Final Project Submission Form

Health Service:	**Department:**
Peter MacCallum Cancer Centre	**Research & Pathology Labs**

Title of project:
Repurposing Icepacks for Community Benefit

Introduction

Provide a short introduction about yourself, your project, and why you were inspired to create sustainable environmental change in your department.

This project was created in collaboration with the Laboratory Manager, Senior Research Assistant/Green Champion and Laboratory Technician/Store Manager. Our project focused on addressing the environmental impact of over a tonne of ice packs we received through couriers for the shipment of research goods that require cold transport.

The aim of this initiative was to prevent ice packs from ending up in landfill by collecting, sorting, and donating them to various community groups, including Men's Sheds, food charities, and sporting clubs. This effort contributes to promoting a circular economy by extending the lifespan of the ice packs, which are typically single use. Additionally, it helps reduce the production of new products, as well as reduce the energy and greenhouse gas emissions involved in the transportation and supply chain process.

What was the problem you tackled?

These ice packs, once used, would typically end up in landfill, contributing to unnecessary waste and environmental degradation. Additionally, their disposal was part of a larger issue that includes the unsustainable production of such products, as well as the greenhouse gas emissions from their transportation and supply chain processes.

By addressing this, our project aimed to prevent waste, promote a circular economy, and reduce the environmental footprint associated with the disposal of single-use ice packs.

What was your SMART Goal?

Specific:
Collect, sort, and donate at least one tonne of ice packs to community groups (such as men's sheds, food charities, and sporting clubs) instead of letting them go to landfill.

Measurable:
Donate a minimum of 1,500 ice packs (> a tonne) to at least 4 community groups by February 2028.

Achievable:
Senior Research Assistant/Green Champion, Laboratory Technician/ Store Manager, and other research volunteers to sort and deliver ice packs to identified community groups on a bi-monthly basis.

Relevant:
Reduce the environmental impact of ice pack waste and contribute to a circular economy by extending the lifespan of these products, while also supporting local charities and community groups in need.

Time-bound:
Complete the collection, sorting, and donation process within 7.5 months, starting from the 17th of June 2024. Provide quarterly updates on the number of ice packs collected and the community groups reached to all research staff via email and our Research Sustainability Committee "Green Labs".

What system factors contributed to the problem?

Lack of Take-Back System by Suppliers:
The suppliers of research goods, which are shipped with ice packs, do not offer take-back systems or programs. This means that once the ice packs are used, there is no built-in mechanism to ensure their proper disposal or recycling. Without this, the ice packs inevitably end up as waste, often disposed of in landfills, instead of being reused or repurposed.

Cultural Norm of Disposal:
Researchers and staff were accustomed to disposing of the used ice packs as general waste, a practice ingrained over time. Many were unaware of the environmental impact or alternative disposal options, leading to a default behaviour of discarding them without considering reuse or recycling solutions.

Improper Disposal in Biohazard Waste:
In some cases, used ice packs were disposed of in biohazard waste bins, which are reserved for GMO or hazardous waste. This not only increases the environmental impact through incineration, but it also incurs significantly higher disposal costs for the hospital. Biohazard waste disposal is more expensive than general waste, leading to unnecessary financial burden on the organisation.

Absence of a Circular Economy Mindset:
There was a lack of awareness or infrastructure supporting the circular economy within the Research department. Without systems in place to collect, sort, and redistribute the ice packs for reuse or donation, the opportunity to close the loop on the product lifecycle was missed.

Who were the key stakeholders?

Over 300 Research Scientists and Pathology Technicians/Scientists:
The researchers and pathology staff were integral to the success of the project. They received the deliveries of ice packs and played a crucial role in ensuring the packs were disinfected before being placed in their respective donation tubs. Their active participation in the collection process helped ensure that the initiative ran smoothly and that the ice packs were safely prepared for redistribution.

Community Groups:
Several local community groups were key recipients of the donated ice packs, including Men's Shed, food charities, the Basketball Sporting Club, the University of Melbourne Sports Centre, and a local sports bar.

Lab Management Team:
The lab management team was essential in disseminating information about the project. They were responsible for educating and inducting researchers on proper waste management practices, including the importance of the ice pack donation initiative. They ensured that everyone was informed and understood the environmental impact of their actions.

