia and internationally are increasingly shifting from 'linear' systems – where resources are procured, used and disposed without regard to their residual value or broader environmental impact – to circular systems where resources are optimised, and used materials are recirculated back into productive use.

To do this successfully, there needs to be a systematic and scalable approach to inform and guide the transition towards circular healthcare systems.

Australia's healthcare system has a carbon footprint equivalent to 7% of the nation's total, with supply chains accounting for the majority of the sector's total emissions.

While some plastics have a critical role to play in healthcare, the absence of clean collection, sustainable procurement and recycling makes them a large part of Australia's carbon and waste problem. Plastics are pervasive in healthcare settings, particularly single-use plastics. Their uses range from packaging of medical items to hospital gowns and personal protective equipment (PPE), drinking straws and medicine cups, and IV bags and catheters.

But only a fraction of this is recycled. It is estimated that plastics account for a third of hospital general waste in Australia. Most of this is sent to landfill, incurring additional financial and environmental costs, despite the fact that many of these items are high-grade plastic and have residual value.

Public health services in NSW generate **52,400 tonnes** of waste each year: weighing as much as the Sydney Harbour Bridge. This costs the NSW Government **over $16 million** a year (accounting for **45%** of total public sector waste management costs) to manage.

This report identifies significant and urgent opportunities to reduce plastic use, and give disposed plastics new life as high-quality recyclates where they are procured, sorted and collected through new circular supply chains.

As part of its Circular Supply Chain Alliance program, NSW Circular led a project that recycled single-use uncontaminated plastic products from hospital wards. This provided valuable insights into the economic potential of further scaling up of these efforts.

The project, supported by evidence from other parts of the healthcare system, indicates significant potential savings from reducing, reusing and recycling hospital waste plastics, currently incinerated or landfilled. These are savings that can be reinvested into patient care, staffing, resources and other essential services.

EXECUTIVE SUMMARY CONT.

The project also highlighted the environmental benefits of these supply chain interventions, with recycled plastics having a significantly lower carbon footprint than virgin material.

In short, moving to circular supply chains present significant opportunities for unlocking value. These include:

- Generating savings by reducing unnecessary use of resources and reducing waste
- Lower environmental impacts by reducing and recirculating healthcare plastic waste
- Creating new markets in sustainable healthcare supplies, supporting innovation in the design, manufacture and use of these items.
- Raising economic productivity by extending the productive life of used materials through more accessible recycling options.

This presents clear and tested pathways for the healthcare industry, policymakers and industry participants to transition towards lower-carbon, higher-value and lower environmental impact alternatives.

This transition is creating new economic opportunities and improving supply chain resilience. This is vital for NSW and Australia as we navigate a period of unprecedented economic volatility and disruption in global supply chains and the economic impact of a resource-constrained future where natural resources continue to be depleted.

CHAPTER

One

The problem

Facts:

1. **Single-use plastics are prevalent throughout the health system, as they offer cost-effective solutions for health and hygiene requirements.**
2. **Much of single-use non-clinical plastic waste is made from polypropylene (PP) and polyethylene (PE). If sourced and sorted correctly, these are valuable recyclables.**
3. **Single-use plastics in healthcare settings range from packaging of drugs and medical items to hospital gowns and personal protective equipment (PPE), drinking straws and medicine cups, and IV bags and catheters.**
4. **But only a fraction of this is recycled. It is estimated that plastics account for up to a third of hospitals' general waste streams, and up to 40-60% of waste going into the clinical waste streams is recyclable.**

for them as they offer higher- quality recyclates than commingled recycling streams. This offers real savings to hospitals which can be reinvested into patient care.

Plastic waste is prevalent in healthcare systems

Single-use plastics are prevalent throughout the health system. Plastic packaging and equipment are valued for their adaptability, protective properties, and cost-effectiveness, all of which help meet the standards and requirements of the medical sector. Single-use plastics offer a cheap and efficient solution for health and hygiene requirements in medical environments.

Much of single-use non-clinical plastic waste is made from PP and PE. If sourced and sorted correctly, these are valuable recyclables. If the materials collected are clean and free of contamination, there is potentially healthy demand

Common single-use healthcare plastic waste which is recyclable include the blue wrap used to cover sterilised instruments (usually made from PP), irrigation bottles (PP or PE), basins, pitchers and trays (PP), flexible sterilisation (primary) packaging e.g. pouches, header bags, blister packs, Tyvek lids (PP or composite plastics), flexible clear packaging (high-density polyethylene, HDPE, or low-density polyethylene, LDPE), needle caps (PP) and plastic ampoules (PE).

For example, a scan of selected single-use plastic items over August 2020 to January 2021 showed that NSW public health services used over **3 million** plastic syringes, **1.5 million** medicine cups and **40,000** kidney dishes **a month** on average.[1]

1 NSW Healthshare

THE PROBLEM CONT.

Hospitals also generate large amounts of flexible packaging waste. This ranges from supplies that are wrapped in stretch film for shipment, to the secondary and tertiary packaging for healthcare products. Flexible packaging can come in many forms, from LDPE to HDPE, to multilayered medical material (such as polyester or nylon), to achieve the desired properties.

There are tangible benefits from reducing and recycling flexible packaging. Bendigo Health's soft plastics recycling program is removing between 3 to 4.5 cubic metres of soft plastics each week, that was previously going to landfill.[2] This is enough soft plastic to fill an average-sized apartment from floor to ceiling in a year.

What happens to this plastic waste?

It is estimated that only a fraction of healthcare plastic waste is currently recycled and most is disposed of as general or clinical waste, which is generally more expensive to manage than recycling.

Where do hospital plastics go?

Plastics in general waste. Plastics can account for up to a third of a hospital's general waste.[3] Most of this is sent to landfill.

Plastics in clinical waste. Waste audits in various hospitals in Australia and the UK suggest that around 40-60% of waste going into clinical waste streams is non-clinical waste, of which substantial amounts are potentially recyclable.[4] Most of this is incinerated.

Plastics in commingled waste. For NSW consumers (particularly in metropolitan areas), the cost of recyclable waste collection is almost always cheaper than for other waste streams, as long as the material is not contaminated by other substances or materials, and a healthy market for the recycled product exists. However, many healthcare plastics cannot be easily picked up by standard waste sorting technologies for commingled waste, and thus need separate collection systems. For example, masks and gowns can get caught in sorting machinery, and needle caps and ampoules are too small to be picked up by standard sorting technologies.

Figure 1: Common single-use plastic hospital items

2 Bendigo Health 2019-20 Annual Report

3 Victorian Department of Health & Human Services website (Accessed 9 Mar 2021)

4 McGain et al, An audit of potentially recyclable waste from anaesthetic practice, Anaesthesia and Intensive Care, Vol. 37, No. 5, September 2009, pp. 820-823; McGain et al, An audit of intensive care unit recyclable waste, Anaesthesia, 2009, Vol 64, pp 1299-1302; Runcie, H., Sort your waste! An audit on the use of clinical waste bins and its implications, Future Healthcare Journal, Vol. 5, No. 3, Oct 2018, pp. 203–206; Hutchins et al, Coming round to recycling, BMJ 28 March 2009, Vol. 338, pp. 746-748.

THE PROBLEM CONT.

Plastics recycling efforts in the public healthcare system are currently fragmented.

Currently the only plastics recycling option available on a whole-of-government basis is commingled recycling (yellow-lid bins). There are currently no mandatory recycling schemes or plastics reduction targets, but many hospitals and local health districts have collection and recycling schemes for specific high-volume items such as for sterilization wrap, and operating room PVC plastics. A number also have plastics reuse or recycling schemes that are run by staff members on a voluntary basis, in partnership with external partners.

It is a challenge when the plastics being disposed of are made of unknown or mixed polymers.

Recycling hospital plastics is often made more challenging by the variety of plastics and the lack of plastics identification coding which identifies the resin type. Mixed plastics recycling streams have lower value than well-sorted, single-resin streams. The former is usually landfilled. If recycled, they require appropriate sorting. It is possible to recycle several types of plastics together such as PP and PE. Polyvinyl chloride (PVC) is also common in healthcare products and is recycled differently.

Waste sorting can be a challenge in time-pressured hospital units.

Often circular systems, including bins for many recyclable waste items, are not in place. Many recyclable healthcare items end up in general or clinical waste bins. Items commonly found in sharps containers that should not be there include polystyrene cups, gloves, glass bottles, kidney dishes, medicine cups, paper towels, plastic ampoules, IV administration sets, and syringes (without needles attached).[5]

5 South West Sydney LHD Waste Management Plan, 2016

THE PROBLEM CONT.

Access to sustainable and cost-effective options for separating, collecting and recycling these plastics is necessary.

For example, correct separation of recyclable plastics is needed at the point of waste generation. This may require expanding existing sorting and collection arrangements, coupled with investment in new solutions (e.g. for mixed polymers) where standard sorting or processing technologies are not appropriate.

Solutions to limited bin space and complex waste separation are needed.

With floor space at a premium in healthcare settings, the lack of space to place more bins for different waste materials is often a roadblock to better recycling. In addition to planning for effective source separation, other solutions such as balers and compactors could be considered, as well as procurement strategies that consider high-volume waste materials that can be commingled for collection.

Short-term cost impacts can also be a challenge in transitioning to more sustainable alternatives.

There are some initiatives at the NSW Government's central procurement level to transition towards more environmentally friendly products, such as sugarcane pulp-based kidney dishes. At the individual hospital or local health district level there have been similar initiatives, but they can sometimes lack the buying power to achieve competitive prices for more sustainable alternatives. Procurement staff also need to manage multiple priorities in contract management, including meeting savings targets while safeguarding clinical performance requirements, and health and safety.

Standardisation, education and clear examples of what is recyclable, and where it ends up after being recycled, is important.

Contamination can be an issue, particularly in the early stages of collection. When a collection program begins, busy staff may not be as familiar with the items that are the target of collection and this can result in contamination of the waste stream. If the bins are contaminated with other materials such as glass, body fluids, or blood, entire loads of recyclable plastics could be deemed contaminated and unrecyclable. As a result, entire loads of mixed recyclable plastics end up going to incinerators or landfill. To reduce contamination, it is vital to have clear protocols, staff engagement, signage, and staff confidence in the value of their efforts.

Recycling schemes are dependent on staff participation for their success, so it is important that materials and collections are as streamlined and standardised as possible. Clinical staff have raised the challenges posed by the complexity of different recycling systems. An example was given of 8 different syringes being used for a procedure, requiring four different bins for disposal.[6] Successful recycling can be stymied if there is a lack of staff engagement, different understandings of what constitutes clinical waste, lack of recycling options, uncertainty of different materials used to make similar products, and lack of standardized collection systems across different health systems.

6 Waste Management Round Tables: St George Hospital and Randwick Campus South Eastern Sydney Local Health District

CHAPTER

Two

Economic cost

Facts:

1. Publicly run health services in NSW generate waste weighing as much as the Sydney Harbour Bridge each year. Much of this goes to landfill.
2. The NSW Government spends millions annually managing its waste properly. The public health system accounts for 45% ($16 million) of these costs.
3. There are potentially significant savings (that can be reinvested into patient care) from reducing, reusing and recycling hospital waste plastics that are currently being incinerated or landfilled.

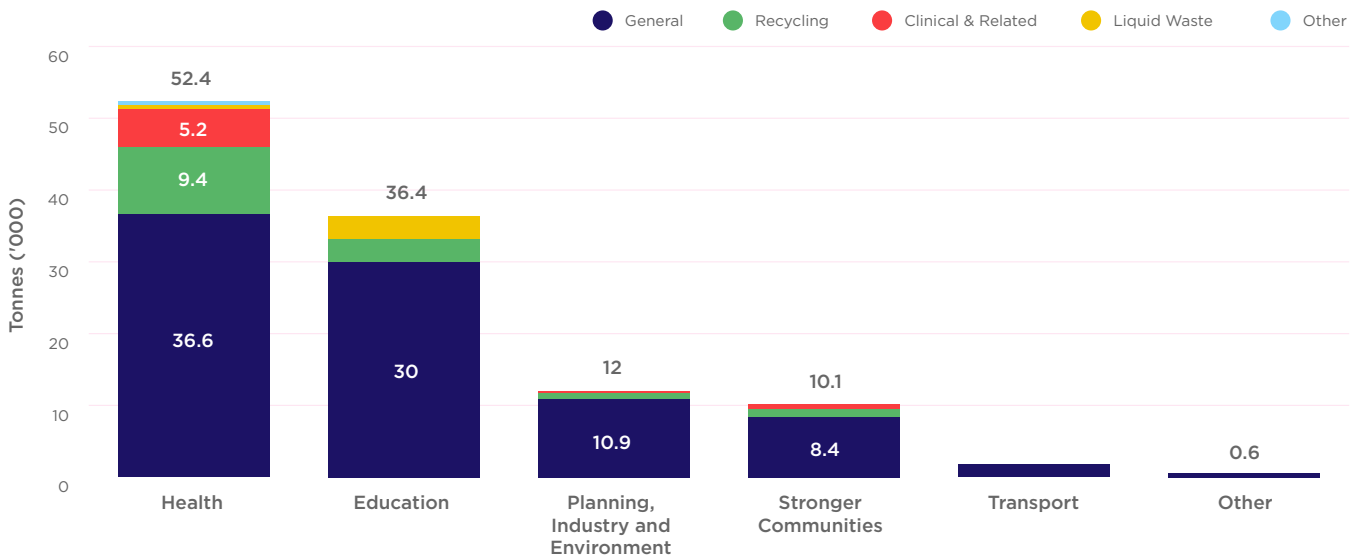
Public health services generate large volumes of waste

Publicly run health services in NSW generate waste weighing as much as the Sydney Harbour Bridge each year: an estimated 52,400 tonnes per annum.

