

# Implementation of live temperature alerts for medicine fridges at a Regional Victorian Hospital

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## INTRODUCTION

Refrigeration monitoring is essential to maintain the cold chain when storing temperature sensitive medications<sup>1</sup>. A temperature exposure outside of 2-8°C may result in decreased medication viability and efficacy. There is added pharmacist workload to follow-up temperature excursion affected medicines that can result in treatment delay and increased costs.<sup>2,3</sup>

At Barwon Health, University Hospital Geelong (UHG), fridge monitoring utilises the Constellation Technologies tags and monitoring program (CT1)<sup>4,5</sup>. Previously, temperature excursions were emailed to a nominated pharmacist who would respond when available, resulting in delayed actions and increased potential for medicine loss.

## OBJECTIVE(S)

To implement and assess the impact of live temperature alerts on medicine fridge temperature excursions and delegation of responsibility to resolve alerts at UHG.

## ACTION

Live alerts for acute-site fridges were implemented in January 2023 via the Constellation Technologies tags and monitoring program. Medication fridges temperature excursion alerts were configured to go to the hospital switchboard in real time who would contact the affected site directly allowing immediate action.

## EVALUATION

A retrospective pre- and post-implementation study was conducted over two 2-month periods each (November-December 2022 & March-April 2023).

### Temperature excursions identified through CT1 daily excursion reports

#### Inclusion criteria:

- Fridges used to store medications at UHG
- Fridges classified as 'acute department fridges (or assets)' only as set-up on CT1

#### Exclusion criteria:

- Fridges without live alerts turned on
- Fridges classified as 'pharmacy fridges (or assets)' as set up on CT1
- Freezers and room temperature storage areas

### Data collection through REDCap®

- Data collected from CT1 fridge temperature reports and pharmacist excursion notes
- Fridge area, excursion date, highest/lowest excursion temperature reached, duration of excursion, pharmacist intervention category and duration (Table 1)

### Analysis of results through REDCap®

Table 1: Category and duration definition for interventions

Category	Intervention	Duration of intervention (minutes)			
1	Minimal temperature excursion – reviewed, excursion already resolved, documentation only	2 minutes			
2	Minimal temperature excursion – reviewed, area notified/alert ward, documentation	5 minutes			
3	Temperature excursion is moderate/severe; review of stability for medicines required – inhouse data follow-up ONLY	No. of drugs in fridge	Duration (minutes)		
		≤5	30		
		6-10	60		
>10	90				
4	Temperature excursion is moderate/severe; extensive review of stability for medicines required – includes inhouse data follow-up, contacting drug companies, isolation of medicine, change to expiry dates etc	No. of drugs in fridge	No. of drugs requiring extensive follow-up	Duration (minutes)	
				≤5	≤5
		6-10	≤5	6-10	90
				6-10	120
		>10	≤5	6-10	150
				>10	180

## REFERENCES

1. Therma. 2022 <https://www.hellotherma.com/research-and-impact/refrigeration-monitoring>
2. AUS Govt. 2019 <https://www.health.gov.au/sites/default/files/documents/2020/04/national-vaccine-storage-guidelines-strive-for-5.pdf>
3. SHPA. 2022 [https://onlinecpd.shpa.org.au/pluginfile.php/34952/mod\\_resource/content/1/2020\\_2%20Temp%20excursions.pdf](https://onlinecpd.shpa.org.au/pluginfile.php/34952/mod_resource/content/1/2020_2%20Temp%20excursions.pdf)
4. Constellation technologies. <https://constellationtechnologies.com.au/products>
5. O'Halloran et al. 2022. Storage, Monitoring and Transport of Temperature Sensitive Medicines. Accessed 20/03/23