Research Store Manager:
Collected the ice packs from 8 different locations across the department, centralising the collection process and notifying Lab Manager if there were any issues with the logistics of the project.

Lab Manager & Green Labs Eco-Chair:
As the main data recorder, the Lab manager tracked the progress of the initiative, ensured accurate data collection, and coordinated with other stakeholders to facilitate the donation process. They played a critical role in overseeing the project's overall success and was responsible for disseminating information about the projects success and any changes that needed to occur throughout.

Senior Research Assistant and Green Champion:
Led the outreach to external community groups, creating advertising materials to engage local organizations like Men's Sheds, food charities, and sporting clubs. She coordinated the collection of ice packs from the centralised data recording point and ensured they were put to good use by the community.

Loading Dock Team:
The loading dock team was involved in handling the ice pack donations, ensuring smooth logistics when community groups came to collect them. They were kept informed about the donation schedule to ensure everything went smoothly.

Research OHS (Occupational Health and Safety):
Research OHS was consulted to ensure that the educational materials placed on the donation tubs were safe and appropriate. They ensured that the project adhered to safety guidelines, safeguarding both researchers and the receiving community groups.

What was the intervention?

The intervention involved creating a system to collect, disinfect, and donate single-use ice packs that would typically end up in landfill.

What impacts/outcomes were measured? How did you measure them?

The impacts and outcomes measured were the total number of ice packs collected, the weight of the ice packs, and the number of ice packs donated.

To measure these, the ice packs were collected from 8 separate laboratories and centralised to one location by our Research Store Manager. The ice packs were then sorted by type and total numbers of each type were recorded into an Excel spreadsheet by the Lab Manager. This was done for each collection cycle, typically occurring every month or two.

The Senior RA and Green Champion then coordinated the donations to community groups and provided Lab Manager with the total number of ice packs donated, which was also recorded. This tracking method allowed for the measurement of the scale of the initiative and its direct impact on waste reduction and community support.

What challenges did you face? What enablers facilitated the change? What were the learning points?

Challenges

Logistical Coordination:
Collecting ice packs from multiple locations within the department presented logistical challenges, as it required regular coordination between different teams and individuals to ensure the ice packs were collected on time and properly stored for donation.

Engagement and Awareness:
Encouraging researchers to change their habitual disposal practices and ensure proper disinfection of the ice packs before placing them in donation tubs was initially a challenge. Some researchers were used to discarding the ice packs as general waste without considering their potential reuse.

Space and Storage:
Storing the ice packs in a centralised location and ensuring there was enough space for collection and sorting at regular intervals was a logistical hurdle, especially considering the limited storage available in a busy lab environment.

Unlabelled Ice Packs:
Some ice packs had no identifying information, preventing verification of their safety. These were excluded from being collected or donated to avoid any potential risks.

Health and Safety Considerations:
Ensuring that the ice packs were safe to handle and donate required consulting with Research OHS to make sure that the educational materials and processes were appropriate to avoid any health risks to community groups.

Enablers

Support from Key Stakeholders:
The involvement of key stakeholders, including lab management, Research Store Manager, Senior RA, and the researchers, was critical. Their active participation, coordination, and commitment to sustainability made the project more successful and easier to implement.

Clear Data Tracking System:
The creation of a simple yet effective tracking system using an Excel spreadsheet made it easy to measure progress, ensuring the collection, sorting, and donation process was organised and transparent.

Community Partnerships:
The support from local community groups that were eager to receive the donated ice packs helped ensure the sustainability and effectiveness of the initiative, as they were willing partners in the process.

Education and Awareness:
The lab management team's role in educating researchers about the project and the importance of proper waste management helped shift behaviours and encouraged more researchers to participate.

Learning Points:

Behaviour Change Takes Time:
It was evident that changing established habits, such as disposal practices, required continuous education and clear communication. Over time, researchers became more aware of the benefits of donating the ice packs, which helped increase participation. Once information about the ice pack donation initiative was disseminated via word-of-mouth other laboratories like the hospital pathology team joined the initiative.

The Importance of Collaboration:
Successful projects often rely on collaboration across different teams and stakeholders. The synergy between the lab management, researchers, store manager, and external community groups was a key factor in overcoming challenges.

