

Learning From a Simulated Self-Rostering Trial

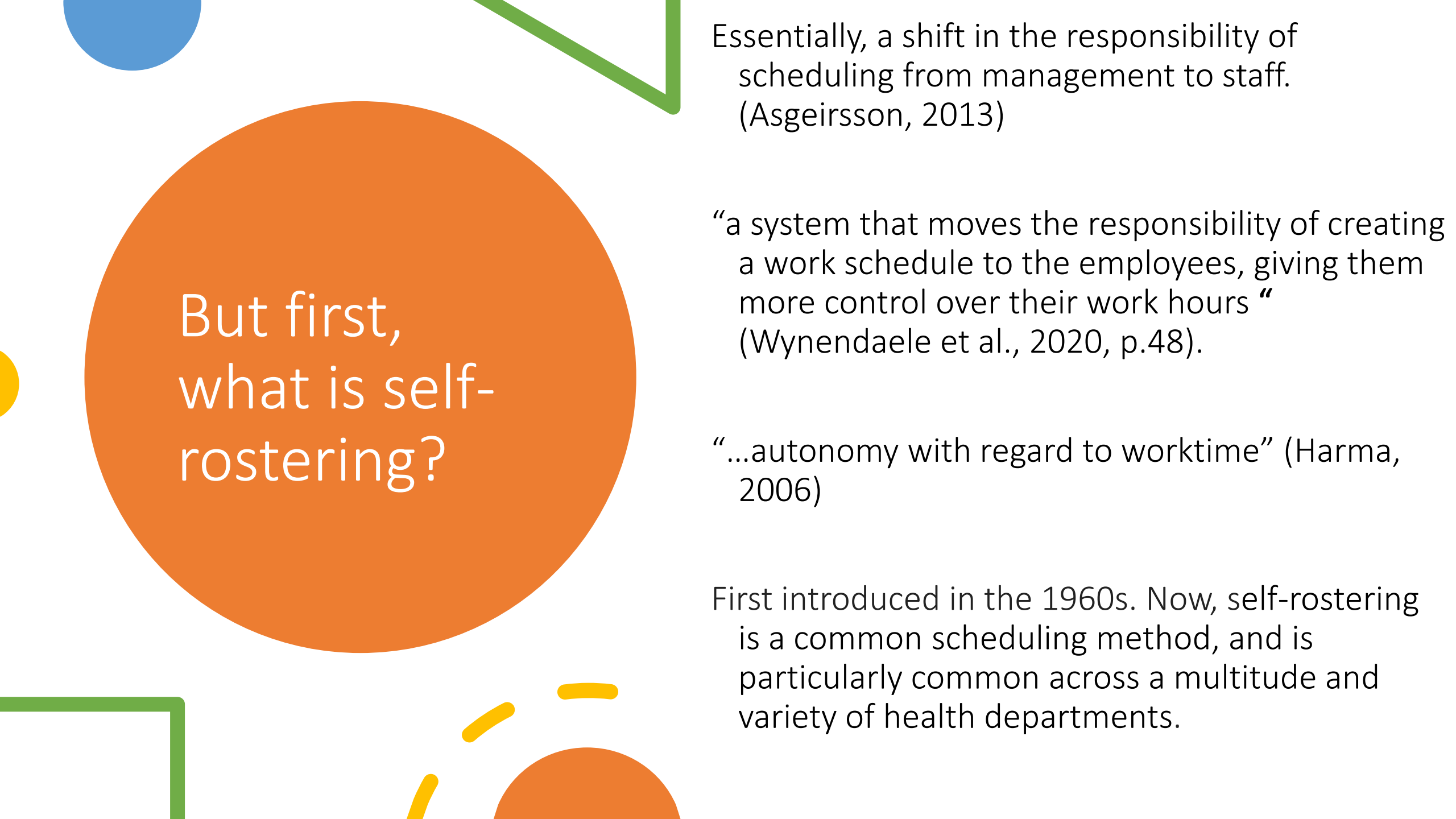
The benefits and challenges for medical imaging rostering – a case study

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Overview:

- Project context
- Research method and CBPAR approach
- The hypothetical rosters:
 - Rostering challenges along the way and modifications
- What did self-rostering look like in our case study?

