Telehealth Enabled Medicines Management for Care Home Residents

Efficiency savings produced by the Proactive Care System in medicines management

and

Effectiveness of the implementation process for the Proactive Care System

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Executive Summary

The management of medicines in care homes is notoriously difficult with significant challenges associated with safety, quality and accountability in medicines administration and record keeping. Electronic medicines management systems have been proposed as a means of addressing these challenges.

In 2014 the Welsh Technology and Telehealth Fund awarded Beacon Digital a grant to implement an evaluate an electronic medicines management solution for care homes in South Wales. The initial evaluation of the project was carried out by The School of Pharmacy and Pharmaceutical Sciences at Cardiff University. The electronic medicines management solution chosen for this project is developed by Invatech Health. The solution is unique in that it links the care home and the pharmacy producing a closed loop system that allows two-way exchange of data. The system consists of a care home medicines management system called the Proactive Care System (PCS), a secure web portal called Invalife that displays health records and also holds important resources, and a pharmacy dispensing system called Consolidated Applications for Pharmacy Administration (CAPA); data is shared across the applications giving permitted users access to a complete medicine record for any individual patient.

In the initial evaluation of the Proactive Care System (PCS)[1], there was evidence of improvements in Quality and Safety in medicines management with 21 out of 23 potential error types associated with paper based systems eradicated. In addition, the use of the system resulted in a 55% reduction of waste associated with medicines being returned and a 22% reduction of overstock of medicines in the care home. Usability of the system was evident in that the majority of the care homes did not want to return to using the traditional paper systems.

Introduction of the PCS system brings with it changes in the traditional medicines management processes. These processes are unique to the PCS system because of the way it links with the pharmacy system and produces reports of activities on Invalife that can be used for audit and evidence. These new processes have the potential to make medicines management activities more efficient. The introduction of new systems and processes also requires a planned implementation to manage the change from the traditional paper based systems and processes.

It is against this background that further evaluation of the impact of the new processes with the PCS system and the implementation of the system in to care homes was carried out. This evaluation describes the results of two surveys:

1. Telephone surveys of Care Home staff where the aims were:
    - To estimate the length of time spent on different medicines management activities prior to and after the implementation of PCS.
    - To ascertain the qualifications of staff involved in each activity.
    - To calculate the time savings, if any, with the use of the PCS.
    - To calculate the monetary value of any savings identified.

2. Self-completed online survey of care home managers' views on the implementation process of the PCS in their care homes.

[1] Telehealth Enabled Medicines Management for Care Home Residents: An evaluation conducted by the School of Pharmacy & Pharmaceutical Sciences, Cardiff University November 2015.

The telephone surveys asked about the following critical medicines management processes in the care homes: administering medicines to residents; ordering prescriptions; checking issued prescriptions against the list of required medicines; booking in of medicine deliveries to the care home; accounting for the removal of unwanted medicines from the care home; audit of medicines administration records; and audit of stock levels.

Responses were received from 66 care homes and a direct comparison of the overall time in medicines management with the PCS and paper based systems was made with 58 homes. The overall time spent undertaking medicines management using paper based systems was an average of **352 hours** per care home per month which is 2.34 full time equivalent members of staff. With the PCS medicines management processes, the average overall time spent per care home per month was **286 hours** which is 1.9 full time equivalent members of staff. The average overall time saving with the PCS system was **65.5 hours** per care home per month representing an average reduction of **17.4%**. This is associated with an average cost saving of **£1350 per care home per month.**

The time savings using the PCS were shown to be statistically significant ($p<0.05$) for each element of the medicines management process and for the overall time devoted to medicines management in the care home. The greatest percentage reduction in time using the PCS was for the process of auditing medication administration records (**72%**) followed by the process of checking prescriptions (**66%**), the new monthly supply changeover process (**65%**), the booking in of medicines (**64%**) and monthly ordering of prescriptions (**62%**). Time efficiencies of up to an average of **30%** were achieved by 28 care homes using the PCS for the administration of medicines.