Scalable Solutions:
The initiative demonstrated how relatively simple changes in process (like creating a collection and donation system) could have a significant environmental impact and could potentially be scaled to other departments or organisations.

Health and Safety Considerations Are Essential:
Ensuring that all practices met health and safety standards is crucial when involving external groups. Consulting with Research OHS early on allowed the project to move forward safely, with clear guidelines for both researchers and community recipients.

What are the next steps with this project?

Simplified Sorting and Data Collection:
Continue collecting and donating ice packs but reduce the sorting and detailed data tracking to focus on total counts and weights, streamlining the process and reducing labour.

Ongoing Collection and Donation:
Maintain regular collection cycles (monthly or bi-monthly) and ensure continued donations to community groups, keeping the system efficient and sustainable.

Reduce Labor Involvement:
By simplifying data collection, reduce the labour required per cycle (previously 1-2 hours), making the process easier to manage long-term.

Monitor and Improve:

Periodically assess the simplified process, adjusting as needed to improve efficiency or address emerging challenges.

Engage with Suppliers for Take-Back Systems:
Proactively engage with companies that supply ice packs to explore the feasibility of take-back systems, helping to create a more sustainable circular economy and reducing waste.

Points will be awarded in the following categories:

Environmental sustainability: What were the carbon savings from your project? (Please include your raw data and calculations)

We were unable to obtain LCA information from healthcare LCA website for ice packs however -

The energy required to manufacture and transport ice packs involves multiple stages. The production of materials like polyethylene and the chemicals in the gel is energy-intensive, contributing to greenhouse gas (GHG) emissions, especially when raw materials like ammonia are produced [1]. Transporting ice packs adds further emissions, particularly if refrigeration is needed, as this relies on energy-consuming processes [2]. The freezing and storage phases also require significant energy to maintain low temperatures, amplifying GHG emissions. Each of these steps, from manufacturing to transport and freezing, significantly contributes to the environmental footprint of ice packs [2].

Base off the current process assumptions from the Arctic Express Report [3] we presume the estimate emissions reductions the transportation details of ice pack manufacturing to distributing to the end user for all ice packs we collected and donated is 135.5 kgCO2e (See Excel spreadsheet for raw data/workings). This is likely an underestimation and does not incorporate the transportation to disposal sites as well as potential degradation of cardboard packaging into methane and Co2 within landfill.

Carbon Footprint

Table 4 Current Process vs. AEP Process Carbon Footprint Results

		Current Process	AEP Process	Current Process	AEP Process	Units (/24,000 gel packs)
		16 oz Gel Packs	16 oz Gel Packs	48 oz Gel Packs	48 oz Gel Packs	
Carbon Footprint	Transportation	175.60	0.73	509.50	0.73	kg CO_2-eq.
	Freezer	160.00	9.28	480.00	27.40	kg CO_2-eq.
	Forklift	10.00	0.25	30.00	0.25	kg CO_2-eq.
	Cardboard Waste	53.10	3.80	192.40	3.80	kg CO_2-eq.
	Total	**398.70**	**14.06**	**1211.90**	**32.18**	kg CO_2-eq.

