



Remote temperature monitoring system for all medication fridges in St. Vincent's University Hospital

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Introduction

St. Vincent's University Hospital (SVUH) is a level 4 hospital and is part of the Ireland East Hospital Group. It is the national referral centre for liver and pancreas transplantation and adult cystic fibrosis. The hospital provides in excess of forty medical, surgical and allied specialities, and has 479 in-patient beds incorporating 7-day, 5-day and day care.

SVUH currently has 90 medication fridges on its campus that require continuous monitoring to ensure that medicines are stored under conditions which ensure that their quality and stability are maintained until the point of administration.

Aims & Objectives

The challenge facing the pharmacy department in SVUH was to introduce an efficient system to record medication fridge temperatures and to ensure that temperatures remain within the licensed range for storage of medication.

The aim was to install continuous remote temperature monitoring of all medication fridges in SVUH. The installed system must send alerts for all temperature excursions. It was also a requirement of the system to record the corrective action taken hospital wide.

Prior to August 2016 pharmacy medication fridges were monitored remotely, and nurses were responsible for manually recording fridge temperatures in clinical areas. As all areas in SVUH do not have twenty four hour cover, some fridges were not monitored out of hours or at weekends.

Methodology

Kelsius is a remote wireless, paperless temperature monitoring system. Sensors placed in fridges, incubators and freezers throughout the hospital monitor temperature. The data is sent to the Kelsius website where it is presented as user-friendly dashboard with reporting functionality. Network controllers, which can only be accessed by trained members of staff are located at staff bases and display information from the sensors. If a medication fridge is out of service for a period of time the network controller is used to place the fridge in service (a temporary cessation of alarm). A policy for the remote temperature monitoring was developed with roles and responsibilities defined for working hours and out of hours. An operational flow chart was also developed and placed on all medication fridges throughout the hospital. (As shown in figure 1 below).

A pharmacy technician receives temperature alerts to a designated mobile phone during working hours and an assistant director of nursing receives alerts out of hours.

A corrective action must be entered on the Kelsius online system for all alerts. This is performed by logging onto the site map and entering a reason for the temperature excursion. A senior pharmacy technician manages the hospital-wide Kelsius fridge monitoring system during core hours and follows up on out of hours excursions the next working day.

Figure 1: Operational flow chart for core hours and out of hours



Results

In the initial stages of the implementation of remote temperature monitoring system some technical faults with sensors were experienced. With the support of a Kelsius engineer they were quickly rectified.

All fridges, freezers and incubators containing medication in SVUH are now monitored on a continuous basis and alerts acted on immediately. Alerts received on Kelsius system are stored on Kelsius email and corrective actions for each alert entered on the Kelsius website.

The figures below illustrate the cause and timing of alerts received in a three month period from Dec 2016 to Feb 2017. As shown in figure 2 below the main reason for alerts was the fridge door left ajar. A higher number of alerts were received out of hours than during core hours as shown in figure 3 below.

Figure 2: Cause of Alerts (3 Month Period 01/12/16 to 28/02/2017)