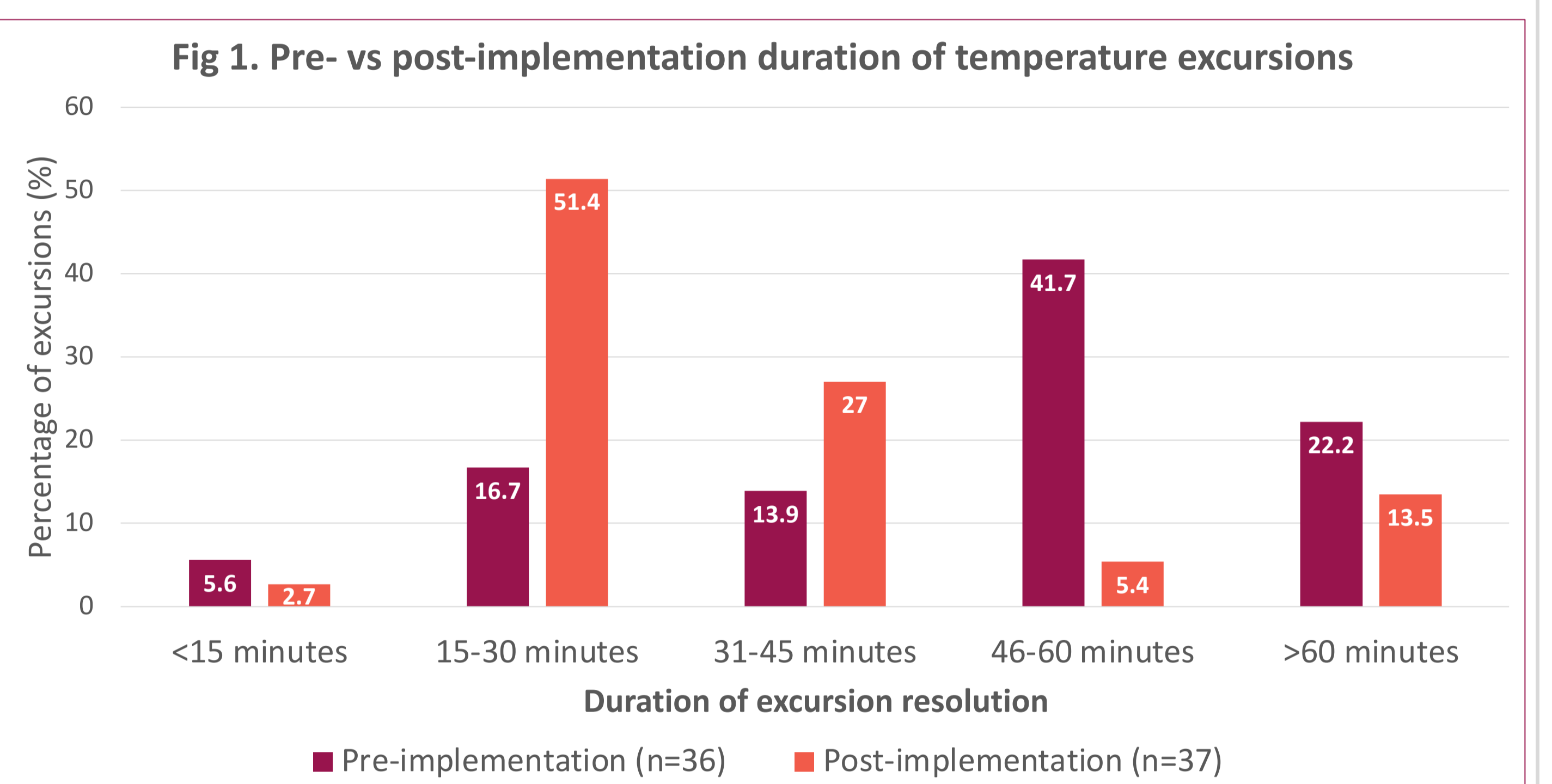
## RESULTS

- 28 fridges were included in the study, of which 50% (14/28) had at least one excursion during the data collection periods
  - 73 fridge excursions were included in the study [49.3% (36/73) vs 50.7% (37/73) excursions pre- and post-implementation respectively]
  - All 37 post-live implementation alerts were sent to switchboard.
- The degree of excursions were similar pre- and post-implementation (Table 2).