The implementation process of the PCS in to care homes is unique and therefore the results of the survey of care home managers reported here should not be extrapolated to other alternative implementations of electronic medicines management solutions. Responses from 118 surveys were collected representing a 58% response rate. **Eighty nine percent** of the respondents (103) said that they were at least satisfied with the implementation process. For each stage of the implementation process the majority of the care home managers provided positive responses: **80%** were satisfied with the communication regarding the implementation process; **67%** found the registration process on Invalife very easy or easy; **95% and 94%** found the e-learning courses and on-site training very helpful or helpful and; **92%** found the Go Live support at least helpful.

In conclusion, the unique PCS medicines management processes produce significant time efficiencies in addition to the already reported quality and waste reduction characteristics. The implementation process is comprehensive and produces high levels of satisfaction with care home managers.

1 Introduction to the studies

The team at the Cardiff School of Pharmacy and Pharmaceutical Sciences carried out the evaluation of the Proactive Care System funded by the Welsh Health Technology and Telehealth Fund. The evaluation focussed on the following criteria:

- Safety and quality
- Reduction in waste associated with medicine
- Usability of the system as measured by views of care home and pharmacy personnel.

The usability of the system qualitatively explored the views of care home and pharmacy staff before and after the implementation. The themes identified from the usability study included the impact of the PCS system on medicines management activities and their processes as well as the implementation, training, and support for the system.

From the qualitative themes captured in the usability study two surveys were designed entitled "Time taken for medicines management activities" and "Post implementation survey".

The first survey was designed to capture an estimate of time spent on different activities with the PCS system as compared to the paper based systems (MAR charts) that the care homes were using prior to implementation. The objectives of this survey were to ascertain if the unique processes introduced by the PCS system produce time savings in the various elements of the medicines management process. Further, if there were time savings for staff, what would the monetary value of these time savings accrue over one month.

The second survey was designed to capture the views of care home managers on the implementation process which includes the communication of time lines, registration on Invalife, e-learning, on-site training and support on the first day that the care home uses the PCS.

Section 2 of this report describes the evaluation and the results relating to the time savings with the PCS and Section 3 describes the results from the survey of care home managers regarding the implementation process.

2 Time taken for medicines management activities with the PCS system and with paper based systems.

2.1 Background

The usability study in the first evaluation report highlighted the time-consuming nature of medicines management in care homes. The study reported that the "Impact of time spent doing medicines administration on other areas of care" was rated as significant by the respondents. The study also revealed that one of the aspirations of care homes in taking on the electronic system was to provide time savings in tasks which would free up more time to spend providing care to residents. Similarly, one of the barriers to taking on the new system is a fear that more time will be taken with medicines management activities.

The medicines management activity themes captured in the in the qualitative interviews relate to the following processes:

1. Direct administration of medicines to residents
2. The process of ordering chronic "monthly" and acute "interim" prescriptions with GPs
3. Checking prescriptions to ensure that prescriptions have been issued – known as "prescription chasing"
4. Making records of medicines received in to the home - known as "booking in"
5. At the end of each monthly medication supply, there is a process for preparing the medication trolley with the new supply, making records of un-wanted medicines that are returned to the pharmacy or the clinical waste company, if the care home is to continue to use stock from the previous month, then this stock must be added to the count of new stock received ("carried forward"). In addition, the care homes often check the medication administration records to ensure all therapy changes during the previous month have continued. This process is known as the "changeover".
6. Audits of administration records to ensure all required administrations are accounted for – known as auditing for "missings".
7. Audit of stock counts
8. Audit of staff training

2.1.1 Traditional paper based medicines management versus the PCS medicines management processes

This section below discusses the medicines management with traditional paper based systems and the uniqueness of the PCS system.

In general, although care homes have documented processes for each medicines management activity, the use of traditional paper based systems heavily rely on individual staff members complying with these processes to ensure the following:

- Safety and accountability in medicines administration
- Appropriate and timely requests for prescriptions from the surgery
- Checking of issued prescriptions against requests and ensuring all therapy changes made at the care home are updated on the surgery and pharmacy records
- Accountability in medicines received in to the home and taken out of the home
- Appropriate stock holding

Staff members are expected to comply with time consuming processes in an environment where they are often under pressure to complete tasks quickly, where there are numerous interruptions and where the paper systems allow flexibility in processes and do not allow for easy audit and monitoring to enforce policies. The system and the environment that it is being used does not promote consistency and has contributed to the many reports that highlight challenges with medicines management in care homes including medication errors and wastage of medicines.