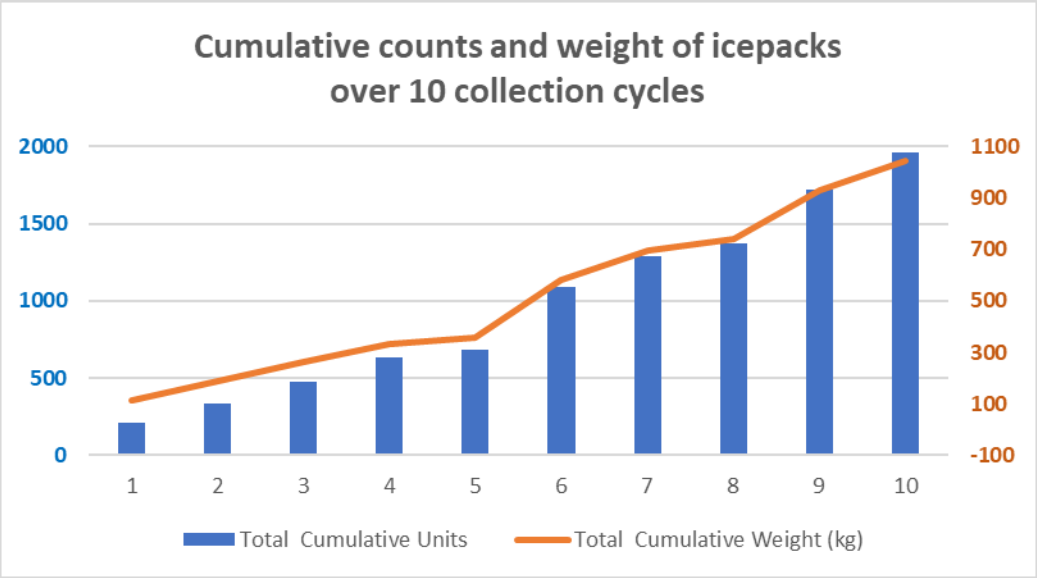
1. https://www.designlife-cycle.com/enviroice-gel-pack?

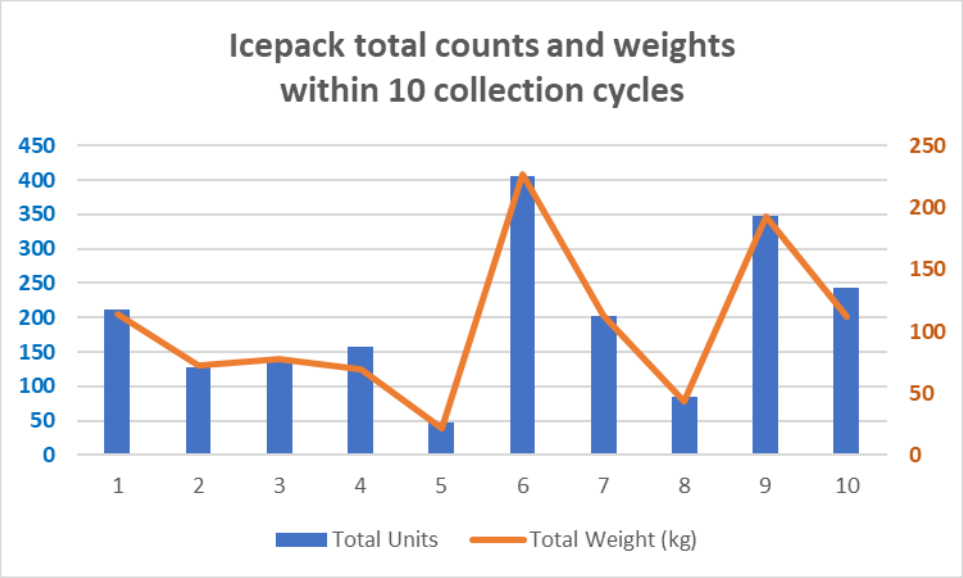
2. du Plessis M, van Eeden J, Goedhals-Gerber LL. Energy and emissions: Comparing short and long fruit cold chains. Heliyon. 2024 Jun 6;10(11):e32507. doi: 10.1016/j.heliyon.2024.e32507. PMID: 38912466; PMCID: PMC11193027.

3. https://arcticexpresspack.com/images/carbon.pdf

Environmental sustainability: What were the waste reductions? (If possible, please specify what waste stream – reduced clinical waste by diverting to recycling, reduced clinical waste by using reusable equipment etc.)

Please see workings attached in Excel format (graphs included).
The total waste diverted from landfill was 1044kg, and 1,964 ice packs in total.





Clinical outcomes: How did your project improve patient care? (include outcome data)

While the ice pack donation initiative hasn't directly impacted patient care yet, it holds significant potential for future use. If underfunded healthcare centres or physiotherapy teams in need of resources were to receive them, they could aid in treating sports injuries or falls by providing immediate pain relief, reducing swelling, and promoting recovery. In rural or community-based settings, these donations could improve initial care for minor injuries, allowing healthcare providers

to focus on more serious cases. Thus, while the direct impact hasn't occurred yet, the initiative has the potential to support better patient outcomes in the future

Financial sustainability: Have there been any financial savings? (please include your calculations)

General waste disposal is not a significant cost to the hospital at an average of 24c per kg. The cost savings estimate for the initiative's duration is $250 in this regard however the total estimate savings to the community and community groups is at least $2,170 as a minimum. Please see workings in Excel spreadsheet provided. This may seem like a drop in the ocean for large corporations or public funded bodies however for community groups it is a significant cost.

