MACH
Melbourne Academic
Centre for Health

MacHSR Future Leaders Fellowship program
Final reporting (Cohort 3)

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Project title: Reducing consumable resource waste in intensive care using considered purchasing: A quasi-experimental Time-series Study

Report:

Introduction:

The management of consumables in an ICU setting is a balancing act. Having too much, leads to expiration before use, a primary example of low value health care. Having too little leads to care delivery delay. Supply of medical consumables is a complicated system managed primarily by specialised equipment nurses in the Intensive Care setting. Unopened expired consumables place a considerable burden on the healthcare system resulting in both avoidable environmental and financial costs. The aim of this quasi-experimental time series study was to quantify both the financial (dollars) and environmental (grams) burden of expired consumables over 18 months and to evaluate if changes to purchasing structures and redistribution (considered purchasing) could reduce this burden over time.

Research question:
Can reducing and redistributing stock using considered purchasing in the ICU reduce resource waste over 18 months?

Objectives:
Quantify:
1. The number of expired consumables each month.
2. Weight in grams to landfill of the expired consumables.
3. Financial cost of purchase of the expired consumables.

Methods: A quasi-experimental 'simple time-series design' was adopted with 18 months as points of reference in a single centre metropolitan ICU in Melbourne, Australia. This design facilitated the exploration of patterns, in this incidence, resource waste which is the dependent outcome variable. Waste is evaluated in terms of financial cost in dollars and weight in grams. Stage 1 consisted of 6 time-points (months) (pre intervention), stage 2 (intervention period) was 3 months and stage 3 (post evaluation period has 9 reference points. Simple targeted, considered purchasing interventions were adopted to curb waste.

Results: Over the 18 months, a total of 3370 items expired before use, weighing over 61kg and costing over $23,500. However, when broken down into stage 1, 2 and 3, a significant reduction occurred over time. In stage 1 (6 time-points), there were 2035 items to landfill, costing over $14,200. During stage 2 (3 time-points), there were 1012 items expired costing over $6500. However, stage 3 (9 time-points) saw a significant decrease in waste with only 323 items expired, costing approximately $2,650.

There were 560 barcodes prior to intervention. During the considered purchasing intervention period January to March 2025, 160 barcodes were no longer required and removed completely from the ICU imprest list as the primary intervention. Also, 105 barcodes had their MAX levels changed to reflect required usage, meaning less product was ordered each week and left unused on the shelf.

Interward and interhospital transfers were initiated for stock redistribution if the equipment nurse specialists felt the item was in excess or no longer needed. A total of 226 items were sent to other ICUs around Victoria,

saving 8100.5g of waste to landfill. This was priced at $5,555.28 which was not reimbursed from the ICU who received the goods. Internal hospital transfers saved 2119 items from expiring before use, saving 48080.3gms from landfill and saved the organisation $8,649.13. Whilst the financial burden still came from the ICU budget, the health service itself saved over $8000 as the items were used rather than left to expire on the shelf.

Figure 1 is a monthly breakdown of costs for each time point.

Stage	Month	Total items	Total weight	Total cost
1	Jul-24	64	3584.1	$1,888.01
1	Aug-24	897	11620.5	$2,668.14
1	Sep-24	129	3849	$1,819.76
1	Oct-24	159	4322	$3,876.65
1	Nov-24	382	4842	$1,113.86
1	Dec-24	404	11186	$2,915.93
2	Jan-25	465	6176	$1,418.10
2	Feb-25	202	4471.5	$3,971.65
2	Mar-25	345	2841.5	$1,194.00
3	Apr-25	0	0	$-
3	May-25	161	4955	$841.82
3	Jun-25	4	10.45	$50.68
3	Jul-25	9	248.5	$273.59
3	Aug-25	13	508.5	$108.48
3	Sep-25	56	1194	$710.05
3	Oct-25	6	206.5	$36.17
3	Nov-25	60	791.5	$208.35

Figure 2 demonstrates the trend in expired consumables over time.