The PCS system enforces set procedures in medicines management that ensure consistency in safety and accountability. Central to achieving safety is the requirement of scanning of barcodes prior to administration of medicines to residents. In addition, the integration with the pharmacy system that uniquely allows two-way exchange of information between the care home and the pharmacy, allows the pharmacist to provide an enhanced clinical input, now having the ability to ensure prescriptions received match the latest changes to therapy for residents that have been updated by the care home. Accountability is achieved by the requirement for each member of staff to only have access to the system with their own log in details and assigning each medicine activity to that individual. The previous evaluation showed the use of the PCS system in care homes produced improvements in safety, accountability as well as reducing waste associated with medicines.

The PCS processes and the integration with the pharmacy also have the potential to produce efficiencies in each medicines management process. These are described below:

1. Medicines administration:
    a. For each round prompting medicines that are due for administration as opposed to searching through paper MAR charts to identify medicines that are due for administration.

2. The process of ordering prescriptions:
    a. the PCS system prompts for prescriptions for chronic medicines to be requested from surgeries at the appropriate time. In addition, current stock levels are held on the PCS and presented at the point of ordering so that staff members can make informed decisions. Requests can only be completed and submitted when all medicines have been accounted for. The PCS produces a list of medicines that are low in stock and which will run out prior to the monthly delivery. Care homes can use this list to ensure they request prescriptions before stocks run out.
    b. The PCS system produces a prescription request print out with accurate and complete information that can be forwarded to the surgery.

3. The process of checking issued prescriptions:
    a. The two-way link with the pharmacy system means that the pharmacy are now aware of the prescription requests. This enables the pharmacy to carry out an initial reconciliation process of prescriptions received against the requests. The

pharmacy and the care home can then work together to ensure all prescriptions requested have been received.
    b. The prescription request print out can be used to reconcile prescriptions issued against prescriptions requested.

4. The process of accounting for medicines received:
    a. The PCS system requires that the barcodes on each dispensed medicine pack is scanned. Since the barcodes are unique to each pack and produced by the dispensing process at the pharmacy, the quantities in each pack are known and added to stock.
    b. A record of the person who is logged in at the time and the date and time of the scan is made.

5. The process of preparing the monthly supply (Changeover):
    a. This is facilitated by reducing the need to return medicines and by automatically adding the new supply quantities to existing stock count (automatic carry forward).

6. Audit of administration records and stock and training:
    a. The PCS prompts for medicine doses that have not been accounted for and for medicines where a stock take is required
    b. An audit report is emailed daily to care home managers highlighting medicines that have not been accounted for, items that have stock issues
    c. The Invalife website maintains a training record of e-learning courses completed relating to the PCS.

The following section describes the methodology used to investigate if the PCS processes produce efficiencies in medicines management processes.

2.2 Methodology

The objective of this study was the following:

- To determine a quantitative estimate of time spent on different medicines management activities using the PCS system compared with paper based systems.
- To investigate any time saving achieved with the PCS system and the magnitude of such savings
- To determine the monetary value of any time saving achieved.

A survey was designed using the themes that were elucidated in the original qualitative study and the knowledge of the processes involved and the survey by telephone to ensure responses from individuals involved in all medicines management activities could be ascertained.

Initially a letter was written to care home managers who were using the PCS system, informing them of the study, inviting them to participate and to expect a call from a researcher.

The research officer at Invatech then called the care home to speak with the manager and to identify the correct person to speak to regarding the medicines management processes and secondly to arrange an appointment for the telephone survey with them.

The survey was initially piloted with 10 care homes that did not use the PCS system. Questions relating to ordering of acute prescriptions and audit of training were taken out of the main survey. This was because for interim prescriptions there were too many variables such as from which surgery and which items required to be ordered. In terms of audit of training, only one care home described the audit process. This indicated that this is not an activity that can be directly compared using paper and the PCS system.

The responses were collected by the research officer at Invatech on paper questionnaires and inputted in to Microsoft Excel.