Of this, general waste is by far the largest waste stream (36,600 tonnes or 69.8% of total waste volume), largely going to landfill (Figure 2). Recycling accounts for 9,400 tonnes (17.9%) and clinical waste 5,200 tonnes (9.9%). In contrast, 23% of waste in England's National Health Service (NHS) is recycled.

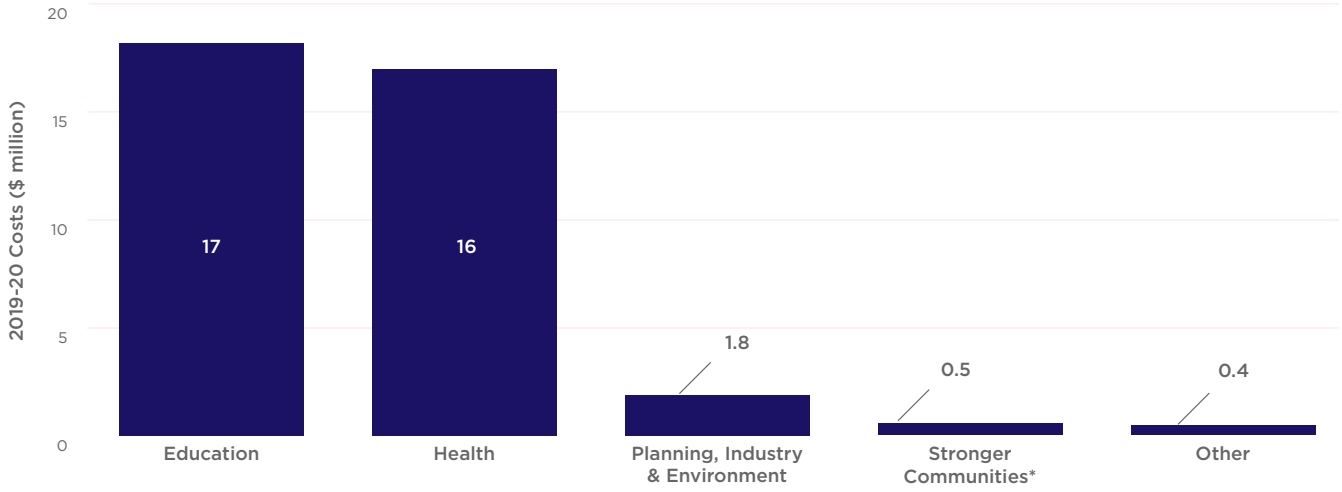
The COVID pandemic has also contributed to plastic waste, including personal protective equipment (PPE). For example, one metropolitan hospital's COVID clinic alone generated 7,440 litres of non-clinical dry waste in a month – averaging over one wheelie bin a day – which was sent to landfill.

Figure 2: Waste by NSW Government Cluster included in the whole of government waste tender ('000 tonnes)
Source: NSW Government, based on supplier RFI response data (FY17-18)



ECONOMIC COST CONT.

Figure 3: Waste management costs for top three waste streams by NSW Government Clusters (2019-20, $m)
Source: NSW Government Centralised Analysis System for Performance of Energy and Resources (accessed 2 Sep 2021)



* The total for the Stronger Communities cluster should be interpreted with caution to the unavailability of waste data from several key service areas.

Throwing recyclables into clinical or general waste is costly

We spend millions in managing waste properly in our public services (Figure 3). The NSW public sector spends over $35 million each year managing its waste. Of this, over $16 million is spent each year in the NSW public health system, accounting for 45% of the NSW public sector's annual waste costs.[7]

Clinical waste is the most expensive to manage. Every kilogram of clinical waste can cost hospitals around five times more than a kilogram general waste.[8] Some estimates put the cost of disposing clinical waste at as much as ten times the cost of general waste.[9]

The 36,600 tonnes of hospital general waste largely going to landfill is also a significant cost as, in addition to collection and management costs, it incurs landfill gate fees and the waste levy (of $146 per tonne in the metropolitan levy area and $84.10 per tonne in regional levy area, at 2020-21 rates).

Recycling is generally the lowest cost means of waste disposal as long as the materials are uncontaminated, can be easily transported and recycled, and have strong aftermarkets for the recycled product. Where there is strong demand for the recycled material (such as cardboard or scrap metal), recyclers may pick it up for little to no cost.

Waste costs are generally correlated to the level of activity and regional location (Figure 4). Busy hospitals generate higher waste volumes, and metropolitan hospitals are subject to higher regulated landfill levy rates and tend to perform more complex procedures. On the other hand, regional hospitals can incur higher costs from transporting and managing their clinical waste. Other variations in waste costs arise from factors such as the frequency and types of healthcare services performed, contractual arrangements with waste service providers, landfill levy rates in that locality, and proximity to transport links and waste facilities.

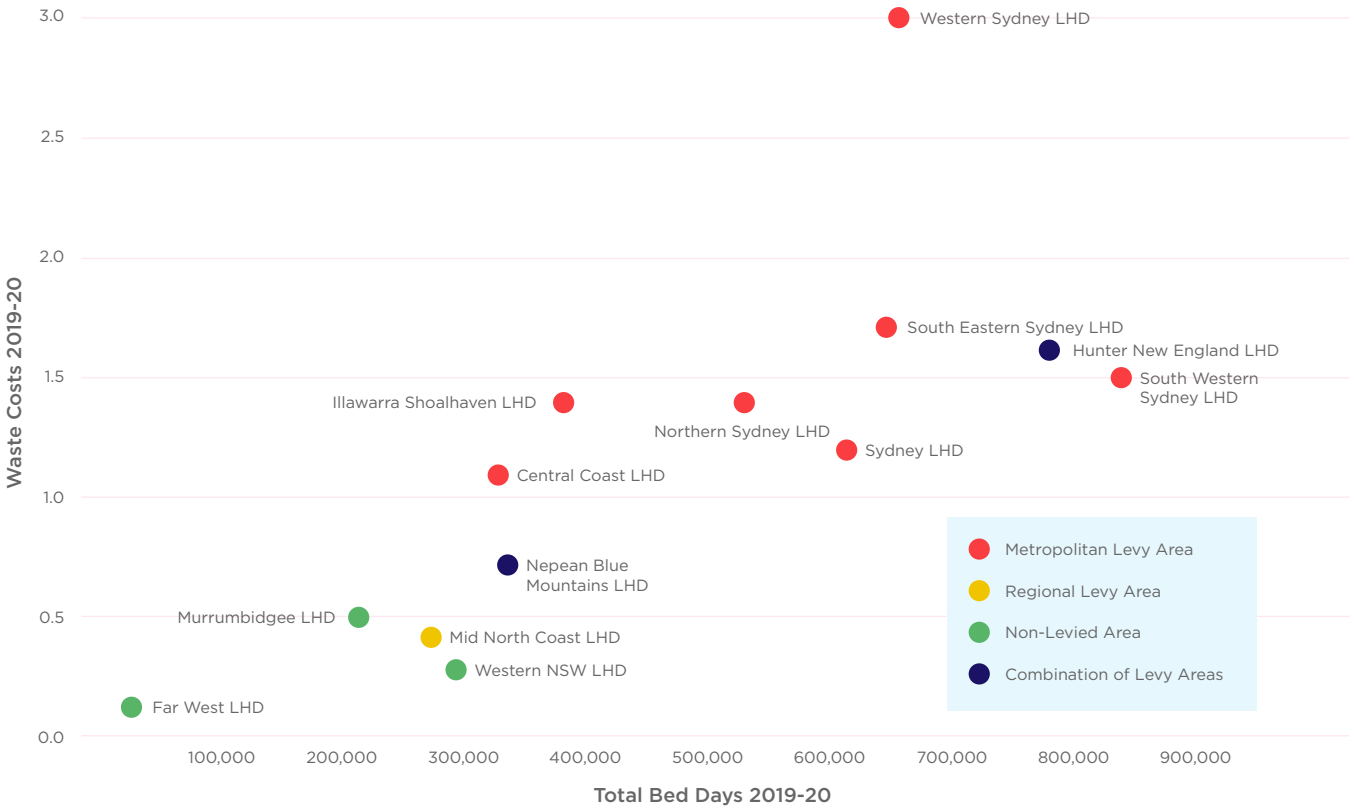
7 NSW Government Centralised Analysis System for Performance of Energy and Resources, 2019-2020 (accessed 2 Sep 2021). These figures are for the top three waste streams only, as required under the current reporting obligations under the NSW Government Resource Efficiency Policy.

8 State of Victoria, Department of Health and Human Services, Staff-driven sustainability initiatives in a Melbourne Health dialysis centre, Case Study: Conversation Series No.5, April 2017

9 Sydney Local Health District Sustainability Plan 2013-18

ECONOMIC COST CONT.

Figure 4: Waste Management Expenditure vs Total Bed Days across selected NSW Health Cluster reporting entities
Sources: NSW Government Centralised Analysis System for Performance of Energy and Resources, NSW Health Annual Reports, NSW Circular analysis (accessed 2 Sep 2021)



For example:

- For one large hospital in metropolitan Sydney, every kilogram of clinical waste costs over four times as much to manage as general dry waste going to landfill, and almost five times that of commingled waste.
- Victoria's public hospitals recycled only a third of its non-hazardous clinical waste in 2017-2018.[10] The state's public health services incurred $17 million in disposal costs that year, half of which were attributed to the treatment and disposal of clinical waste.[11]
- Evidence from the US indicates that though regulated medical waste can make up less than 8% of a hospital's total waste production, it can consume over 40% of their waste management budgets.[12]

Circular economy solutions are opportunities for cost savings

In the healthcare sector, reducing the volume of recyclable materials going into the more expensive clinical and general waste streams can generate real savings for hospitals and ratepayers, which can then be reinvested into patient care.

Reducing unnecessary use and switching to reusable items can offer significant economic gains. For example:

- An initiative at Western Health in Melbourne to identify reusable items now saves the hospital $100,000 a year[13]
- England's National Health Service's Plastics Reduction Pledge has seen the removal of 200,000 single-use plastic items from its waste stream in 2019-20, saving over £12,000 a year in packaging, delivery and disposal costs[14]

10 ABC News, Australia's healthcare industry battling 'devastating' level of waste, nurses and doctors say, 13 Jul 2019.
11 Department of Health and Human Services, Waste Education In Healthcare: Summary Report; 2018.
12 Practice Greenhealth, Regulated Medical Waste (Accessed 1 June 2021).
13 Terzon, E., Australia's healthcare industry battling 'devastating' level of waste, nurses and doctors say, ABC News, 13 July 2019.
14 NHS, Delivering a 'Net Zero' National Health Service, Oct 2020.

ECONOMIC COST CONT.

- Switching to reusable isolation gowns in the Carilion Clinic, US saved the clinic US$850,000 over three years, with an ROI period of only 6 months[15]
- After transitioning to 3.3 million reusable gowns across its centres, the Ronald Reagan UCLA Medical Centre saved US$1.1m over 3 years, with gowns being used 75-100 times before disposal[16]
- Over a five-year period to 2018, over 12,000 staff received dedicated waste compliance and behavioural change training at Barts Health NHS Trust (UK) which helped deliver cost savings of £1.5m through improved infectious waste segregation[17]

Where waste cannot be avoided, recycling offers an opportunity for additional financial and environmental savings.

A notable characteristic of hospital waste is that there are large amounts of non-hazardous plastic waste (such as sterilisation wrap, irrigation bottles, saline plastic ampoules, packaging) made of very recyclable plastic resins.

Correctly sorted and collected in sufficient volumes, they offer clean and reliable streams of recyclate, that have greater value than mixed plastics generally. It is expected that metropolitan hospitals in particular would get the greatest savings from diverting plastics from going to landfill, as landfill levies are much higher for metropolitan hospitals.

Promoting greater standardisation in polymer types across products and packaging being procured would also help make collection easier, reduce contamination and consequently increase their recycling value.

Medium to long term horizon needed

Interventions to reduce plastic waste often require a medium to long term horizon. This considers the initial investment of resources needed in planning, a changeover to more sustainable products, process reorganisation and staff education.