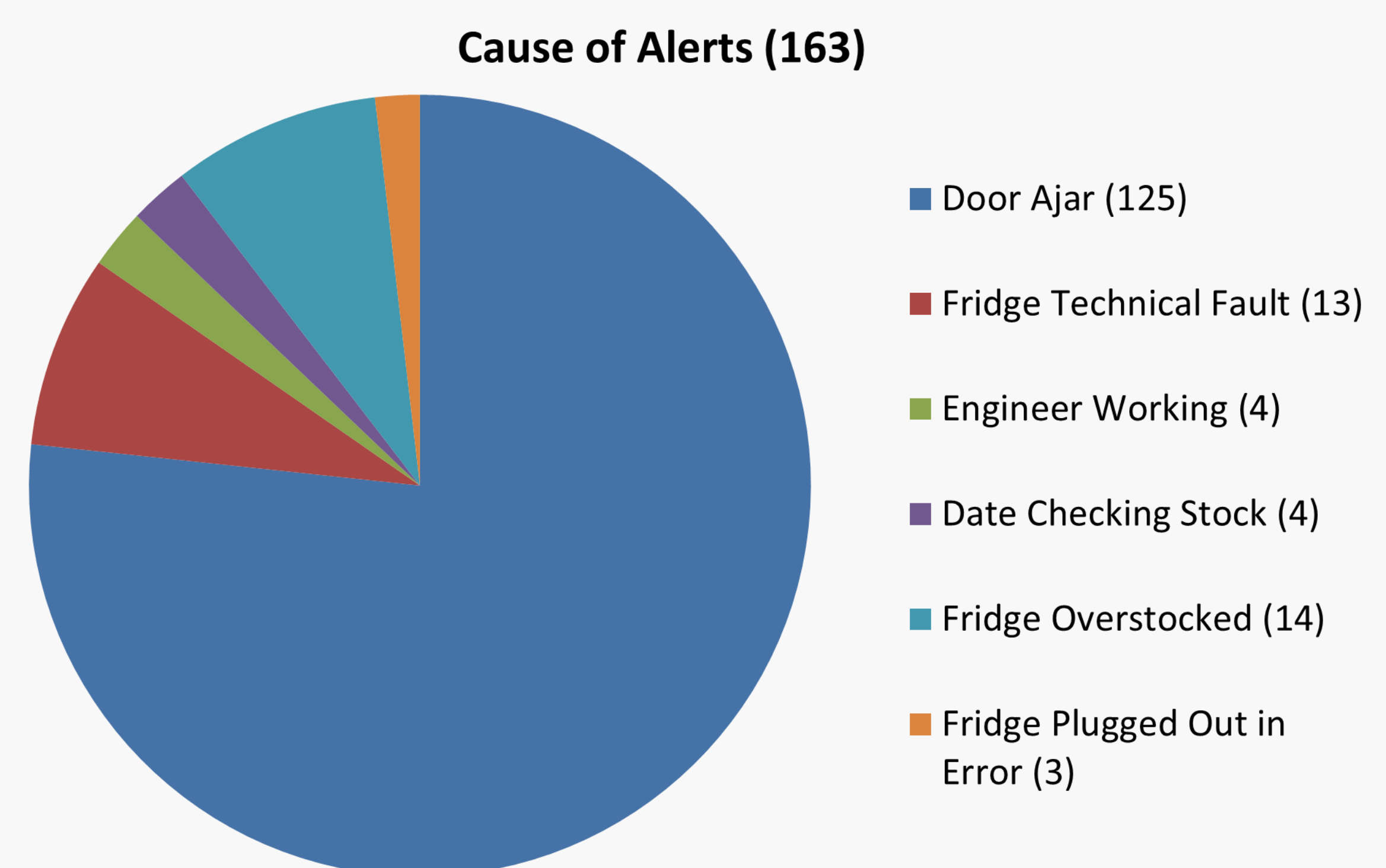
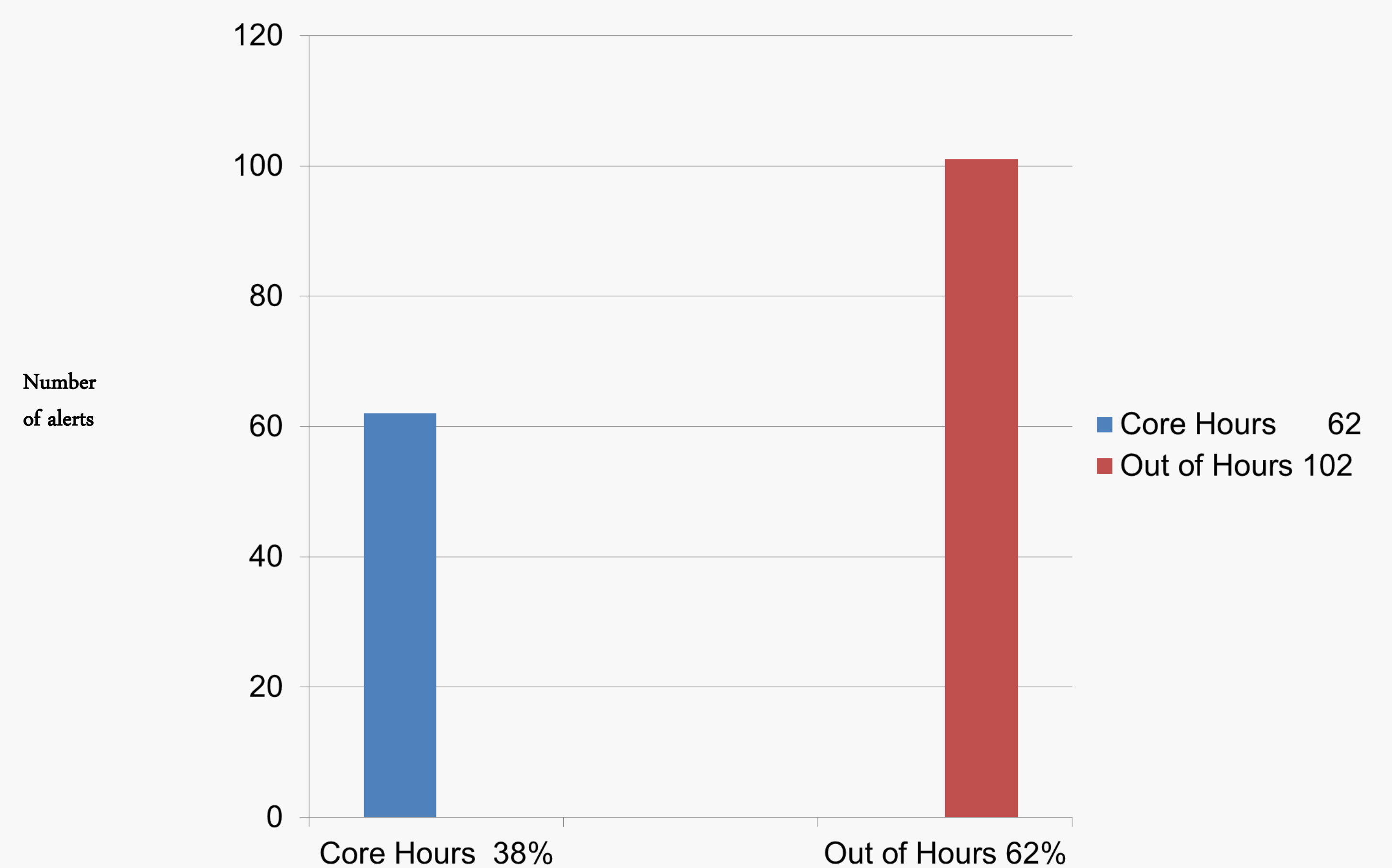


Figure 3: Time of Alerts (3 Month Period 01/12/16 to 28/02/2017)



The potential maximum financial savings within the three month period 01/12/2016 to 28/02/2017 was approximately €120,000 (if all stock involved had to be discarded).

Conclusion

The Kelsius system has provided reliable temperature monitoring in 90 medication fridges across the hospital and makes 24hr monitoring in all areas possible. It has ensured rapid response to deviation from recommended temperatures and provided important data about fridges and allows trends to be identified. In the future we hope to expand our monitoring system to include room temperature and humidity monitoring.

References

1. Tighe P, Kearns B, Lawlor K. Temperature monitoring system for Medication Fridges in SVUH. St. Vincent's University Hospital Procedure, PPG-ORG-383. 2016 Aug; Version 1.