Financial Workings

Peter Mac Waste Disposal Cost Savings

General Waste Cost $0.24c p/kg	0.24
Total Weight of Waste	1043.9
Total Waste Disposal Cost	$ 250.54

Estimated Community Cost Savings

	Protecta Chill (28 pack)	Coleman Icebrick	Coleman Brick Large	Thermogard	Nordic Ice	Signet Own	Xice
Online Cost per pack	$ 27.45				$ 16.49	$ 21.29	
Per Unit	$ 0.98	$ 4.99	$ 6.99	$ 1.32	$ 0.69	$ 1.42	$ 0.80
Total Donated	221	104	62	316	199	228	160
Total $ Saved	$ 216.66	$ 518.96	$ 433.38	$ 417.12	$ 136.73	$ 323.61	$ 128.00

Total Savings	$2,174.46

Social sustainability: How did your project socially benefit patients, staff, or wider community?

Many donation collectors were very appreciative and expressed this verbally or through kind gestures/gifts such as home-made jam. A few groups that have collected from us throughout the initiative and the benefits to them include:

1. **Scarsdale Men's Shed (Ballarat)**
The ice packs were used to support the health and comfort of the members, especially those involved in physical activities or projects. In such community-based spaces, ice packs can be crucial for managing minor injuries or heat-related issues during outdoor work. Additionally, these packs may have been shared within the local community, benefiting others in need of cooling relief.

2. **Broadmeadows Basketball Association "Broncos"**
The ice packs directly benefited the players by helping treat common sports injuries like sprains and strains. With approximately 40 ice packs needed each month, they were used to reduce recovery time, manage swelling, and alleviate pain, promoting the overall health and performance of athletes.

3. **Melbourne University Sport**
The ice packs were used to aid student-athletes in managing sports-related injuries. Whether used for treating sprains, strains, or reducing muscle soreness, these ice packs helped ensure students

could recover quickly and stay active in their athletic programs, supporting their overall well-being and engagement in physical activities.

4. Scientifx
While Scientifx is involved in scientific and medical applications, they likely used the ice packs for research purposes, for cooling equipment, or in laboratory settings. In addition, they may have distributed them to community partners or individuals in need, ensuring vulnerable groups had access to basic cooling resources when required.

5. Helping Hands (Tullamarine)
Helping Hands is a food charity, the ice packs were directly utilised for food distribution and have played an essential role in supporting the well-being of those accessing the charity's services.

Generalisability: Could this project be replicated in other areas of the hospital?

Yes, this project could potentially be replicated in other areas of the hospital or healthcare system. The concept of donating ice packs could be extended to different departments such as emergency care, outpatient clinics, or rehabilitation units, where immediate injury treatment is necessary. It could also be useful in community outreach programs or home care services, where resources for minor injury management are limited. By creating partnerships with organisations and charities in these areas, the initiative could help provide cost-effective solutions to manage injuries, promote recovery, and support overall patient care in various hospital settings.

Please attach some photos of you and your team undertaking this project

Good morning Green Champions!

Please see icepack donation poster below and let me know if you have any further feedback for it. As we discussed at our Green Labs meeting on Tuesday this will be one of our entries for the Parkville Sustainability Competition, the details which can now be located here .