For example, a study of a range of waste reduction interventions in four US hospitals found that the average net cost savings over five years were about US$0.40 per adjusted patient day (amounting to US$700m in net cost savings over five years, averaging US$175m per hospital). However, net savings were largely neutral in the first two years before ramping up in the third to fifth years.[18]

15 Baker N, Bromley-Dulfano R, Chan J, et al. COVID-19 Solutions Are Climate Solutions: Lessons From Reusable Gowns. Front Public Health. 2020;8:590275. Published 2020 Nov 25. doi:10.3389/fpubh.2020.590275

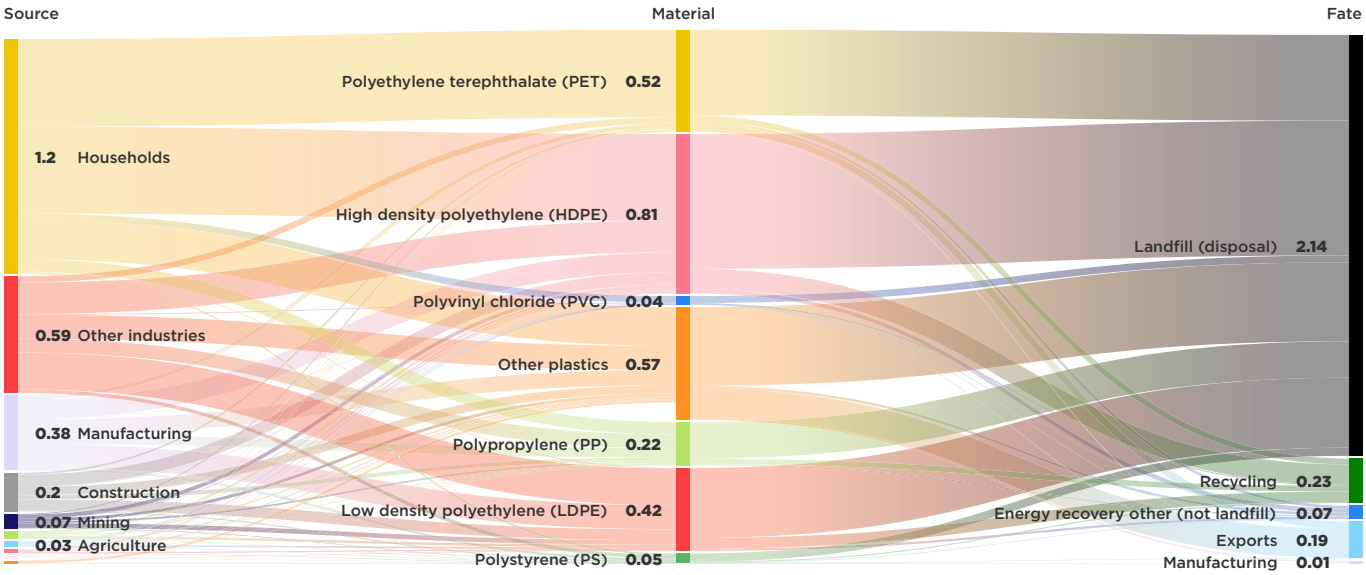
16 Baker et al, ibid.

17 NHS Sustainability Impact Report 2019

18 Kaplan et al., Can Sustainable Hospitals Help Bend the Health Care Cost Curve?, The Commonwealth Fund, Nov 2012

ECONOMIC COST CONT.

Figure 5: Plastic waste in Australia: who generates it, and where it ends up (2018-19)
Sources: ABS Experimental Waste Accounts, 2018-19, NSW Circular



Productivity gains from circular supply chains

Plastics manufacturing and consumption in Australia

Australia consumes 3.4 million tonnes of plastic every year. Of this, 1.2 million tonnes is produced locally. Australia imported US$5.39 billion worth of plastic in 2019, of which US$2.25 billion came from China.[19]

Plastic manufacturing employs about 85,000 people in Australia and is 10% of all manufacturing activity.[20] NSW has 17 plastic recyclers and reman-ufacturers. Only 30% of plastic waste recycled in NSW is reprocessed in the state. The rest is sent interstate or overseas for reprocessing.[21]

Plastics recycling in Australia

Despite this, plastic recycling rates in Australia are low. In 2018-19, Australia generated 2.5m tonnes of plastic waste, of which the majority were HDPE, LDPE and PP. 84% of all plastic thrown away went to landfill. Only 9% was recycled, and another 7% was exported. Industry generates slightly over half of this waste, while households account for the other half.

Packaging constitutes the largest source (71%) of recovered plastic in Australia. The majority of this is HDPE, PET, LDPE and PP. PET has the highest recovery rate (21% in 2018-19), supported by state-based container deposit schemes. HDPE items have the next highest recovery rate (19.7%), but due to its large and widespread use in Australia, it also has the highest amount of unrecovered material.[22]

It is estimated that Australia is missing out on $419 million of value p.a. for PET and HDPE that is not recovered.[23]

19 UN Comtrade Database

20 Senate Standing Committee on Environment and Communications, Report of the Inquiry into the Threat of Marine Plastic Pollution in Austra-lia, 20 April 2016

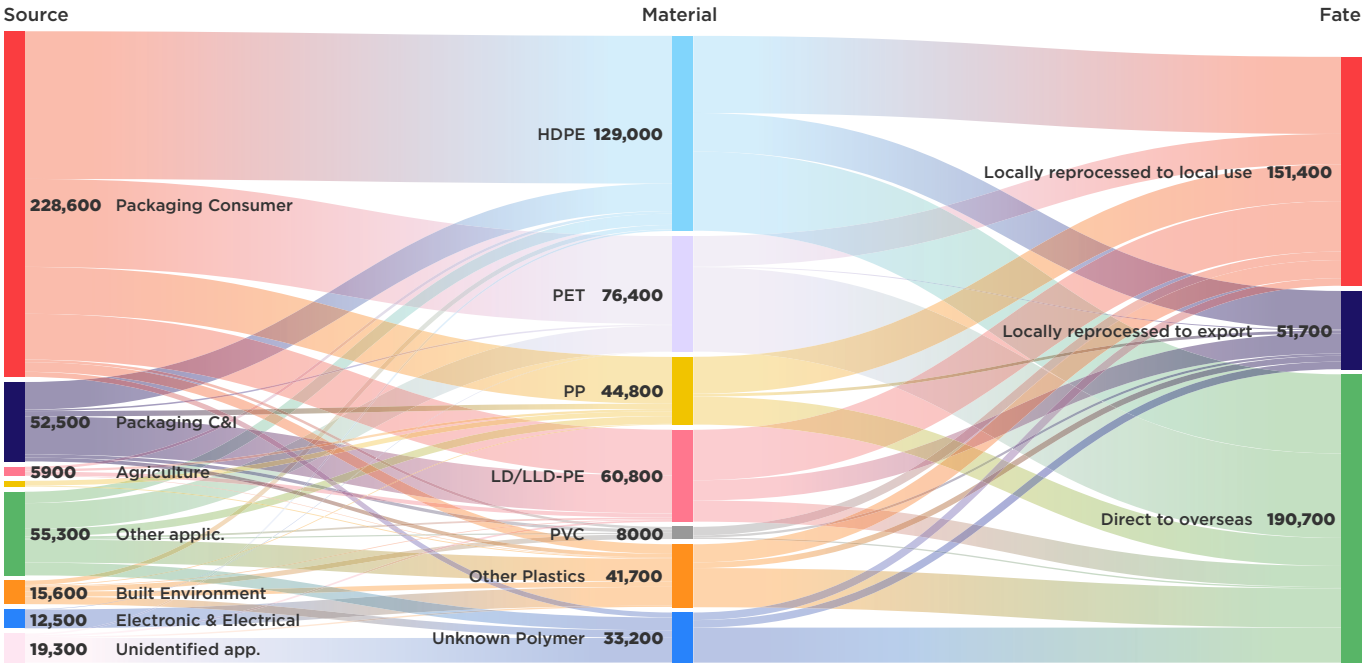
21 NSW Department of Planning, Industry and Environment, Cleaning Up Our Act: Redirecting the Future of Plastic in NSW Discussion Paper, Mar 2020

22 Department of Agriculture, Water and the Environment, 2018-19 Australian Plastics Recycling Survey

23 Schandl H, King S, Walton A, Kaksonen AH, Tapsuwan S and Baynes TM (2020) National Circular Economy Roadmap for plastics, glass, paper and tyres. CSIRO, Australia (based on 2017-18 data).

ECONOMIC COST CONT.

Figure 6: Sources, polymer type and destinations of recycled plastics in Australia, 2018-19
Sources: 2018-2019 Australian Plastics Recycling Survey – National Report, NSW Circular



Nationally, plastics reprocessors are increasing their capacity following the Federal Government's announcement in 2019 of its commitment to ban the exports of plastics waste from 2021 and to support investment in local recycling.

However, significant challenges remain, due to the low cost of virgin plastic over the last few years, and the need for more significant and targeted procurement activity to drive take-up of recycled products.

As existing technologies already allow recycled plastics to be used in large volumes in building materials, road base and packaging, major consumers such as governments, large businesses and infrastructure developers have an important role to play in using their considerable buying power to drive the level of demand and acceptance needed to develop circular plastics supply chains.

A McKinsey & Company study estimates the plastics recycling could contribute an estimated US$60 billion in profit growth to the global petrochemical and plastics sector by 2030, with China accounting for 43% of this growth.[24]

Recycling offers tangible economic benefits over landfilling. But even with recycling there is still some loss of value as there are limits to how often plastic can be recycled. In practice it is often "downcycled" into lower-grade plastics than the original material. In some cases, they are burned for energy recovery. Consequently, there remains a strong case reducing plastics consumption and using more environmentally friendly alternative materials where possible, while moving towards technologies that can recover the material for use in high-grade, high value outcomes.

24 McKinsey & Company, How plastics waste recycling could transform the chemical industry, December 2018

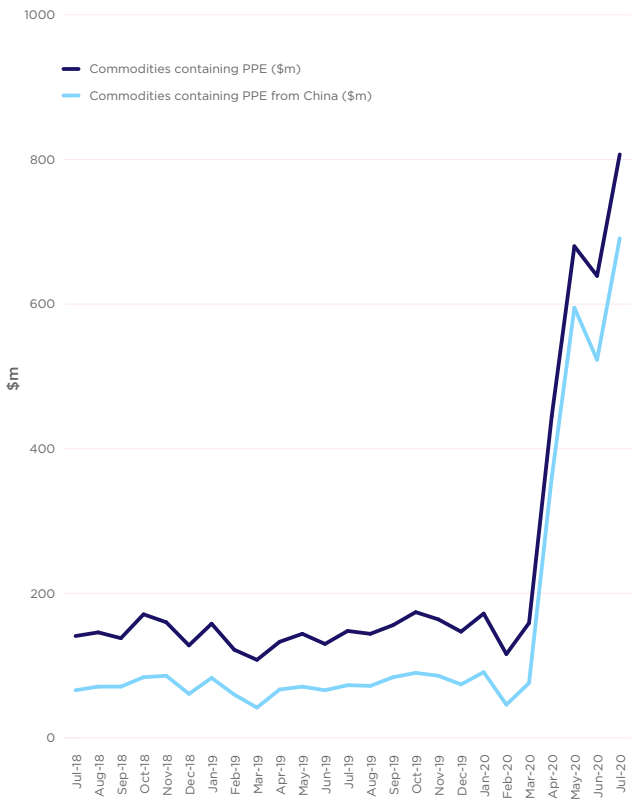
ECONOMIC COST CONT.

Impact of COVID-19 on supply chain resilience

The outbreak of COVID-19 has seen a surge in demand for a number of plastic healthcare products. These include items made of PP (surgical masks and gowns), PE (Tyvek protective suits), and PET (medical face shields).

In Victoria, it has been estimated that there was a 100-fold increase in contaminated medical waste produced by aged care facilities with positive COVID-19 cases. At the height of the pandemic, this led to a build-up of unsecured personal protective equipment (PPE) waste in collection bags on street corners, with authorities scrambling to secure storage, collection, incinerators and safe disposal services.[25]

Figure 7: Imports of commodities containing PPE into Australia ($m)
Source: ABS, International Trade in Goods and Services, Australia, Jul 2020



The COVID pandemic has also highlighted that Australia is highly reliant on the supply of both virgin and recycled primary plastic polymers, as well as plastic products, from overseas.

This includes PPE items such as masks, gloves and gowns. Prior to the pandemic China supplied around half of the total value of PPE imports into Australia, but this spiked to between 80-90% over April to July 2020 (Figure 7).

Single-use, nonwoven polypropylene PPE is cheap, but this does not take into account the environmental costs of shipping, tariffs, and incineration or waste disposal. Knock-on impacts on essential economic activity in the event of a major supply chain disruption also need to be considered.

Vaccinations for the world's population of 7.8 billion will further generate large amounts of plastic waste in the form of used PPE, syringes, needle caps, and packaging. Some vaccine suppliers have reported shortages in vital manufacturing components, such as sterile plastic liners used for making mRNA vaccines.[26]

Comprehensive solutions are needed to responsibly manage supplies of raw materials and their recovery from disposal. These include the need for a coordinated national or state strategy for sustainable management of these anticipated waste streams, and circular solutions where possible.

In short, reducing waste, redirecting quality waste materials back into the supply chain, and innovation in more circular models of product design can help support local jobs by building onshore capacity in our manufacturing industry. This will be important for future supply chain resilience as well.

25 Estcourt, D., The Age, One man on a mission to clean up the COVID mountain of clinical waste, 28 Aug 2020

26 Kuchler, H., and Miller, J., Shortage of giant plastic bags threatens global vaccines rollout, Financial Times, Financial Times, 17 February 2021.

CHAPTER

Three

Environmental cost

Facts:

1. **The carbon footprint of Australia's healthcare system is equivalent to 7% of the nation's total, with hospitals and pharmaceuticals the biggest contributors.**
2. **Supply chains account for the majority of the sector's total emissions, and plastics are a part of the problem. There is an environmental cost in making, incinerating and landfilling plastics.**
3. **When plastic waste is incinerated or landfilled, not only is the material lost forever from productive use, it will have a negative impact on the environment.**
4. **And with the removal of the polymer from productive use, new plastic products will continue to rely on virgin plastic made from refined fossil fuels.**

Healthcare supply chains have a large carbon footprint

Australia's healthcare system has a carbon footprint equivalent to over 7% of the nation's total carbon footprint, with hospitals and pharmaceuticals the biggest contributors (Figure 8). This is equivalent to the carbon footprint of all people in the state of South Australia. The five biggest emitters within health care are public hospitals (34%), private hospitals (10%), non-PBS medications (9%), PBS medications (9%), and capital expenditure for buildings (8%). 90% of this carbon footprint stems from the activities of other economic sectors that feed into the provision of healthcare services.[27]

If the global health sector were a country, it would be the fifth-largest emitter on the planet.[28] The global healthcare sector's carbon footprint is equivalent to 4.4% of global net emissions, equivalent to the annual greenhouse gas emissions from 514 coal-fired power plants. The sector's carbon footprint includes energy, waste, water, travel, supply chains and fugitive gases.