The responses relating to the PCS system and paper based systems were tested for statistical difference using the Student t test for matched pairs with two degrees of freedom. A p value of 0.05 was taken to represent a significant difference. Statistical analysis was undertaken in Microsoft Excel.

The business costs related to the time spent on medicines management and any potential savings are based on an hourly rate for the qualification of the staff involved plus 25%. This additional cost takes in to account management, training, utilization, holidays, and other business costs.

2.3 Findings

The time frame for the data collection was a two month period (September and October 2016) and the intention was to collect responses from at least 50 care homes. Sixty-six care homes were contacted and responses were received from all 66 care homes representing a 100% response rate.

2.3.1 Care Home and respondent Characteristics

Table 1 details the characteristics of the 66 homes that participated in the survey. There were 48 registered for providing residential care and 12 registered as providing nursing or were dually registered for providing residential and nursing care. On average the care homes had capacity for 36 residents in two different units within the home. The care homes had, on average, been using the PCS device for 10 months. Both independent and multiple pharmacies served the care homes.

Table 1 Care Home Characteristics (n=66)

Characteristics of care homes	Numbers
Total number of homes	66
Residential homes	48
Nursing home / dual registration	18
Average number of beds	36 (s.d 9)
Average number of units	2 (s.d 0.7)
Average number of months with PCS	10 (s.d 4.3)
Served by Multiple Pharmacy	46
Served by Independent Pharmacy	20

Two care homes (care home 27 and 32) were newly established and used the PCS from the day the care home opened, therefore a direct comparison with paper based systems could not be undertaken. However, data relating to the use of the PCS is included in the results presented. Similarly, there were other care homes that did not carry out some of the medicines management processes with the traditional paper based systems, therefore comparisons between the individual activities could not take in to account data from these homes.

Table 2 provides the characteristics of the respondents. Of the 66 respondents 20 were care home managers, 46 were deputies or medicines leads. The average number of years in the care home sector was 12 with 6.6 years being the average number of years in their current post. All the respondents were involved in all aspects of medicines management.

Table 2 Respondent characteristics

Characteristics of respondents	Numbers
Manager	20
Deputy / Meds Lead	46
Average number of years in care sector	12 (s.d 10.1)
Average number of years in current post	6.6 (s.d 7.2)
Number of respondents involved in all aspects of medicines management	66

2.3.2 Medication Round times

There are normally at least 4 medication rounds per day in a care home; morning, lunch, teatime, and night. The respondents were asked to estimate how long each medication round takes with the PCS system and with the paper based systems that they were using prior to implementing the PCS. Table 3 below shows the average and the range of reported times for medication rounds with PCS and paper based systems and shows if the difference is statistically significant.

Table 3 Average length of time per round with the PCS system and paper based systems

Medication rounds	Average time per unit (Hrs) using the PCS system (n=66)	Average time per unit (Hrs) using paper base systems (n= 64)	*p* value	Significance
Morning	1.8 (0.75-4)	2 (0.75-4)	p=0.000001	p<0.05 – reduced time with PCS is statistically significant
Lunch	0.8 (0.16-2)	0.9 (0.25-2)	p=0.00062	p<0.05 – reduced time with PCS is statistically significant
Tea	1.3 (0.5-3)	1.4 (0.25-5)	p=0.0001	p<0.05 – reduced time with PCS is statistically significant
Night	1.3 (0.5-3)	1.5 (0.5-5)	p=0.0000099	p<0.05 – reduced time with PCS is statistically significant
Total time	**5.2 hours**	**5.8 hours**		

The morning round is reported to take the longest, followed by the night and tea time rounds. The lunch time round is reported to be the shortest. The cumulative average per medication

round suggests that **5.8 hours** per day (294.8 hours per month) are spent on just administering medicines to residents using paper based systems and about **5.2 hours** per day (264.8 hours per month) using the PCS system.

Figure 1 presents each care home's matched responses for their main unit. Over half of the respondents (37) said that there was no difference between the length of the morning medication round with PCS and paper systems. Twenty-seven respondents said that the morning medication round is shorter with PCS, for two care homes a comparison could not be made (care homes 27 and 32)

The pattern of responses for the length of time for each medication round show that in most responses the round with PCS is either shorter or the same as paper based systems, see *Figure 2, Figure 3 and Figure 4*

A student t test for matched pairs was performed to determine statistical differences between the responses for each medication round. The difference was considered statistically significant for probability values below 0.05. Table 3 presents the student t test values for each of the medication rounds. For each round the reduced difference in the time using the PCS system is statistically significant.