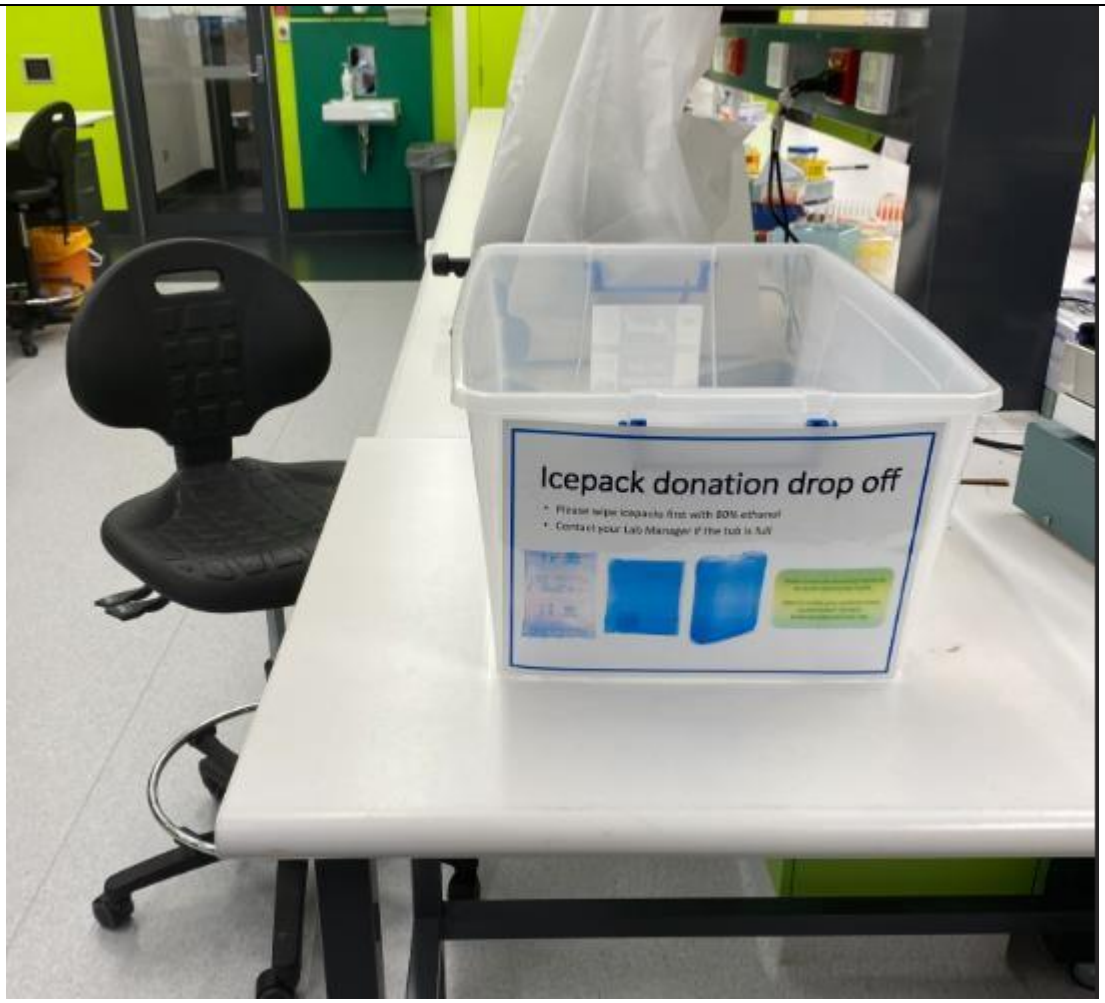
Icepack donation drop off

- Please wipe icepacks with 70-80% ethanol
- Contact your Lab Manager once the tub is full

Green Labs are donating icepacks to local sporting clubs.

Want to make your science more sustainable? Contact Greenlabs@petermac.org

Consultation of poster design with Green Champions emailing list ~54 research staff.



Example of one ice pack donation tub within the lab.

Transportation of centralised collection area to data collection and sorting area.

Art created by the ice packs

Centralised point for sorting and data collection


COLD
GEL PACK
NORDIC
Chill

Thanks for the reminder!

Can Green Labs please contribute this:

Be Water Savvy in the Lavvy

- Green Labs Working Group will be popping up some educational posters in your local loo's as a water reduction initiative. Our calculations show if you use the half flush *(where appropriate), we save 1.5L* of water each time. Doesn't seem like much? If we all do that we **save over 150,000 L per year**! Use the half flush – be water savvy in the lavvy.