An analysis of England's National Health Service – the world's largest single health system – carbon footprint in 2019 found that **supply chains accounted for the majority (62%) of the NHS's total emissions**, followed 24% from the direct delivery of care (including energy, water, waste and business travel).[29]

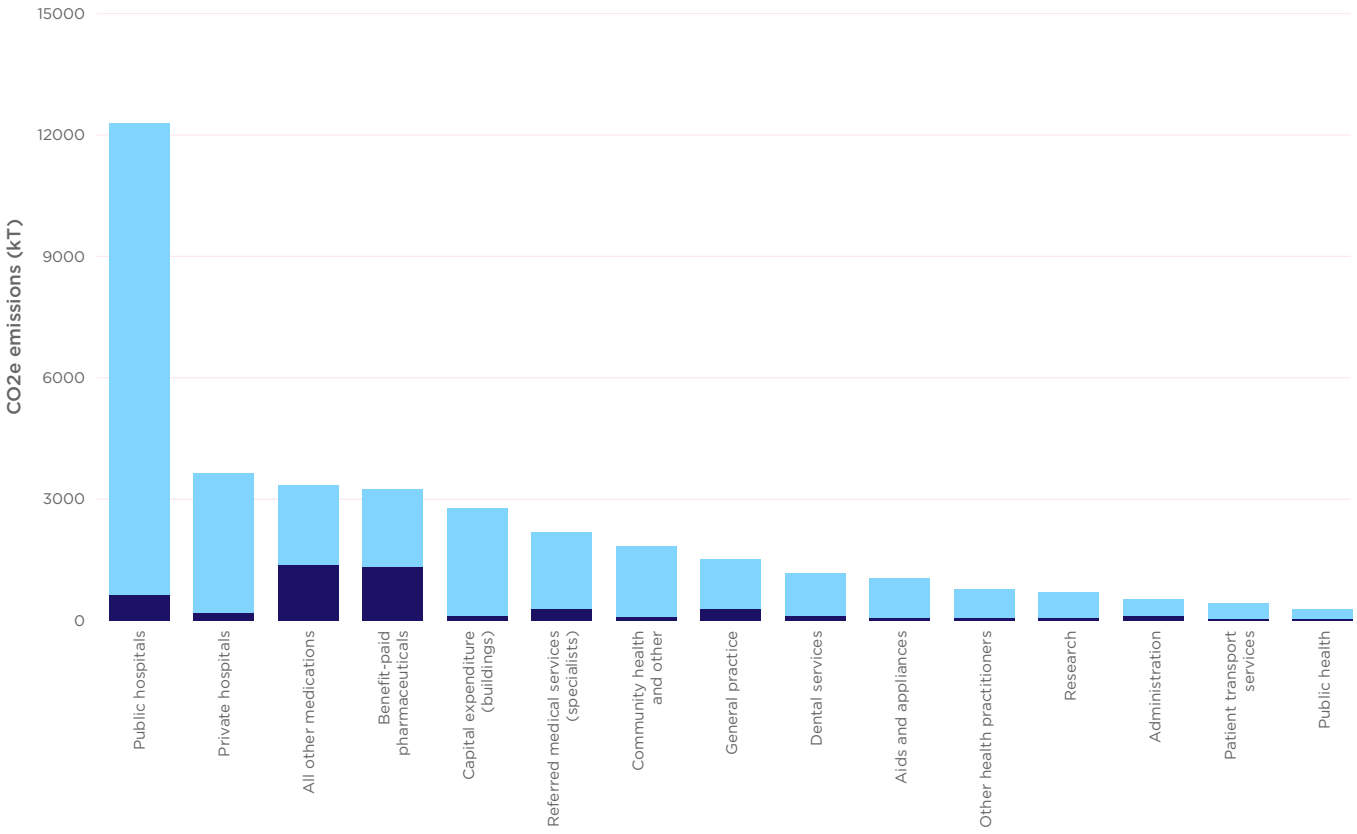
27 Malik et al., 2018, The carbon footprint of Australian health care, The Lancet Planetary Health, 2: e27-35

28 Arup, Healthcare's Climate Footprint, Sep 2019

29 Tennison et al, 2021, Health care's response to climate change: a carbon footprint assessment of the NHS in England, The Lancet Planetary Health, Vol 5, Issue 2, E84-E92

ENVIRONMENTAL COST CONT.

Figure 8: Australian healthcare system carbon footprint
Source: Malik et al., 2018, The carbon footprint of Australian health care, The Lancet Planetary Health, 2: e27-35



Research undertaken by the Victorian government yielded similar results, indicating that 57% of the Victorian public healthcare system's carbon footprint was related to procurement, 20% to stationary energy, 11% to travel and 10% to waste.[30]

Lifecycle impacts

Plastics in the healthcare system carry both direct and indirect environmental costs. Fossil fuels are used to manufacture the petrochemicals that make up virgin plastic. This generates emissions and depletes our natural resources.

The relative benefits of different ways of managing plastic waste can be classified according to the standard waste hierarchy, with avoidance, reuse and recycling having lower environmental and economic loss of value than incineration and landfilling (Figure 9).

There are generally two main methods for recycling plastic: mechanical and chemical.[31]

Mechanical recycling is the most common method of managing plastic waste. This involves sorting, grinding, washing, drying and generating flakes and pellets for reuse. This reduces the demand for virgin polymer, and consequently demand for oil.

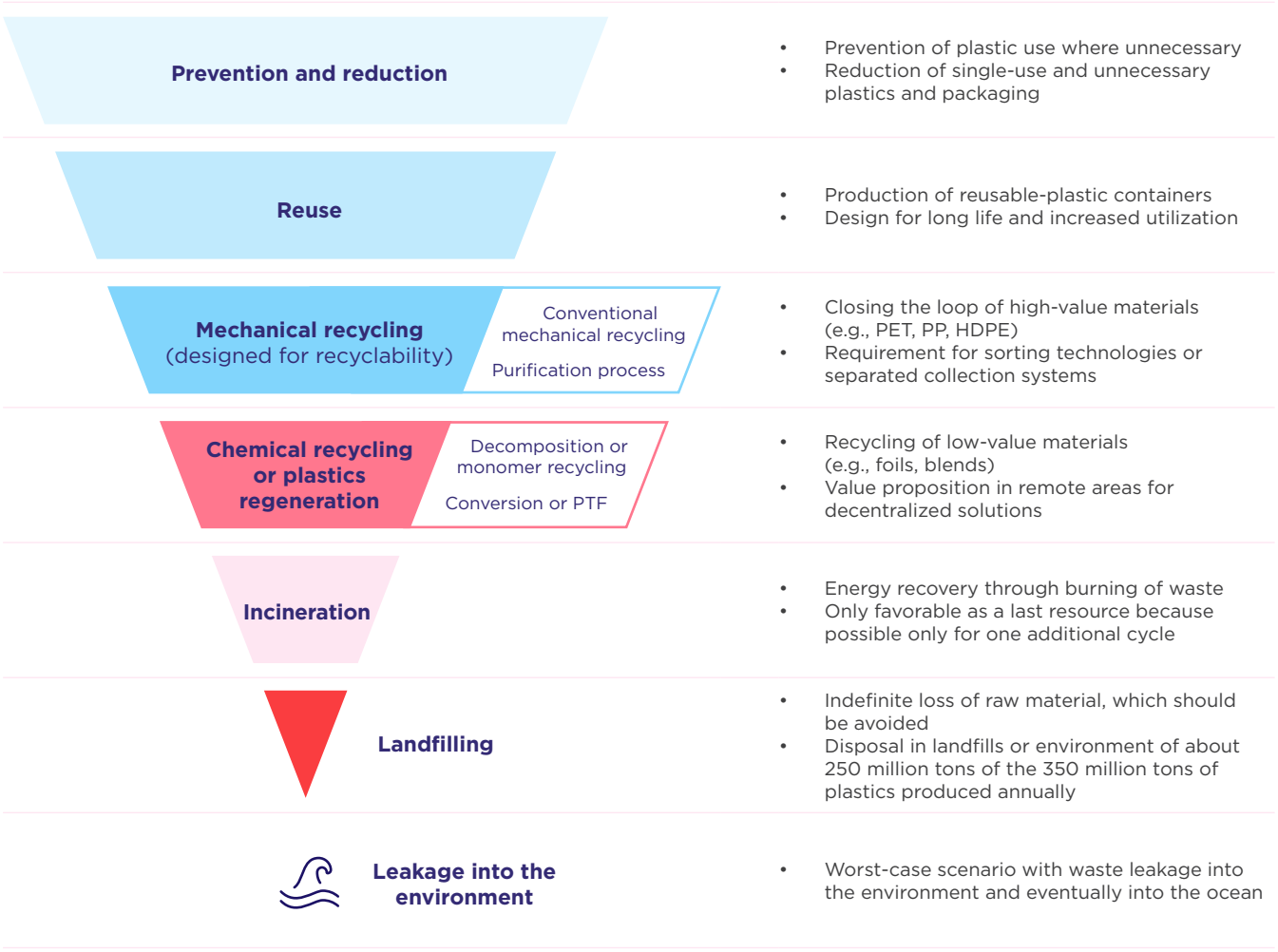
Chemical recycling involves chemically reducing plastic into the oil it was derived from. Methods include gasification (which turns plastics into a synthesis gas or "syngas'), and pyrolysis (which turns plastics into a synthetic crude oil that can be refined into fuel). Chemical recycling is a potential longer-term solution to decompose mixed plastics waste streams, and would also present substitutes for fossil fuels.

30 Department of Health and Human Services, State Government of Victoria, Carbon Emissions in Healthcare Facilities (accessed 1 April 2021)

31 A third avenue for material recovery is energy recovery (incineration), which is typically only used for end-of-life plastics that cannot be recycled.

ENVIRONMENTAL COST CONT.

Figure 9: Hierarchy of plastic waste management
Source: Boston Consulting Group, A Circular Solution to Plastic Waste, 2019



Much of non-clinical plastic waste is made of polyolefins (PP and PE). Sorted correctly, these are very recyclable. Recycling plastic can reduce energy use by around 80-90%, and reduce emissions by around 70%, compared to using virgin resin.[32]

Lifecycle analysis by the Healthcare Plastics Recycling Council has found that with current commercial technologies, mechanical recycling of waste plastics has a lower environmental impact than other disposal options, particularly due to the benefits of avoiding virgin plastic production. The findings confirm the waste hierarchy guidance to pursue mechanical recycling as the most preferred recycling option (after reuse and reduction).

In any case, all circular economy options (reduce, reuse and recycling) offer lower carbon impacts than the products they are substituting. With the global transition towards cleaner energy sources and extending the economic productivity of materials, there will be increased interest in how recycling technologies can be further developed to shift the value chain higher. This may be through producing increasingly higher-value recycled products, and/or lower-emission lifecycle outcomes from recycling.

32 Using recycled plastic reduces total energy consumption by 79% for PET, by 88% for HDPE and by 88% for PP. Using recycled plastics also limits emissions by 67% for PET, by 71% for HDPE and by 71% for PP. Source: Franklin Associates, Life Cycle Impacts of Postconsumer Recycled Resins: PET, HDPE and PP, Dec 2018

CHAPTER

Four

4

Building a circular plastics supply chain in healthcare

Facts:

1. Considerable work has been done by the NSW Government in recent years to consolidate its procurement and waste services processes to obtain greater efficiency, accountability and accurate data to inform decision making.
2. Emerging sustainable procurement initiatives and staff-initiated recycling programs are currently the main drivers of incremental change.
3. There are also several recycling programs for high-volume plastic waste items such as operating theatre PVC items and sterilisation wrap. However, not all hospitals participate in these.
4. There can be challenges to scaling up recycling efforts due to limitations in resourcing, logistics and end-markets.
5. There is however opportunity for capturing additional benefits, savings and catalysing innovation through: (i) setting sector-wide targets and strategies to unlock the opportunities from these materials; (ii) integrating the lifecycle costs of procured items in the budgeting process, including disposal costs; (iii) targeted procurement activity to achieve better recovery outcomes at scale; (iv) behavioural change interventions to facilitate better materials recovery; and (v) better information on cost savings, waste volumes and recycling outcomes.

The healthcare plastics supply chain

Healthcare services generate high volumes of plastic packaging and single-use items. For example, in 2018, Australia imported US$4.83 billion in packaged medicaments, making this category the 7th most imported product in Australia that year.[33]

Figure 10 illustrates the supply chain for non-durable plastics in hospitals.