Mo	Tu	We	Th
	Early MRI 1	Early MRI 1	Early MRI 1
1230 Late	0830 Flouro	0830 Flouro	0830 Flouro-Night C
AL	AL	AL	AL
			0830 Mobiles
	0830 GEN-Night Call		Late MRI 1
0730 CT	Admin	0730 CT	0730 CT
Early MRI 1	Late MRI 2	Admin	Early MRI 2
AL	AL	AL	AL
0700 ED	0700 ED	0830 ED-Night Call	0830 GEN
0800 Flouro	0800 Flouro	Admin	Admin
	1300 CT	1430 Late	1430 Late
			0700 ED
AL	AL	AL	AL
PACS/RIS-CT Call		1300 CT	1300 CT
1430 Late	0830 GEN	0700 ED	
0830 Theatre	0830 Theatre	0830 Theatre-CT Call	0830 GEN
Early MRI 2	Early MRI 2	Early MRI 2	
0830 ED	0830 ED	0800 Flouro	0800 Flouro
	Late MRI 1	Late MRI 1	
0830 GEN-Night Call		Late MRI 2	Late MRI 2
0830 Mobiles	1430 Late	0830 Mobiles	1230 Late
0830 Flouro	0730 CT	0830 GEN	0830 GEN
1300 CT	0830 Mobiles-CT Call		0830 ED-CT Call
	1230 Late	1230 Late	0830 Theatre
0800 GEN	0800 GEN	0800 GEN	0800 GEN
0800 CT	0800 CT	0800 CT	0800 CT



But first, what is self- rostering?

Essentially, a shift in the responsibility of scheduling from management to staff. (Asgeirsson, 2013)

“a system that moves the responsibility of creating a work schedule to the employees, giving them more control over their work hours “ (Wynendaele et al., 2020, p.48).

“...autonomy with regard to worktime” (Harma, 2006)

First introduced in the 1960s. Now, self-rostering is a common scheduling method, and is particularly common across a multitude and variety of health departments.

Benefits of SR in the literature:

- Links to increased staff retention and increased staff morale (Petrovic, 2017).
- Improvements also noted in wellbeing (various metrics) in many healthcare settings studied (Petrovic, S., Berghe, V. 2012).

Rosters produced using self-rostering within e-rostering require fewer post-approval changes and, when changes are made, they break fewer rostering rules (Drake [2014](#))



Project Context

23 participants

- Total staff of 26 - first roster (increased to 27 by second roster)

Current rostering method:

- 14 week-long roster
- One staff member in charge of writing the roster
- ~1 week spent to create each roster
- ~2 hours of formal swaps per week

Department aim for fewer swapped shifts and happier staff.

Methodology

Mixed-methods approach:

2 anonymous surveys: one before the first roster and one after the second iteration.

Focus groups in between the rosters.

Elements of CBPAR approach incorporated throughout.



Why Community-based Participatory Action Research (CBPAR)?

Collaborative Problem-Solving: Using CBPAR allows for collaborative problem-solving, ensuring that the solutions developed are beneficial to all stakeholders.

Informed Decision-Making: CBPAR involves the community in the research process, which can lead to more informed and effective decision-making. Captures insights that may not be obvious to external researchers.

Empowerment and Autonomy: CBPAR itself is rooted in empowering community members, making the approach and the subject matter well-aligned.

Context-Specific Insights: research guided by staff to address their interests and context.

Trust and Credibility: Involving the staff in the research process can increase the trust and credibility of the research findings.

Action-Oriented Outcomes: CBPAR is focused on effecting positive change. This aligns well with the aims of studying and potentially improving a self-rostering system.

Ethical Considerations: Including the voices of those directly affected by the research aligns with ethical best practices.

Iterative Feedback: CBPAR allows for an iterative process where initial findings can be tested and refined in real-world settings, making it particularly suited for the development and improvement of systems like self-rostering.

Building Capacity: CBPAR not only solves immediate problems but also builds the community's capacity for problem-solving, which is beneficial for future challenges.

Resource Optimization: By involving the community, the researchers can identify the most pressing issues and focus their efforts more efficiently and effectively.