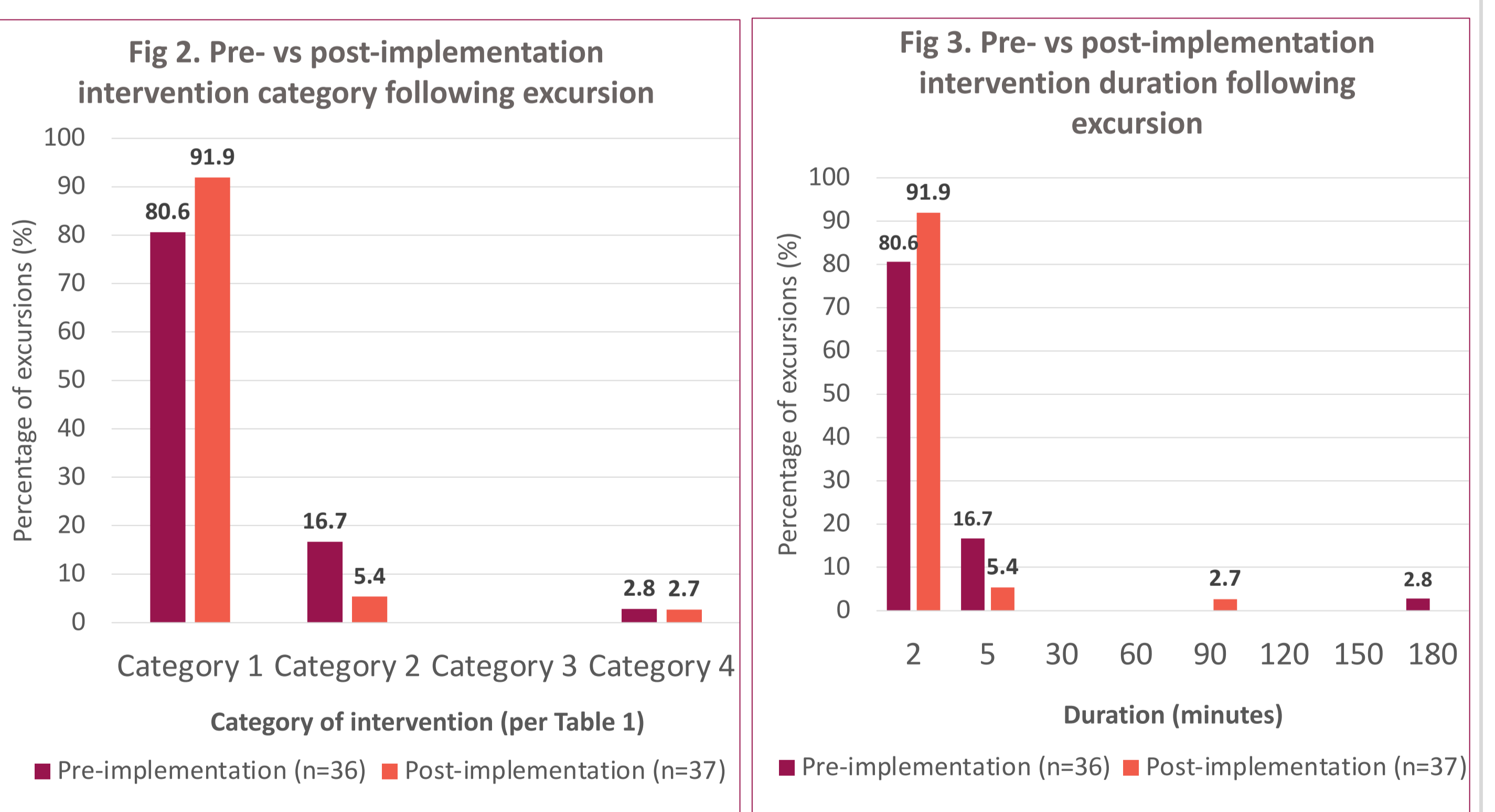
Table 2: Highest and lowest temperature excursions

	Pre-implementation	Post-implementation
Highest temperature excursion median °C [IQR]	9.9 [9.1, 10.7]	9.5 [9.2, 10.2]
Lowest temperature excursion median °C [IQR]	1.6 [1.5, 1.7]	1.3 [1.1,1.6]

Post-implementation, duration of temperature excursions decreased (Fig 1).



There was no significant difference in the complexity of pharmacist intervention required following a temperature excursion post-implementation (Fig 2 and 3).



## DISCUSSION

Overall, the results show that the implementation of the live alert system at UHG did not alter the temperatures reached during an excursion. However, there was a significant reduction in the excursion duration. This is important as the excursion duration will often determine the medications' viability, as is evident for vaccinations where cold chain breaches must be reported to state health departments, excluding excursions where temperatures peaked below 12°C for less than 15 minutes<sup>2</sup>.

While fridges involved in these excursions carried few high-risk medicines, resulting in few interventions by pharmacists, it is comforting to know that any cold chain breaches regardless of fridge content will be resolved quickly with the live alert system.

## CONCLUSION

This study has demonstrated that implementation of a live alert system at UHG decreased temperature excursion durations. Further studies are required to guide recommendations on live temperature alert systems for other hospitals.