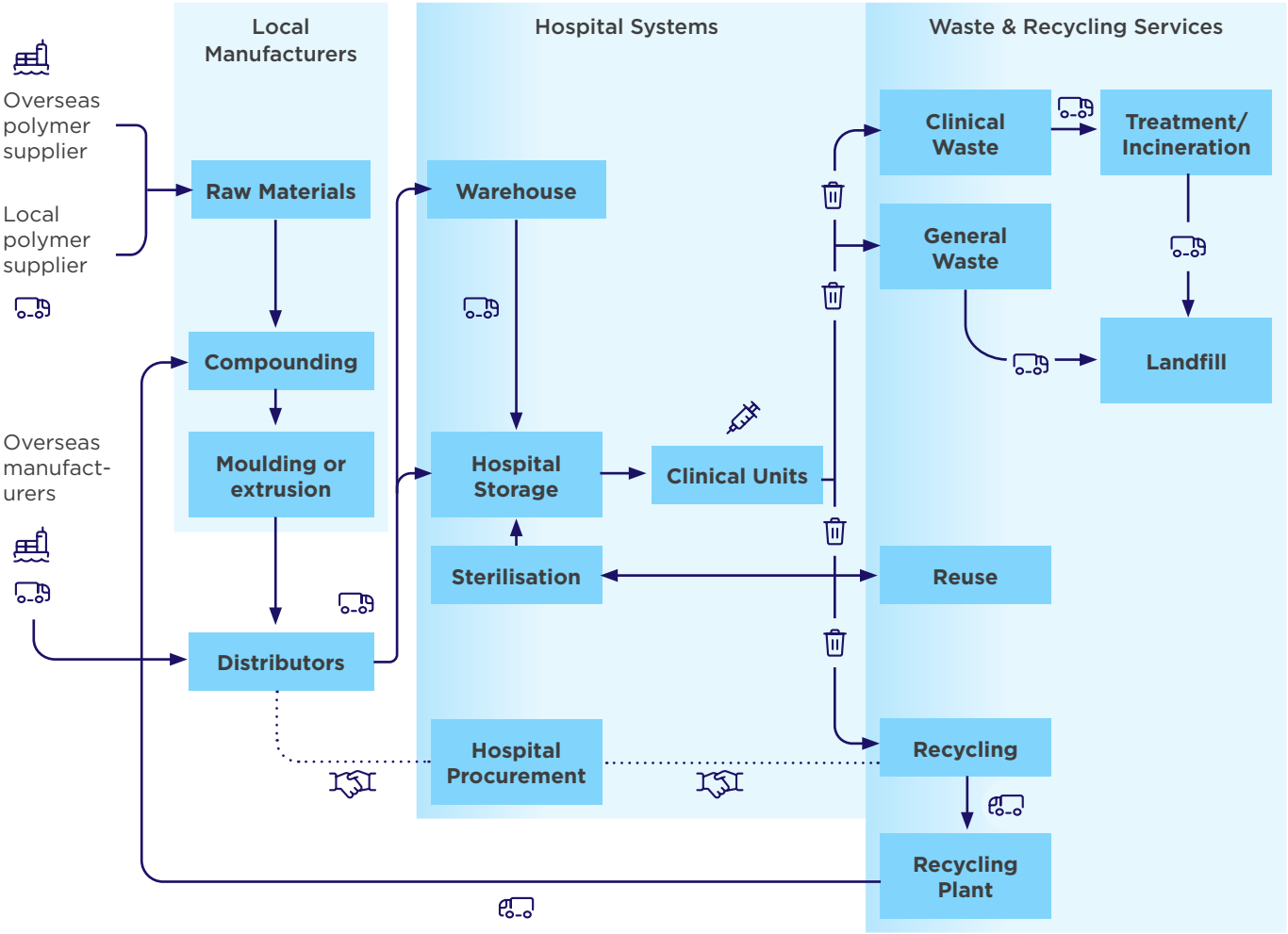
Production Plastic healthcare products may be locally or overseas made. For local plastic manufacturers, most of their resins (both virgin and recycled) are imported from countries such as China, Taiwan, the US and Southeast Asia. Only small amounts come from local primary production and recycling streams. The raw polymer is then compounded to create different formulations and grades to meet the specific needs of their end use applications. The compounded material is then manufactured into the final product, either through injection moulding, blow moulding, or an extrusion process.

Procurement Products are procured by NSW Health mostly from local distributors. Public hospitals in NSW use the central procurement services provided by NSW Healthshare for hospital goods and services, and by NSW Procurement for waste management. Individual hospitals and local health districts also have some flexibility to enter into individual agreements to meet their procurement needs.

33 OEC World, Packaged Medicaments in Australia (Accessed 24 Feb 2021)

BUILDING A CIRCULAR PLASTICS SUPPLY CHAIN IN HEALTHCARE CONT.

Figure 10: The hospitals plastics supply chain
Source: NSW Circular



Distribution and storage Centrally procured products are transported to NSW Health's central warehousing and distribution centre in Western Sydney, Onelink. Supplies are distributed from there to individual hospitals. This is stored until needed for use.

Usage and collection Some plastics can be reused, after cleaning and sterilisation. Used packaging and single-use plastics can end up any of the following hospital waste streams: clinical waste (which is then transported away for treatment and/or incineration), general waste (which goes to landfill), reuse (which would usually require resterilisation) and recycling (which gets sent to a recycling facility).

Disposal In NSW, hospital waste must be managed in accordance with a range of regulations and standards. Appendix 1 sets these out in more detail. Incineration is often the preferred option for managing clinical and other hazardous waste. However, healthcare providers are increasingly mindful of the need to consider the economic and environmental costs of unnecessary waste incineration, which is also an energy-intensive process. Much of the non-hazardous plastic waste ends up in the general waste stream which goes to landfill.

Recycling Some plastic items such as sterilisation wrap, PVC operating theatre plastics and other plastic items are collected for recycling if the hospitals participate in these recycling schemes. These products are usually recycled into non-clinical plastic products or turned into process-engineered fuel.

BUILDING A CIRCULAR PLASTICS SUPPLY CHAIN IN HEALTHCARE CONT.

Procurement

The **NSW Government Procurement Policy Framework** provides guidance for government entities on their procurement activity, including guidance on some aspects of the circular economy in procurement decisions.

Within the procurement evaluation framework, for all procurements valued above $3m agencies must include a non-price evaluation criterion of at least 15% which considers how potential suppliers will support the government's economic, ethical, environmental and social priorities.[34] Suppliers awarded these tenders must report on commitments made to address the sustainability criteria. Examples of the guidance provided by the framework on how the sustainability criterion can be applied and evaluated are set out in Appendix 2.

NSW Healthshare manages central procurement for the state's public health services. However, individual hospitals can undertake procurement-related activities up to $250,000 within the framework of the NSW Health Procurement Policy. In clinical settings, product selection typically also considers factors such as appropriateness for their clinical practice, suitability for use in each clinical area, and whether the product is readily available, cost-effective and meets relevant standards.

Hospitals, local health districts and central procurement agencies play an important role in identifying potential procurement and waste management savings, for example:

- Sydney Children's Hospitals Network clinicians noted the large amount of waste that was being created by using 'packs' of equipment and throwing everything out, even if some parts of the pack were not used. As a result, the network undertook to assess its procurement practices to avoid unnecessary waste from the purchase and use of such packs, and to increase the opportunities to procure reusable items rather than disposables.[35]
- Kirketon Road Centre (a walk-in primary health care service in the inner-city suburb of Kings Cross) introduced a three-month trial replacing the PP packs they distribute (for storage, transportation and disposal of syringes) through the Needle and Syringe Program (NSP) with cardboard packs instead. Monitoring by the NSP of the response from clients and levels of correct disposal of used syringes will determine the evidence-based advice given the NSW Health for a state-wide scheme.

The Commonwealth Government's Sustainable Procurement Guide

Under the National Waste Policy Action Plan, the Australian Government is committed to significantly increase the amount of recycled content it uses. Consequently, the Commonwealth Procurement Rules (CPRs) require entities to consider the Sustainable Procurement Guide. More specifically, the CPRs specify that when assessing value-for-money, an official must consider the environmental sustainability of the proposed goods and services (such as energy efficiency, environmental impact and the use of recycled products).

34 Of this, a minimum of 10% must be allocated to small and medium sized enterprise (SME) participation.

35 Sydney Children's Hospitals Network, Waste Management Policy, 2019

BUILDING A CIRCULAR PLASTICS SUPPLY CHAIN IN HEALTHCARE CONT.

Recycling

There are a number of recycling arrangements initiated by individual hospitals or local health districts. These generally fall into three categories:

- Product stewardship schemes
- Social impact schemes
- Recycling initiatives with private waste and recycling operators

Product stewardship programs

Some healthcare suppliers offer recycling schemes for their products, providing the benefit of known end-of-life solutions. However, the more fractionalised the different product stewardship schemes are for similar materials or items, the more challenging it can be to make these schemes commercially self-sustaining.

Further work is needed to investigate the potential for efficiency gains by consolidating opportunities from a sector-wide perspective, while also fostering competitive markets for the supply of these products and services.

Sterilisation wrap recycling programs Sterilisation wrap is widely used in healthcare settings to protect surgical and other instruments from contamination during and after sterilization.

It is among the highest-volume recyclable plastic material generated in healthcare settings. Evidence from the US estimates that blue wrap alone accounts for 37% of packaging waste in clinical settings, 19% of all operating room waste and 5% of all hospital waste.[36]

Local recycling schemes for this material include the Kimguard and the Wrapback recycling programs. Used wrap is collected in separate bins and recycled into products such as pipes and drainage systems.[37]

Blue wrap is usually made of several layers of PP. Because it is only ever used once to wrap sterile instrument sets and in typical use does not come into contact with patients, it accounts for a considerable amount of 'clean' waste, uncontaminated by soiling or biohazards.

According to the Healthcare Plastics Recycling Council, sterilisation wrap can be collected and recycled with other PP items. With a melt flow index of around 40, it can be used by PP compounders to raise the melt on their lower melt flow index PP feedstreams.

PVC recycling program [38] PVC items make up an estimated 25% of hospital plastic waste. The PVC Recycling in Hospitals program in Australia is a world-first program in healthcare PVC recycling, set up by the Vinyl Council and Baxter Healthcare.

Its introduction was driven by medical staff concerned about escalating consumption and waste in the healthcare sector. Beginning with a pilot in 2009, the program now has over 250 participating hospitals across Australia.

Building on the learnings from the initial phases of the scheme, it ultimately chose to focus on collecting oxygen masks and tubing, and Baxter IV bags. Collections were also focused on specific hospital units such as operating theatres, renal units, ICU and recovery where: (i) staff had time to consider the items they were handling and throwing away, and (ii) produced high volumes of clean PVC. Currently, hospitals must be able to produce at least two wheelie bins' worth of PVC waste/month to take part in the scheme.

36 Healthcare Plastics Recycling Council, Guidance for Recyclers 2019; Supply Chain Dive, Packaging, PPE and surgical supplies: How COVID-19 is pushing hospitals to reduce waste, 12 Jan 2021

37 Wrapback, http://wrapback.com.au/#wrapback-blueprint (Accessed 18 January 2021)

38 Vinyl Council of Australia, PVC Recycling in Hospitals (Accessed 20 Aug 2020); discussions with Vinyl Council

BUILDING A CIRCULAR PLASTICS SUPPLY CHAIN IN HEALTHCARE CONT.

Some hospitals have also had success in emergency departments, and some are rolling the scheme into maternity wards where there is a high use of oxygen masks.

The costs of collecting, sorting and transporting the PVC are the most significant cost component of running the scheme. The scheme subsidised by Baxter and the sorted PVC is sold by Baxter to Australian re-processor Welvic.

Over 140 tonnes of PVC were recycled in 2019. The program has helped hospitals reduce their waste disposal costs and contribute to local supply chains, contributing to an 18% emissions reduction by not landfilling general PVC hospital waste.

The success of the scheme has seen similar programs being rolled out in New Zealand, South Africa, Thailand, the US, UK and Canada.

Social impact schemes

There are a few purpose-driven recycling initiatives in hospitals that are driven by staff on a voluntary basis. For example, staff at Auburn Hospital in NSW had noticed that more than 2,500 single-use kidney dishes were being disposed of monthly at a cost of hundreds of dollars in waste fees. They began collecting used hospital items such as plastic bowls from the operating theatres and unwanted sterile syringes from the maternity unit. This eventually expanded to old hospital furniture and equipment. Program partners include MedEarth and Doctors Assisting in South Pacific Islands who take disused furniture and hospital equipment for reuse, and Featherdale Wildlife Park and Sydney Zoo who take disused bandages.[39]

Recycling initiatives with private operators

Some hospitals have individually negotiated contracts with waste and recycling operators to get better recycling outcomes.

For example, Concord Repatriation General Hospital's operating theatre staff formed a Waste Action Group to reduce the large amount of waste produced in operating theatres (nine tonnes of recyclable plastic waste annually). The group initiated a three-month trial of recycling non-contaminated, co-mingled plastic waste products, such as packaging and unused items from custom packs. The trial established a high level of acceptability and compliance with the waste segregation process by staff.[40]

There is an opportunity for the healthcare system to investigate the feasibility of adopting such schemes more widely to maximise their savings and accompanying environmental benefits. One such scheme is outlined in Chapter 5, which describes a demonstration project led by NSW Circular in recycling hospital plastics, and the learnings from this project.

39 The Pulse, Trifecta of awards for Auburn Hospital's War on Waste, (Accessed 24 March 2021)

40 Sydney Local Health District, Sustainability Plan 2013 - 2018, (Accessed 27 March 2021)

CHAPTER

Five

5

NSW Circular hospital plastics recycling demonstration project

The project

As part of its Circular Supply Chain Alliance program, NSW Circular collaborated with St Vincent's Hospital Sydney, Allmould Plastics Group and University of NSW's SMaRT Centre on trialling recycling of single-use uncontaminated plastic products from hospital wards. The project commenced in October 2020.

The project goal was to support St Vincent's Hospital to reduce waste disposal costs to the hospital while also reducing the environmental impact of the hospital's operations. The project involved volunteers from St Vincent's and Allmould Plastics who provided the collection and recycling service at no cost to the hospital.

The initial focus was on uncontaminated single-use products made of commercially valuable plastics (PP or PE) that were considered low-risk, commonly used and commercially valuable.

After considering various medical items that met these criteria, it was decided that the project would focus on collecting hypodermic needle caps, peripheral cannula caps, phlebotomy needle caps (made from PP) and used saline and water ampoules (from PE). These items were previously being sent to landfill but required only minimal changes in practice to collect them for recycling, with the potential for scaling up to other locations and similar products.