CBPAR in this project:

- Inclusion of multiple stakeholder groups – junior & senior staff and management
- Iterative (2 x rosters)
- Open dialogue
- Shared ownership and negotiation of rules
- Voicing of concerns and challenges
- Research aimed at actionable outcomes that address community concerns
- Reciprocal learning



Creating and
modifying the
rosters

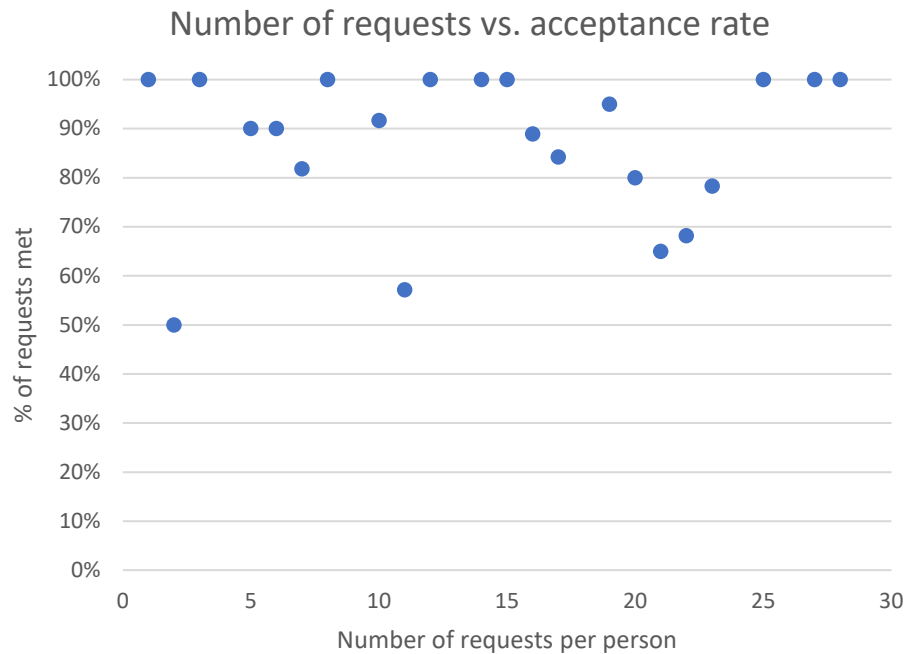
First hypothetical roster:

First roster sample shown:

- 4 weeks long
- All requests are same priority
- No maximum or minimum requests
- Requests can be as broad/specific as desired
- Blank spaces/ non-requests allocated by AI

Sun	Mon	Tue	Wed	Thu	Fri	Sat
			1	2	3 OFF	4 OFF
5 OFF	6	7 CALL	8 LATE START	9 OFF	10 NOT BAM	11
12	13	14 8	15 830	16 8	17 8	18 NOT CALL
19	20 Admin CALL	21	22	23 EARLY	24 EARLY ED	25 ANY
26 OFF	27 OFF	28 A/L				

Requesting behaviour: *Total reqs n = 347*



Analysis of the range of requests:

Average number of requests made 15.8 (mean) equates to **4 requests per week on average.**

- 10 staff made fewer than 15.8 requests
- 12 staff made more than 15.8 requests

Average percentage of requests met below the mean (1-14) = 83.19%

Average percentage of requests met above the mean (16-28) = 86.62%

NB: Outlier scores NOT removed

Requests made	N=	% average for range	
<7 (<2 pw)	3	83.33%	
8-11 (2-2.9)	4	90.45%	
12-15 (3-3.9)	3	75.79%	
16-19 (4-4.9)	4	91.71%	
20-23 (5-5.9)	5	73.29%	
24-27 (6-6.9)	1	81.48% (n=1)	
28 (7)	2	100%	

First roster iteration: Achieved 84.15% of met requests

- Initially created a rule-set to ensure that the AI could create a functional roster that would meet:
 - Service demands
 - Union rules
 - Department roster rules e.g. STO for w/end.
- First roster with preferences: ~50% met requests with that rule set. Percentage improved when
 - Some department rules outright
 - Deprioritised remaining department against individual preferences
 - Deprioritised union rules against individual preferences ('unless mutually agreed')



Second hypothetical roster modifications

Sample shown:

- 8 weeks long
- **priority requests** were added as an option
- Participants encouraged to be more specific in their requesting, e.g. no call before a requested day off
- Individual rules established for each participant