Figure 1Time taken for the morning medication round with PCS and Paper base systems

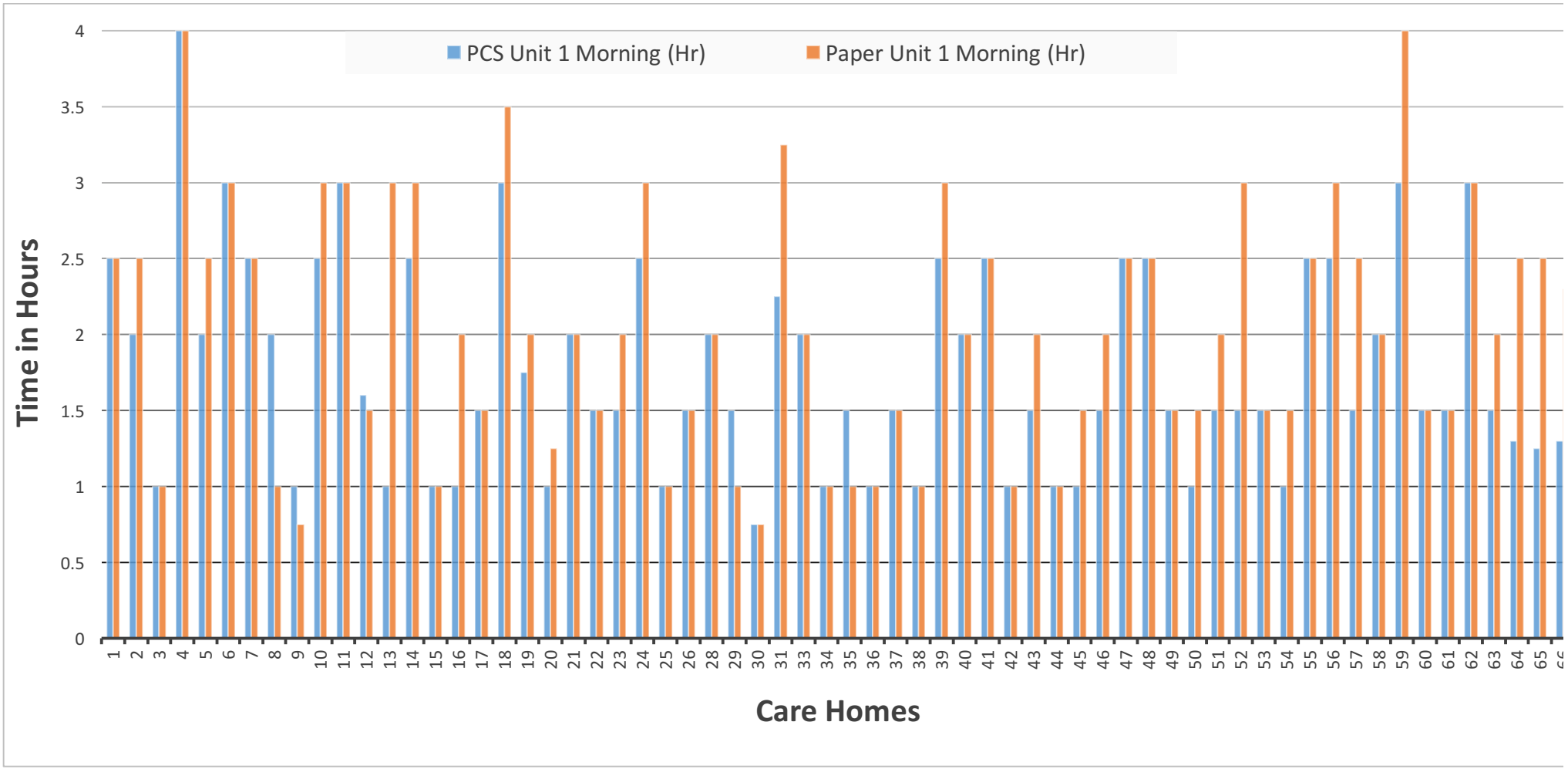


Figure 2 Time taken for the lunch time medication round with PCS and Paper base systems