The provision of recycling bins on cannulation trolleys allowed for the collection of needle caps without disruption to regular workflow in the wards. Each of these products are handled away from biological or pharmaceutical exposure and are touched only once in a clean procedure before disposal, either in a medicine room or cannula trolley.

Hospital staff were keen to recycle, and participation in the program was very positive. Committed staff in each ward helped develop posters and methods of keeping the program running smoothly.

Once the bins from cannulation trolleys and medication rooms were collected, the plastics were checked to ensure there was no contamination. The material was then collected from the hospital by Allmould Plastics, granulated and processed for use as feedstock in the manufacturing of grommets, roller door wheels and packers.

Figure 11: Plastic ampoules and needle caps collected from St Vincent's Hospital

NSW CIRCULAR HOSPITAL PLASTICS RECYCLING DEMONSTRATION PROJECT CONT.

Outcomes

The demonstration project over a three-month period:

- Collected more than 80,000 items of uncontaminated plastic waste
- Collected 205kgs of plastic, equal to the weight of 41,000 plastic bags
- Produced 1,500 roller door wheels, 5,400 grommets and 2,000 packers containing 16% recycled content
- Reduced the transport footprint of this manufacturing production by at least 19,000km by using recycled rather than virgin plastic.

While the project tested small volumes of waste recovery, the real economic benefit lies in a more comprehensive approach to reducing the clinical waste stream and a reduction in waste overall. The trial only included selected clinical areas in the hospital which accounted for 28% of all ampoules and 11% of all needles used in the hospital. **Expanding the collection of even just these two small items across the NSW public health system would save nearly 70m pieces of plastic from landfill amounting to 150 tonnes and generate savings of $150,000 each year.**[41]

The plastics being disposed had embedded value as they were made of high-grade material, clean and properly segregated from other plastics types. Consequently, they could be easily used as feedstock in Allmould Plastics' existing manufacturing lines. Technical assessments of the material showed that it was able to be used without compromising the performance characteristics of the end-products, which included building materials (grommets and packers) and roller door wheels (Figure 14).

Figure 12: Products made from recycled plastics from the project

Further opportunities to increase the scale and potential benefits of such work have emerged during the course of the demonstration project. Work is currently underway on scaling up this approach in other hospitals and a wider range of products.

Importantly, this would also have broader economic benefits, including additional job creation to process the larger volumes of high-grade plastics being collected for recycling and remanufacturing.

41 Activity levels (including level of use of common clinical items) in the NSW public health system were estimated based on total bed days in 2019-20.

CHAPTER

Six

Drivers of change

Facts:

1. **Sustainability commitments** such as bans on single-use plastics, net zero emissions targets, Australia's commitment to its National Waste Policy goals, including achieving 100% sustainable packaging by 2025, and sustainability commitments by different healthcare systems, are among the strongest drivers for focusing action on the problem of plastic waste in the healthcare sector.
2. This is driving a rise in **circular procurement approaches** to drive, catalyse and create demand for goods and services that deliver the economic and environmental benefits embodied in the circular economy.
3. Australian healthcare institutions need to align their actions with **staff and community expectations** of how they manage — either directly or through their buying power — their supply chains, from product design to traceability of source materials and industry standards.

The use of taxation as a policy incentive to reduce the use of harmful plastics packaging is gaining momentum, particularly in Europe. From 1 January 2021, the European Union introduced a tax on non-recycled plastic packaging as part of their €750bn coronavirus pandemic recovery plan. The UK will also introduce a similar tax from April 2022.

Global shift to reduce plastic waste

International

As of July 2018, 127 countries had already committed to legislative measures targeting single-use plastics. Of these, 91 have bans or restrictions on the production, importation and retail distribution of single-use plastics.

Other measures include extended producer responsibility measures such as container deposit schemes and take-back schemes, waste disposal charges, and special environmental taxes.[42]

In North America, there is no current legislation mandating the use of recycled content in medical devices and packaging. However, commitments have been made by industry groups such as the American Chemistry Council's pledge to recycle or recover 100% of plastics packaging by 2040, and the Canadian Plastics Industry goal for all plastic packaging to be reused, recycled, or recovered by 2040.

In Europe, waste directives including the Single-Use Plastics Directive and the Packaging and Packaging Waste Directive (PPWD) all form part of European Union laws that seek to reduce plastic pollution and drive environmental improvement of packaging and recycling rates in the Member States. In article 20, the PPWD acknowledges the challenges in applying all the provisions to medical device products.

42 Patrício Silva AL, Prata JC, Walker TR, et al. Rethinking and optimising plastic waste management under COVID-19 pandemic: Policy solutions based on redesign and reduction of single-use plastics and personal protective equipment, Sci Total Environ, 2020; 742:140565.

DRIVERS OF CHANGE CONT.

Australia

In Australia, environment ministers agreed in 2018 to establish a new approach to packaging in Australia, including committing to achieve by 2025:

- 100% reusable, recyclable or compostable packaging
- 70% of plastic packaging being recycled or composted
- 50% of average recycled content included in packaging
- The phase out of problematic and unnecessary single-use plastics packaging.

The **Australian Packaging Covenant (APCO)** – and its members comprising industry, government participants and community groups – was charged by the government to facilitate the delivery of the targets. The 2025 targets apply to all packaging that is made, used and sold in Australia, including the healthcare sector.[43]

The **National Plastics Plan** announced in March 2021 sets out the government's intentions on accelerating the phase-out of certain plastic polymer types, stopping the export of unprocessed plastic waste, promoting product stewardship, turbocharging Australia's plastic recycling capacity, fostering research in plastics processing, and community education.

State and territory governments are also progressing with efforts to address the plastics problem. In July 2021, the NSW Government released its Plastics Plan to provide a comprehensive approach to reducing plastic use, and managing plastic waste and pollution in the state. Many states either already have, or are in the process, of phasing out plastic bags and common single-use plastics. Consequently, many businesses have already commenced transitioning to more sustainable products, and this activity is expected to increase.

Sustainability commitments in Australian healthcare

Currently, different states and healthcare systems across Australia have varying degrees of commitment to sustainability targets. However, there is clear momentum and desire within the healthcare sector itself to reduce its carbon footprint and to leverage opportunities to reduce waste and unnecessary resource use. For example:

- In May 2021, the Victorian government pledged to reduce emissions from all Victorian Government operations – including hospitals – by 2.7 Mt CO2-e by 2025 compared to 2018-19.
- Ambulance Victoria updated their emissions reduction targets in March 2021 to achieve net zero emissions by 2045: five years earlier than planned.
- The Sydney Children's Hospitals Network, the largest provider of paediatric care in the country, has introduced targets for reducing clinical waste by 30% and increasing recycling rates by 20% over 2017-2022.
- The Queensland Procurement Policy includes a target of net zero emissions by 2050.
- Some private health organisations have undertaken to proactively set their own targets, such as private operator Ramsay Health Care which in June 2020 commenced its pledge to replace the 24 million single-use plastic items used every year in its Australian operations (covering 72 hospitals, day surgeries and clinics) with more environmentally friendly alternatives.

43 APCO, Our Packaging Future: a collective impact framework to achieve the 2025 national packaging targets, 2020. Note: the Covenant applies to all businesses that produce packaging or packaged products and have an annual turnover of $5 million or more.

DRIVERS OF CHANGE CONT.

Healthcare practitioners' concerns about plastic waste

There is significant and growing concern among healthcare professionals over the amount of waste produced by the healthcare system.

The Australian Medical Association's position is that environmental sustainability in health care should not be limited to decreasing energy use and waste, but also to better procurement decisions, improved infrastructure and planning, public and preventive health care, and innovative care pathways.[44]

A survey of 500 staff across the South Eastern Sydney Local Health District district saw 100% of responses indicating that they felt NSW Health organisations should be acting on environmental sustainability. Waste was identified as a clear and consistent issue for staff who wished to see reduced waste and more standardized waste management and recycling processes, and the significant use of plastics, including single-use items and gloves, were singled out as a particular concern.[45]

These concerns are echoed by healthcare practitioners around the world, who see the large amount of environmentally unsustainable waste being generated in their workplaces each day. These concerns have led to the creation of networks such as Global Green and Healthy Hospitals (GGHH), an international network of health organisations, which has over 1,000 active members across 54 countries and provides a platform and resources for members to discuss and improve their local practices.

Reflecting the strong desire by the medical professional community to see more tangible progress towards environmentally sustainable practices in their field, the Australian Medical Association and medical networks like Doctors for the Environment Australia have advocated strongly for the **establishment of a national Sustainable Healthcare Unit** similar to the Sustainable Development Unit (SDU) in England to drive sustainable outcomes and coordinate efforts with state and territory health departments.[46]

44 Australian Medical Association, Position Statement on Environmental Sustainability in Health Care, 20 Mar 2019.

45 South Eastern Sydney Local Health District Sustainability Plan 2019-21

46 Australian Medical Association, Position Statement on Environmental Sustainability in Health Care, 20 Mar 2019; Doctors for the Environment Australia, Net Zero Carbon Emissions: responsibilities, pathways and opportunities for Australia's healthcare sector, Dec 2020.

DRIVERS OF CHANGE CONT.

The NHS's Sustainable Development Unit and 'Net Zero' emissions targets

The SDU was set up by the NHS in 2008 to meet the agency's commitments under the UK Climate Change Act.

The NHS was one of the first national healthcare organisations to measure the sector's Scope 3 supply chain carbon emissions (i.e. those that occur as a consequence of an organisation's activities, but from sources not owned or controlled by the organisation) in 2008. It was also one of the first to recognise that it was impossible to achieve its carbon reduction targets without also working to achieve a significant reduction in its supply chain emissions. These assessments now constitute the longest-running effort to quantify healthcare-related emissions in the world.[47]

This unit has helped reduce healthcare emissions by 18.5%, water use by 21% and 85% of waste in 10 years.[48] It has estimated that the savings from energy measures alone have saved the health system £1.85 billion since 2007, and with investment levels maintained at then-current rates would return a cumulative saving of £6.2 billion by 2025 against a business-as-usual case.[49] Substantial further savings have also been made in waste, water, transport and procurement.

With plastics so prevalent in the healthcare supply chain (22.7% of NHS waste is plastic, making it a bigger generator of plastic waste than most industries), the SDU identified the plastic challenge as one of their top priorities.[50]

In October 2020 the NHS became the first national health system in the world to make a commitment to achieving net-zero emissions, specifically:

- A net zero direct carbon footprint (emissions they control directly) by 2040, with ambition to reach an 80% reduction from 2028-2032
- A net zero carbon footprint 'plus' (emissions they can influence, including through its supply chains) by 2045, with ambition to reach an 80% reduction from 2036-2039

This was announced with a plan outlining the interventions required to achieve the net-zero ambition.

The NHS contracts with over 80,000 suppliers. The non-medicines supply chain alone -- including medical equipment, food and office goods -- makes up 42% of the NHS's carbon footprint. It uses its considerable purchasing power to reduce this carbon footprint including through:

- More efficient use of supplies
- Low-carbon substitutions
- Product innovation
- Ensuring suppliers are decarbonising their own processes

In November 2020 it was announced that the SDU would be transitioning to the new Greener NHS national programme, led by the NHS's first Chief Sustainability Officer, with an expanded remit and capacity focusing on net zero healthcare and the broader sustainability agenda. The NHS has committed to no longer deal with suppliers that do not meet or exceed its commitment to net zero emissions by 2030.

47 Tennison et al, 2021, Health care's response to climate change: a carbon footprint assessment of the NHS in England, The Lancet Planetary Health, Vol 5, Issue 2, E84-E92

48 Sustainable Development Unit, Natural Resources Footprint, 2018

49 Sustainable Development Unit, Securing Healthy Returns: Realising the financial value of sustainable development, 2016

50 Sustainable Development Unit, Single Use Plastics (Accessed 16 Feb 2021)

DRIVERS OF CHANGE CONT.

Rise of sustainability and traceability standards

Having confidence in the provenance and integrity of input materials is particularly important in the healthcare sector where many of these products have strict performance requirements to safeguard patient care and safety.

In addition, confidence that waste collected for recycling is actually being recycled is also vital to imbue confidence in any recycling program.

The international voluntary standard **ISO 116074** addresses traceability requirements of materials included in the primary packaging of medical devices. Additionally, ISO 11607 requires that the source, history, and traceability of all materials, including recycled materials, are known and controlled to ensure that the finished product will consistently meet its requirements.

The Association for the Advancement of Medical Instrumentation has also developed an industry standard **ISO TIR 65:2015** focusing on the sustainability of medical devices. The association suggests that non-sterile medical packaging poses fewer challenges to incorporating recycled materials, while the most viable options for using recycled content in sterile barrier packaging may be from in-process re-grind (that is, involving using material from the same lot, making it traceable).[51]

Technologies such as **GPS tracking** and **blockchain** are also presenting new opportunities to go beyond the tracking of hazardous waste, to allow the tracking of supply chains from end-to-end. This would enable participants to identify, for example, where leakages and uneven value distribution are occurring across the supply chain, and to more effectively close the loop on these materials.

51 Healthcare Plastics Recycling Council, Circularity for Healthcare Plastics: The Challenges and Opportunities

DRIVERS OF CHANGE CONT.

Rise in circular procurement approaches

Circular procurement can be defined as procurement that stimulates and creates demand for goods that contribute to the circular economy.[52]

These generally entail designing out 'linear economy' or unsustainable products and approaches, and preferencing approaches that offer better long-term benefits and growth prospects from the economic, environmental and innovation perspectives.