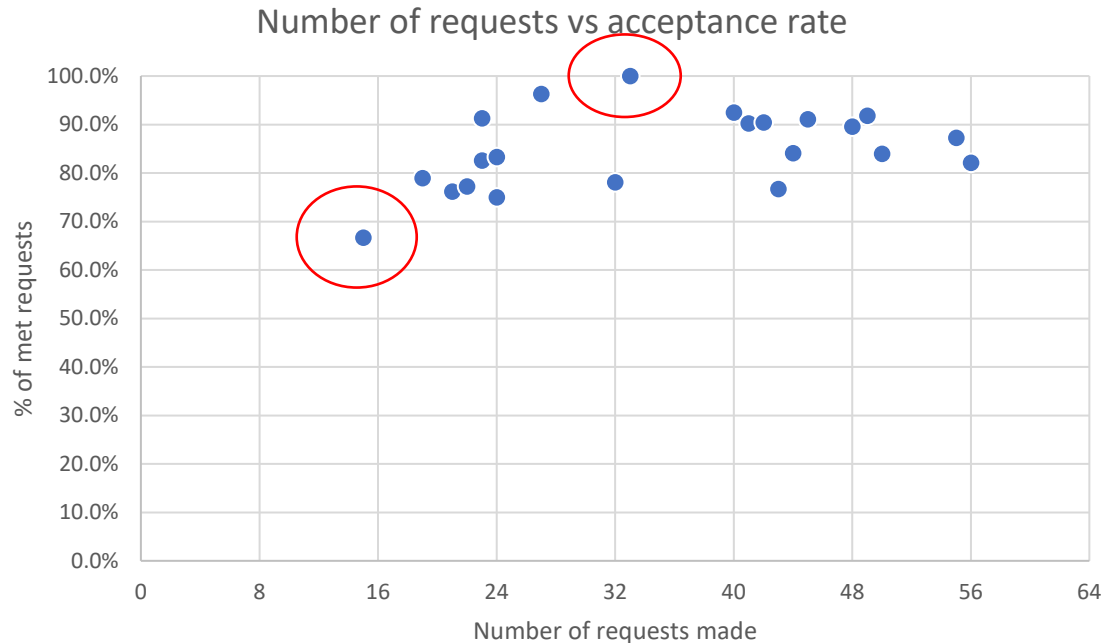
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
	8 0800	9 0800	10 0800	11 1230	12 1230	13 DAY CALL
14 DAY CALL	15 1230	16 0800	17 0800	18 0800 + call	19 0830	20 OFF
21 OFF	22 1230	23 1230	24 0800	25 0800	26 0830	27 OFF
28 OFF	29 0830	30 0830 + call	31 0830			

June - July 2023

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
				1 0700	2 0700	3 0800
4 OFF	5 Public holidays 0800	6 STO	7 0830	8 0830 + call	9 0830	10 OFF
11 OFF	12 1230	13 1230	14 0830	15 0800	16 Night call	17 OFF
18 Night call	19 0830	20 ANY	21 0800 + call	22 0830	23 0800	24
25	26	27	28	29	30 Night call	July 1 st OFF
July 2 nd Night call						

Please tick the boxes that apply to you: I don't mind split weekend duties I don't mind split days off

Requesting behaviour: *Total reqs n = 754*



Analysis of the range of requests:

Average number of requests made 35.6 (mean) equates to **4.5 requests per week** on average.

- 12 staff made fewer than 35.6 requests
- 11 staff made more than 35.6 requests

Average percentage of requests met below the mean (15-33) = 81.6%

Average percentage of requests met above the mean (40-56) = 87.4%

NB: Outlier scores removed

Requests made	N=	% average of reqs met
<15 (<1.9)	1	n/a
16-23 (2-2.9)	6	80%
24-31 (3-3.9)	3	84.9%
32-39 (4-4.9)	2	89.1%
40-47 (5-5.9)	6	87.5%
48-55 (6-6.9)	4	88.6%
56 (7)	1	n/a

Second Roster Iteration:
Achieved 82.4% of met requests
& 90.6% of priority requests

- Used the rule set from the first roster
- Relatively easy setting up priority request
- Individual rules: very difficult
 - *Weekend work pattern: Sat+Sun vs Sat or Sun*
 - *STOs: split vs together*
 - *Required minor adjustment to the final roster*



Benefits and Challenges:

Benefits

- Work/life balance
- Autonomy
- Efficiency
- Reduced burnout due to autonomy
- Increased engagement and ownership
– may lead to increased productivity

Challenges

- Fairness concerns – differing definitions of what is fair
- Complexity and confusion
- Union rules and regulations
- Burnout if staff prioritise financial gain over wellbeing
- Workload imbalance
- Management oversight still needed
- Adjustment period may cause some tensions or stress in the department

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