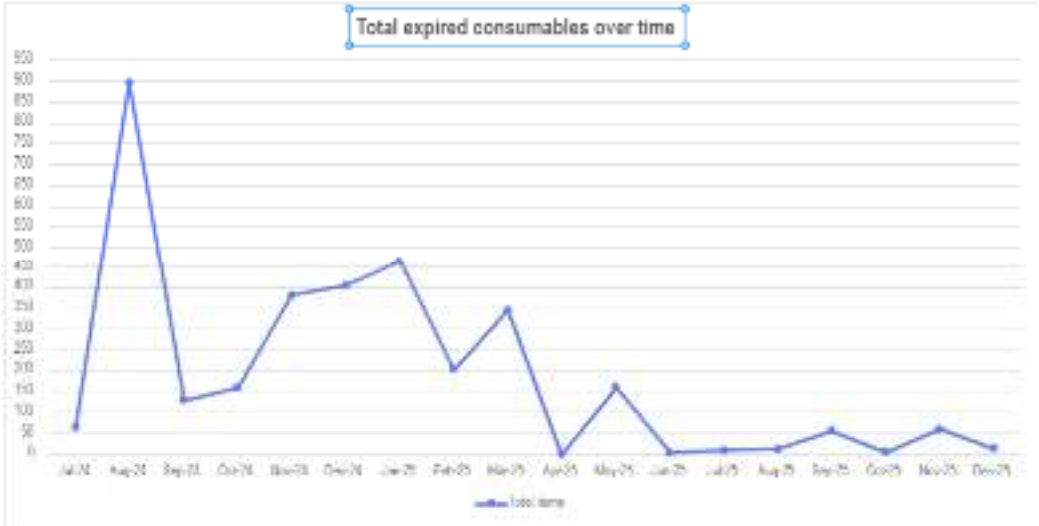
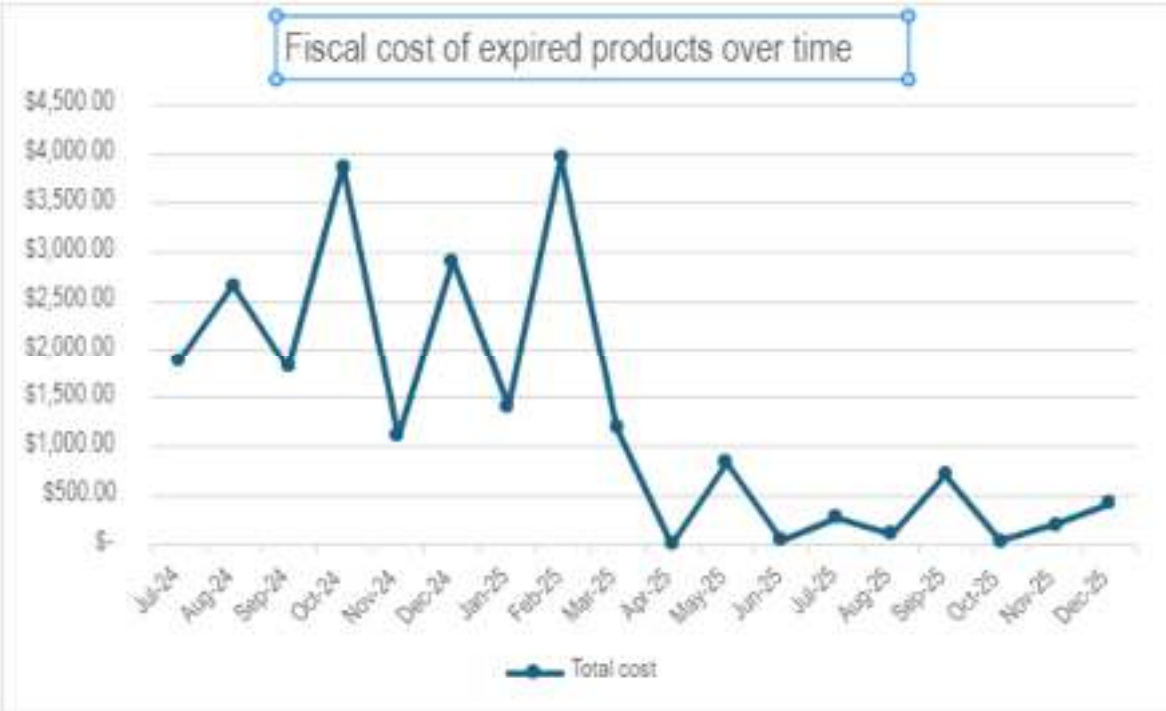


Figure 3 shows the fiscal costs to the health service over time.



Conclusion(s):

The cost of unopened expired consumables places considerable financial and environmental burden on health services. This study showed a significant reduction in the amount of expired consumables and fiscal cost to the health service. It showed the benefits of considered consumable purchasing which has the potential reduce healthcare's environmental footprint if adopted widely.

Other considerations:
Subsequently, this work is in preparation for publication and an abstract submitted to ANZICS for consideration as an oral presentation for the ASM in September. Another paper will also be developed for the second project that was compiled alongside this which looked at resource waste on code and resus trolleys. Whilst this data has been collected, the results are yet to be extrapolated.

The data collected can be used in the future to target specific problem consumables as it has been sorted into "use" categories, for example, wound care products were found as a significant source of waste. This is helping to form the basis of new research into reducing waste of wound products and increasing access to dressings by the introduction of a wound care vending machine. This project is awaiting funding.