Examples of approaches to circular procurement include:

- **Circular procurement criteria** targeting product specifications such as recyclability and recycled content.
- **Performance-based tender specifications** to encourage take-up of circular products while mitigating the risks to consumers of the procurement not meeting its objectives.
- **Tender specifications and incentives that encourage innovation** to drive new circular economy products and services. These may be products that are newly commercialised, or that will be developed as a result of the procurement process (such as building components made of recycled plastic and textiles). This approach leverages the procurer's ability to drive innovation in the market for better future value, for both the procurer and the economy at large.
- **Consideration of alternative service models that maximise resource efficiency** for the broader economy, such as shared use, buy-per use, leasing and other more resource-efficient solutions.
- **Place-based procurement strategy** that takes advantage of industrial symbiosis and circular ecosystems in a specific locale. This approach is most suited for larger developments that call for commitment from different stakeholders in creating networks where the waste from one actor would be used as a raw material for another. Examples include construction sites that reuse demolition waste, agribusiness precincts, or factories powered by energy from waste produced by other local industries.

Recycling is one of the most common themes of circular procurement, whether it is increasing the use of recyclable products, or encouraging recycling. For instance, there is growing interest in increasing both recyclability of materials, and the use of post-consumer resin (PCR) content in medical packaging in some markets, including Norway, Sweden, Denmark, and the UK. As EU customers continue to push for more packaging recyclability and the inclusion of PCR content in new products, it is expected that this will eventually become formalised in EU recycling legislation.[53]

52 Green Deal, Circular Procurement, 2013

53 Healthcare Plastics Recycling Council, Circularity for Healthcare Plastics: The Challenges and Opportunities

DRIVERS OF CHANGE CONT.

Performance based contracts as a tool for the circular economy

Performance-based contracts – whether for waste services or healthcare supplies – are a starting point for more circular procurement. This links bonuses or penalties for the supplier to its performance, according to standards specified in the contract itself. This de-risks the procurement for the hospital and incentivises performance by the vendor.

Examples include performance guarantees of targeted reductions in general waste going to landfill and increased amounts of waste being recycled. Contracts can be structured to operate in a similar way to energy performance contracts.[54] NSW public hospitals can also access low-interest Government Financing Facility (GFF) loans to help fund investment in eligible sustainability projects. The savings from these projects can then be used to help repay these loans.

The fact that the risks and benefits are shared are also a powerful tool in the procurement toolkit. For example, the Batesville school district in Arkansas (US) used the annual savings of nearly $100,000 from their energy performance contract – including from their solar energy installation -- to pay for the project costs and generate additional savings. A portion of the savings was given back to teachers as pay raises, and to attract and retain employees.

For the healthcare system, the cost savings could be reinvested into patient care, staff resources and other initiatives valued by staff, thereby creating further incentives to recycle.

54 Energy performance contracts (EPCs) are a low-risk way of implementing energy and water efficiency projects. EPCs differ from traditional price-driven contracting. It is results-driven based on the quality of performance, energy cost savings and emissions reduction. The energy provider provides some or all of the following services: identify and evaluate energy-saving opportunities, develop solutions, manage the project, arrange for financing if required, train staff, provide ongoing maintenance, and provide guarantees for both consumption and cost savings to cover all project costs, usually over a contract period of 7 to 15 years.

CHAPTER

Seven

Opportunities for better circularity in hospital plastics

Developing pathways for circular supply chains

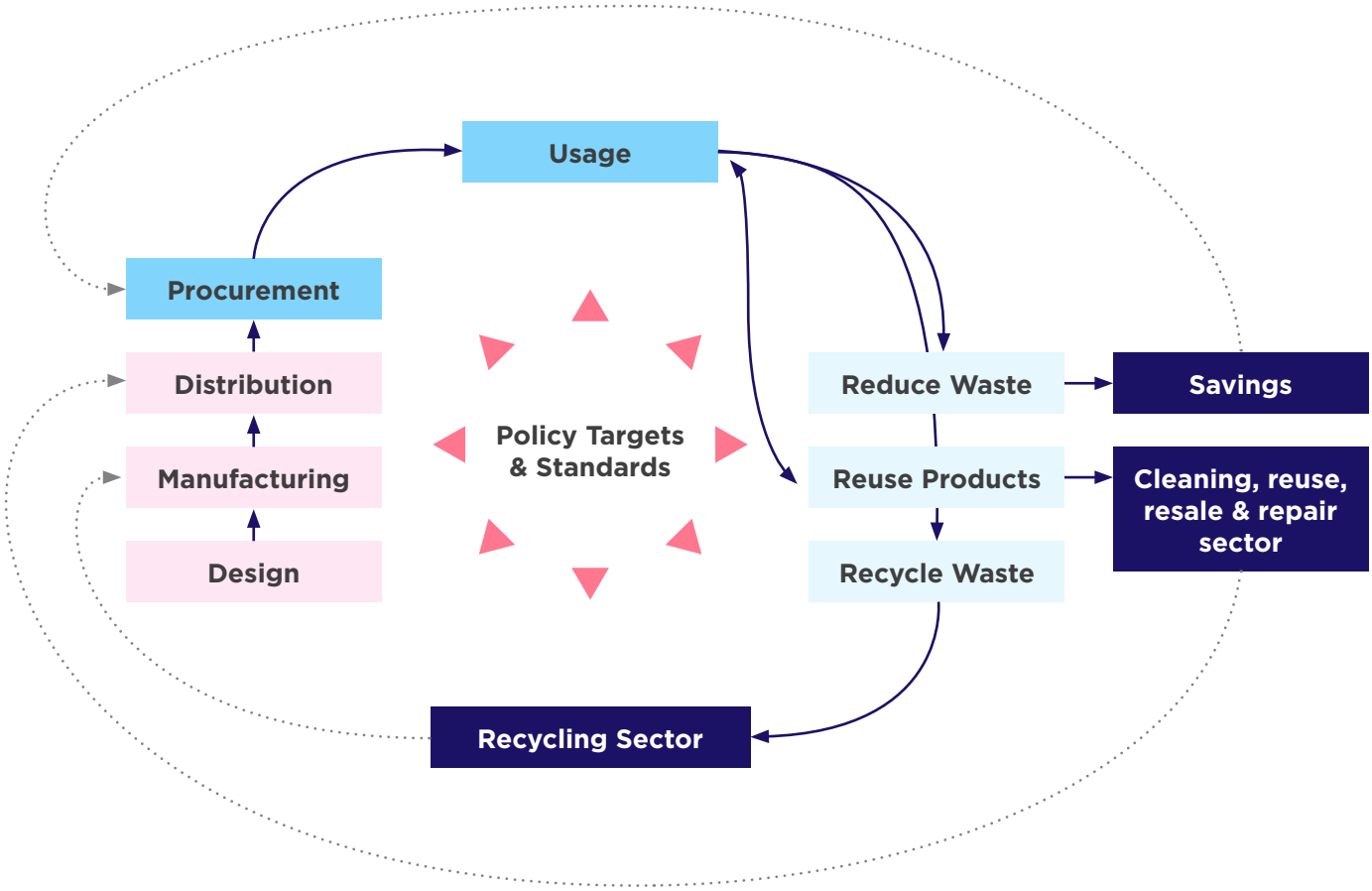
There are significant opportunities for unlocking economic value through more circular supply chains.

Circular supply chains would create clear pathways for the healthcare industry, policymakers and industry participants to capture and recirculate the large volumes of healthcare plastic waste in the environment.

These pathways would enable a more efficient and effective transition towards lower-carbon, higher-value and lower environmental impact alternatives, and in doing so create new economic opportunities and improve supply chain resilience.

Figure 13 illustrates what these pathways would look like; how policy, targets and standards could drive system-wide transitions; and the key sectors that would benefit from greater circularity.

Figure 13: A circular supply chain



OPPORTUNITIES FOR BETTER CIRCULARITY IN HOSPITAL PLASTICS CONT.

The key outcomes that should be aimed for in the transition to circular healthcare plastics supply chains would be:

Savings This can be achieved through reduced waste management costs and potentially even revenue from plastics waste sold to recyclers. There is potential to explore shared benefits mechanisms, for example, free collection of recyclables by recyclers in return for consistent volumes of high-grade plastics, and reinvesting savings into patient care and staff resources.

Economic value creation by increasing the productivity of the material over its lifecycle, resulting in:

- Creation of new jobs and economic activity in cleaning, maintenance/repair, recycling, manufacturing and supply chains
- Greater supply chain resilience through more diversified, innovative and stronger supply chains

Environmental benefits Direct benefits can be achieved through reduced emissions from reduced waste. The reduced use of virgin materials will also reduce resource depletion and emissions generated through supply chain activities. This will have the benefit of contributing to decarbonisation of healthcare activities and progress towards net zero emissions targets.

Figure 14 illustrates the program logic for developing and implementing such pathways in the healthcare sector. This could apply to either individual healthcare institutions or the whole sector. Optimally, these would be guided and driven by whole-of-government efforts and targets for circular supply chains and net-zero emissions (including Scope 3 emissions) from the health sector.

OPPORTUNITIES FOR BETTER CIRCULARITY IN HOSPITAL PLASTICS CONT.

Figure 14: Program logic for developing circular, net-zero healthcare supply chains

PROGRAM AIM
To develop circular, net-zero healthcare supply chains

Inputs

- Senior level leadership
- Clear targets and objectives
- Embedded in strategic direction and enabling policy
- Clear responsibilities & reporting
- Budget and resourcing

Activities

Procurement & usage

- Stocktake of products, materials and modelling of emissions across supply chains
- Identifying and implementing interventions in the products that offer the highest financial and environmental savings, shared benefits, and lowest costs/risks, from transitioning towards circular supply chains
- Budgeting and procurement decisions incorporate lifecycle costs and benefits, and opportunities for catalysing local industry activity, jobs and innovation

Reduce, reuse & recycle

- Staff engagement & education
- Behavioural interventions, e.g. making it convenient to recycle
- Trials of standardized collections of high-volume, high-grade plastics
- Infrastructure to manage materials being collected

Coordination & responsibilities

- Senior leadership as sponsors
- Staff with dedicated responsibility to drive initiatives
- Designated unit to drive/ coordinate outcomes & report on progress
- Accountability across whole of government

Outputs

Procurement & usage

- Plan for circular supply chains for priority target areas and products is developed and implemented
- Reduced rate of general and clinical waste volumes (standardized by activity levels)
- Reduced reliance on high-carbon products and supply chains
- New and competitive low-carbon services and products being offered in supply chain

Reduce, reuse and recycle

- Stakeholders are aware of, and have confidence in, the value of these activities
- Steady volumes of high-grade plastics being recycled
- Standardised collections of high-volume PP and PE across the public health system

Coordination & responsibilities

- Regular reporting and data dissemination on progress
- Publicly released data on waste

Impacts

Procurement & usage

- Procurement savings over multiyear period from reducing reliance on single use items
- Waste cost savings from reduced clinical and general waste volumes, and increased recycling volumes
- Reduced emissions and waste volumes
- Increased flow-on supply chain activity, jobs and innovation as a result of interventions

Reduce, reuse and recycle

- Savings/revenue from consolidated, clean streams of high-grade plastics being recycled

Coordination & responsibilities

- Data collected and communication of outcomes allows for effective feedback loops, evaluation to inform improvements, and further scaling up

Outcomes

Savings

- Reduced medium to long term procurement costs
- Reduced medium to long term waste management costs

Economic value creation

- Reduced long term/ product lifecycle costs
- Increase in jobs and growth in supply chains
- More diversified, innovative and stronger supply chains

Environmental benefits

- Reduced emissions from waste & waste management
- Reduced resource depletion through the substitution of high-grade recycled plastics
- Reduced energy, water use and emissions

OPPORTUNITIES FOR BETTER CIRCULARITY IN HOSPITAL PLASTICS CONT.

Some of the interventions that can be considered in developing circular healthcare plastics supply chains are set out below.

Product design and manufacture

Interventions by manufacturers can include:

- **Designing products with regard to their lifecycle impacts**, including designing for reduced waste and increased sustainability.
- Based on these impacts, work towards a **plan for reducing them**. Options could include the use of reverse logistics to reduce freight emissions, waste reduction initiatives, and the use of more sustainable alternative inputs.
- **Providing product specifications, labelling and traceability** to enable informed decisions by procurers.
- **Reducing the variety and complexity of plastic materials used in healthcare.** Hospitals and manufactures can partner to streamline the types of plastics entering the healthcare market so less detailed sorting is required for recycling these materials.

Budgeting and Procurement

Interventions by budgeting and procurement decision-makers can include:

- **Identifying priority areas for action**, for example through:
  - Undertaking a stocktake of high-volume products going into waste streams, their component materials and recyclability
  - Performing a breakdown of the sector's carbon footprint (including Scope 3 emissions) to identify priority areas for action
- Based on these priority areas for action, **identifying interventions** in areas that offer the highest financial and environmental savings, shared benefits, and lowest costs/risks, from transitioning towards circular supply chains
- **Policy objectives and targets:** Collective accountability in setting targets, standards and responsibility for managing the design, consumption and end-of-life of plastic products
- **Integrating circular economy principles in budgeting**, including assessing medium to long term savings from circular supply chains, and incorporating lifecycle costs and benefits, as part of the budgeting process
- **Integrating circular economy principles in procurement**, including:
  - Driving opportunities to catalyse local supply chain activity, jobs and innovation
  - Requiring more sustainable (or no) packaging that can be easily recycled
  - Standardising the materials being procured, so they can be more easily recycled
  - Requiring suppliers to provide information on the material (and recycling options) in product specifications and labelling

Reducing and reusing consumable products

Reducing the unnecessary use of items often has the most direct positive impact on savings and the environment. Phasing out single-use plastics (i.e. transitioning to reusable items) can be more expensive upfront, but the true cost can only be evaluated by comparing their lifetime use costs (including cleaning, sterilising and maintenance costs) with the alternative single-use items. Therefore, their return on investment often needs to be assessed over a multi-year period.