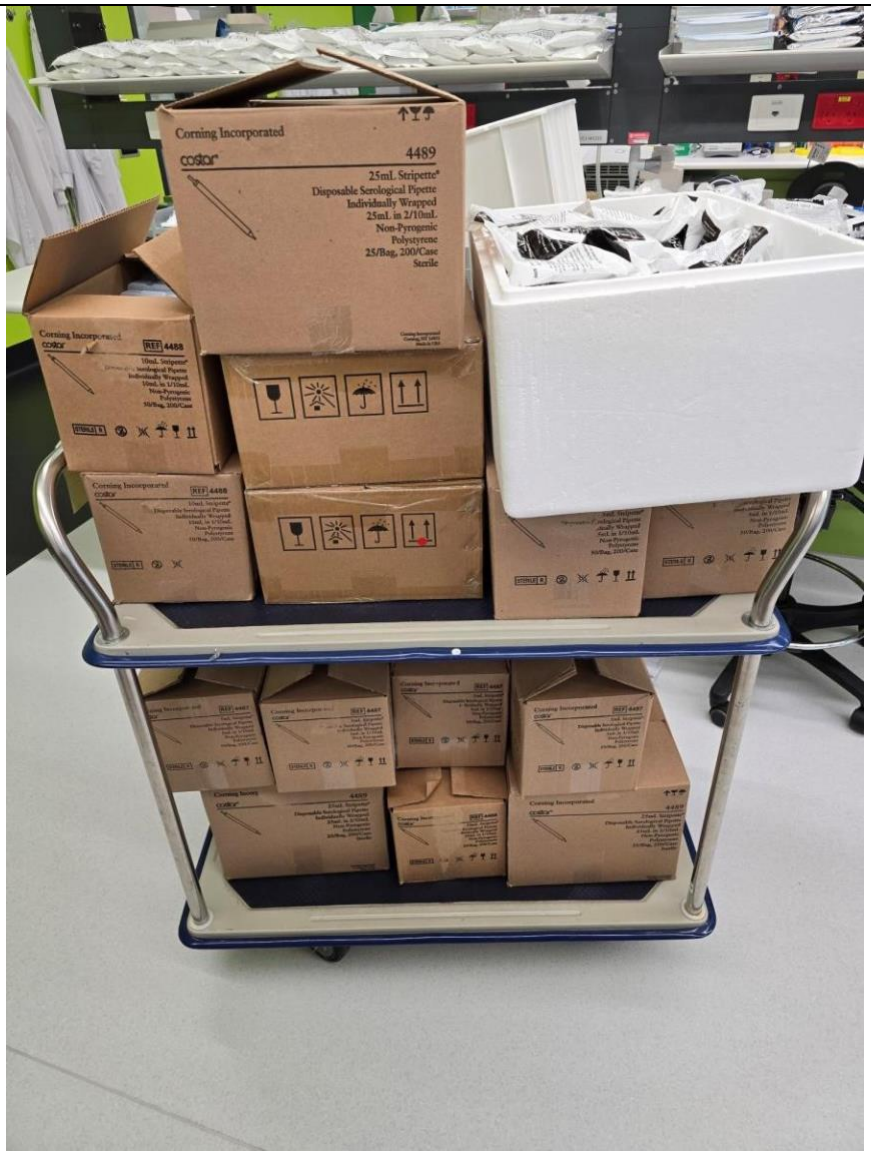
Ice Pack Donations

- Working in the wet lab? We will be collecting as many ice packs as we can from your deliveries to donate to local sporting and community groups. Each Cluster should now have a tub where you can drop off hard and soft ice packs that will be donated, but please make sure you wipe them with 80% ethanol prior to dropping them off. Can't locate the tub? Contact your local Lab Manager or us at greenlabs@petermac.org .

ICE PACK DONATION INITIATIVE

- Green Labs would like to give thanks to all researchers who have been donating their icepacks in their local cluster collection tubs. We have collected over 600 ice packs (~300kg) diverted from landfill which have been donated to various community groups.
- The initiative was also picked up by the Department of Health and will be shared in their next quarterly newsletter to offer inspiration to other hospitals and research institutes. Please continue donating as we'd like to reach 1 tonne diverted from landfill!

Example of communication of progress/update of initiative to all researchers.



Transportation of Icepacks to B2 or B3 carpark area for donation drop off

Scientifix team utilising the donated icepacks in their working area

Ballarat Men's Shed collecting ice packs

Three initiative leads