Interventions by hospitals (consumers) can include:

- **Behavioural interventions** to 'nudge' unnecessary use of products
- **Phasing out single-use products** where competitive sustainable substitutes already exist
- **Designing incentives for behaviour change**, such as shared benefits from cost savings where savings are reinvested into patient care, staff benefits and other resources

OPPORTUNITIES FOR BETTER CIRCULARITY IN HOSPITAL PLASTICS CONT.

Both reducing and reusing products would generally have positive environmental impacts. However, the ongoing financial and environmental costs of cleaning and maintaining the items need to be factored in.

In terms of flow-on economic impacts, increased reuse would be expected to increase activity in cleaning and maintenance/repair and reduce activity in landfilling.

Recycling

To address the prevailing situation of fragmented recycling efforts resulting in lack of scale and large variations in recycling efforts, regulatory certainty, standardisation and consistent terminology and requirements across different healthcare districts, facilities and policies are needed.

Interventions can include:

- **Piloting and scaling up plastics recycling trials** across hospitals and local health districts, to achieve sufficient economies of scale, focusing on high volume, low-risk materials as a start.
- **Consider the options of different models of recycling management (e.g. district-based or centralised models)** to assess which offers the highest economic and environmental benefits. The benefits of greater economies of scale from consolidating recycling services should be considered, as should the risks and costs of increased long-distance transport of waste and mitigating actions such as the use of backhaul as a means of transporting recyclables to sorting and processing facilities.
- **Mapping material flows across hospital spaces to help identify optimal disposal configurations.** The Healthcare Plastics Recycling Council has some useful resources and tested solutions to assist in this.[55] This can be instructive in evaluating the best collection options for the volumes, locations and types of plastic waste generated. For instance, mixed plastics are easier to collect but have lower residual value. Source separation of different plastics is preferred, but if this is not feasible, then assessments of which mixed plastics can be collected together and still effectively recycled should be considered.
- **Address space constraints for waste collection through on-site or mobile compactors or balers** to compress plastic waste, making it easier to store and transport. Longer term solutions include facility planning to ensure appropriate infrastructure is incorporated in the building design at the outset. This would involve not just incorporating enough space in key disposal points like medication rooms, sluice rooms, waste storage and loading docks. It would also include looking at the optimal layouts, locations and collection equipment to make it easy for staff to comply.
- **Greater harmonisation of procurement, recycling and education practices** to address the lack of consistent definitions and understanding, including on clinical and hazardous waste, between hospital staff and waste services, and across different hospitals.
- **Periodic review of healthcare waste management regulations and guidelines** to ensure they remain up to date with international best practice and community expectations.

55 Healthcare Plastics Recycling Council, Space Guidance for Hospitals (Accessed 23 Feb 2021)

OPPORTUNITIES FOR BETTER CIRCULARITY IN HOSPITAL PLASTICS CONT.

Success factors

Experience from the NSW Circular demonstration project and other similar schemes both in Australia and internationally indicate that there are several critical success factors in implementing circular plastics supply chains in healthcare systems:

Leadership Executive and departmental prioritization and support sends a clear message to management, staff and the general public that this is a priority, validates the work of staff.

Engagement and internal buy-in, especially from infection control, procurement, environmental services and facilities managers.

In-house champions within each stakeholder group to assist with training, audits, and reinforcing effective collection

Embedding new norms and processes All stakeholders should have a common understanding that behavioural change is a process, and it takes time to identify and replace existing norms and making it easy and convenient to do so without impacting patient care.

Confidence Staff must feel confident that their recycling waste is making a difference and is not cost-prohibitive. Change can be difficult and reinforcing confidence among stakeholders of the benefits of recycling and showcasing successes helps.

Keep it simple Collection must be simple for clinical staff participation, recommended starting with one item to demonstrate success in diversion.

Conclusion

The success of the circular supply chain is dependent on the success of all parts of the system.

While policies and initiatives at the hospital level are essential, other requisite enablers are reliable information flows on the volumes and quality of plastics available for recycling, favourable demand for recycled products, communication of outcomes, and the sharing of benefits with all participants in the system.

The increasing use of other enabling technologies such as artificial intelligence and tracing technologies will also become increasingly important in making supply chains and related logistics smarter, more reliable and more efficient over time.

Collectively, these enablers will help create and sustain growth in the new and existing industries that will underpin Australia's circular economy.

APPENDIX

One

NSW Public Health Waste Management Requirements

In NSW, hospital waste must be managed in accordance with a range of regulations and standards, including the **Protection of the Environment Operations Act 1997** and subsidiary regulations.[56]

NSW Health's Policy Directive on Clinical and Related Waste Management for Health Services sets out guidance on how specific waste streams must be managed. It also explains and provides examples of what constitutes clinical waste. These can be classified into anatomical, sharps, cytotoxic, pharmaceutical, radioactive and other clinical waste (including pathology waste).

In most cases, incineration is the preferred treatment method for clinical waste. In some instances, autoclaving and shredding are also allowed. Notwithstanding this, there are areas where this guidance could be updated to avoid any uncertainty, for example, where ampoules are listed under "Clinical Sharps Waste" in this guidance without specific mention of whether they are glass or plastic.

The **NSW Government Resource Efficiency Policy** requires annual reporting by government organisations (including health organisations) on the waste performance of the top three waste streams by cost and volume. For the health cluster, the top three waste streams are general waste (going to landfill), clinical waste and recycling.

The **NSW Health Resource Efficiency Strategy 2016-23** further commits NSW Health to stabilising waste generation in the top three streams and driving growth and innovation in the market for recycled and sustainably sourced material, although the actions under this commitment focus on construction and general office supplies.[57]

Every health service in NSW is required to establish a Waste Management Committee and ensure all facilities/services are covered by a Waste Management Plan. Local Health Districts (LHDs) have responsibility for coordinating this. Recycling strategies must be outlined in the Waste Management Plan.

56 Under the NSW EPA's Waste Classification Guidelines (2014) clinical waste refers to waste related to clinical activity that has the "potential to cause injury, infection or offence, and includes waste containing any of the following: human tissue (other than hair, teeth and nails), bulk body fluids or blood, visibly blood-stained body fluids, materials or equipment, laboratory specimens or cultures, animal tissue, carcasses or other waste from animals used for medical research; but does not include any such waste that has been treated by a method approved in writing by the Director-General of NSW Health".

57 NSW Health, Resource Efficiency Strategy 2016-23

APPENDIX

Two

NSW Government procurement guidance on evaluating sustainability

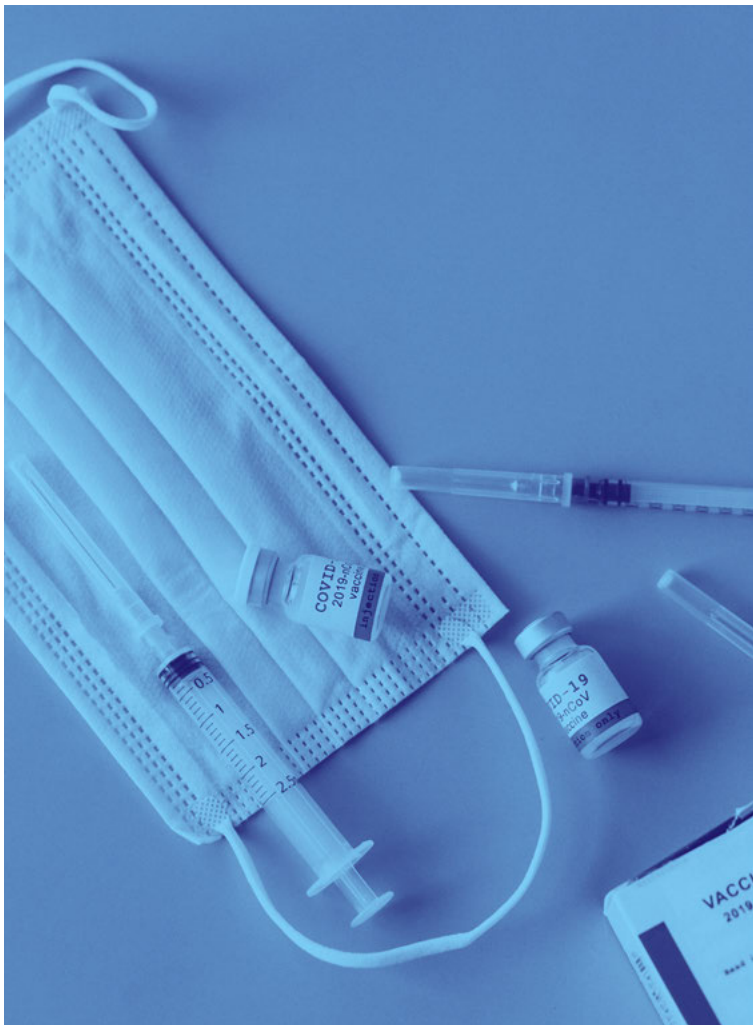
The NSW Government's Procurement Board directive, Procurement (Enforceable Procurement Provisions) Direction 2019 issued under the Public Works and Procurement Act 2019 sets out the following requirements for assessing whether a procurement represents value for money.

In determining whether a procurement represents value for money, a government agency is to have regard to the following matters (as the government agency considers relevant to the procurement):

a) the financial and non-financial costs and benefits of making the procurement,
b) the quality and quantity of the goods or services,
c) whether the goods or services are fit for purpose,
d) the tenderer's relevant experience and performance history,
e) the environmental sustainability of the proposed goods and services (such as energy efficiency, environmental impact and use of recycled products),
f) the whole-of-life costs of the goods or services, including the following (if relevant):
    i. the initial purchase price of the goods and services,
    ii. maintenance and operating costs,
    iii. transition-out costs,
    iv. licensing costs,
    v. the cost of any additional features procured after initial procurement,
    vi. consumable costs,
    vii. disposal costs[58]

This directive informs the **NSW Government Procurement Policy Framework**, which sets out the following guidance for sustainable procurement:

> **Sustainable procurement focuses on spending public money efficiently, economically and ethically to deliver value for money on a whole of life basis. Sustainable procurement extends the assessment of value for money beyond the sourcing process, considering benefits and risks to the organisation, the community, the economy and impacts on the environment.**



58 Procurement (Enforceable Procurement Provisions) Direction 2019 Part 1, 3(2)

NSW GOVERNMENT PROCUREMENT GUIDANCE ON EVALUATING SUSTAINABILITY CONT.

Selected guidance in relation to the circular economy aspects of sustainable procurement are listed below.

Relating to[59]	Procuring entities in NSW Government
Resource efficiency and waste reduction	**Must** comply with the Government Resource Efficiency Policy (GREP) by ensuring goods, services and construction projects meet minimum energy, water use and air emissions standards. An exception applies for agencies with fewer than 100 employees, when compliance is voluntary. **Should** purchase construction materials with recycled content; copy, stationery and print publication paper with post-consumer recycled content; and non-recycled paper from sustainable sources. **Must** use E10 and biodiesel blends where possible, unless there is a clear operational requirement that precludes the use of biofuels. **Should** consider the product lifecycle when conducting needs analysis and developing product specifications, including taking account of circular economy principles, so that use of recycled materials and disposal or repurposing of goods or assets is planned into the procurement process.
Creating a new procurement arrangement	**Should** consider the product lifecycle when conducting needs analysis and developing product specifications, including circular economy principles, so that reuse, repurposing, recycling and/or disposal of goods or assets is planned into the procurement process.
Tender documentation	**Must** include all known environmental management requirements in tender documentation, including any project specific requirements such as recycling and reuse of materials, minimising waste, and/or using resources effectively. Among the factors that should be considered, if relevant, when assessing value for money, are: • the environmental sustainability of the goods or services • the whole of life costs of the goods or services.
Contract requirements	**Must** incorporate supplier SME and sustainability commitments and reporting obligations into applicable agreements and/or contracts, for contracts over $3 million. **Must** monitor supplier compliance with SME and sustainability commitments made in response to the SME and Sustainability Criteria, including monthly reporting, as part of contract management activities.

59 Some of these requirements relate to different eligibility thresholds, for instance, contracts above a certain threshold value.

NSW GOVERNMENT PROCUREMENT GUIDANCE ON EVALUATING SUSTAINABILITY CONT.

Relating to[60]	Procuring entities in NSW Government
Managing the lifecycle of goods and assets	The *Public Works and Procurement Act 1912* defines procurement as a process that includes the disposal of goods that are unserviceable and no longer required. Accordingly, any Board Direction or policy that refers to procurement also applies to the conduct of disposals. **Must** ensure that disposals are approved by the appropriate authority and that due process and disclosure is undertaken, including: • complying with the agency's authority to conduct the disposal • disposal specifications and requirements are disclosed equally to all suppliers invited to quote, if required • supplier selection evaluation criteria are established prior to receiving quotes • proper processes are followed for managing market requests and for receiving and opening quotes. **Should** consider the product lifecycle when conducting needs analysis and developing product specifications, including circular economy principles, so that reuse, repurposing, recycling and/or disposal of goods or assets is planned into the procurement process. **Must** ensure any disposal or repurposing is consistent with environmental and waste management legislation, regulations and policies.

Source: NSW Procurement Policy Framework (Oct 2020)

60 Some of these requirements relate to different eligibility thresholds, for instance, contracts above a certain threshold value.

NSW
Circular