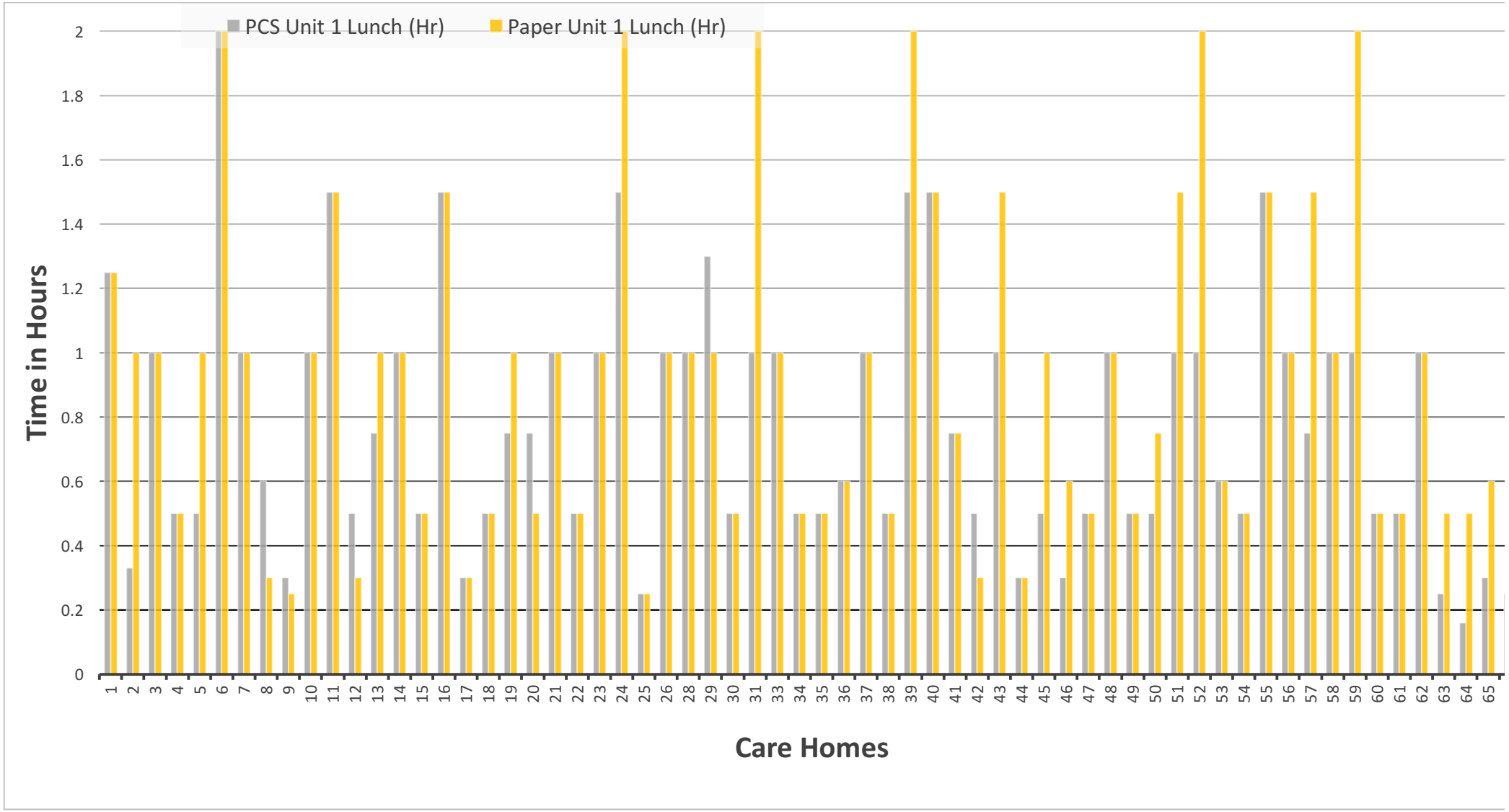


Figure 3 Time taken for the tea time medication round with PCS and Paper base systems

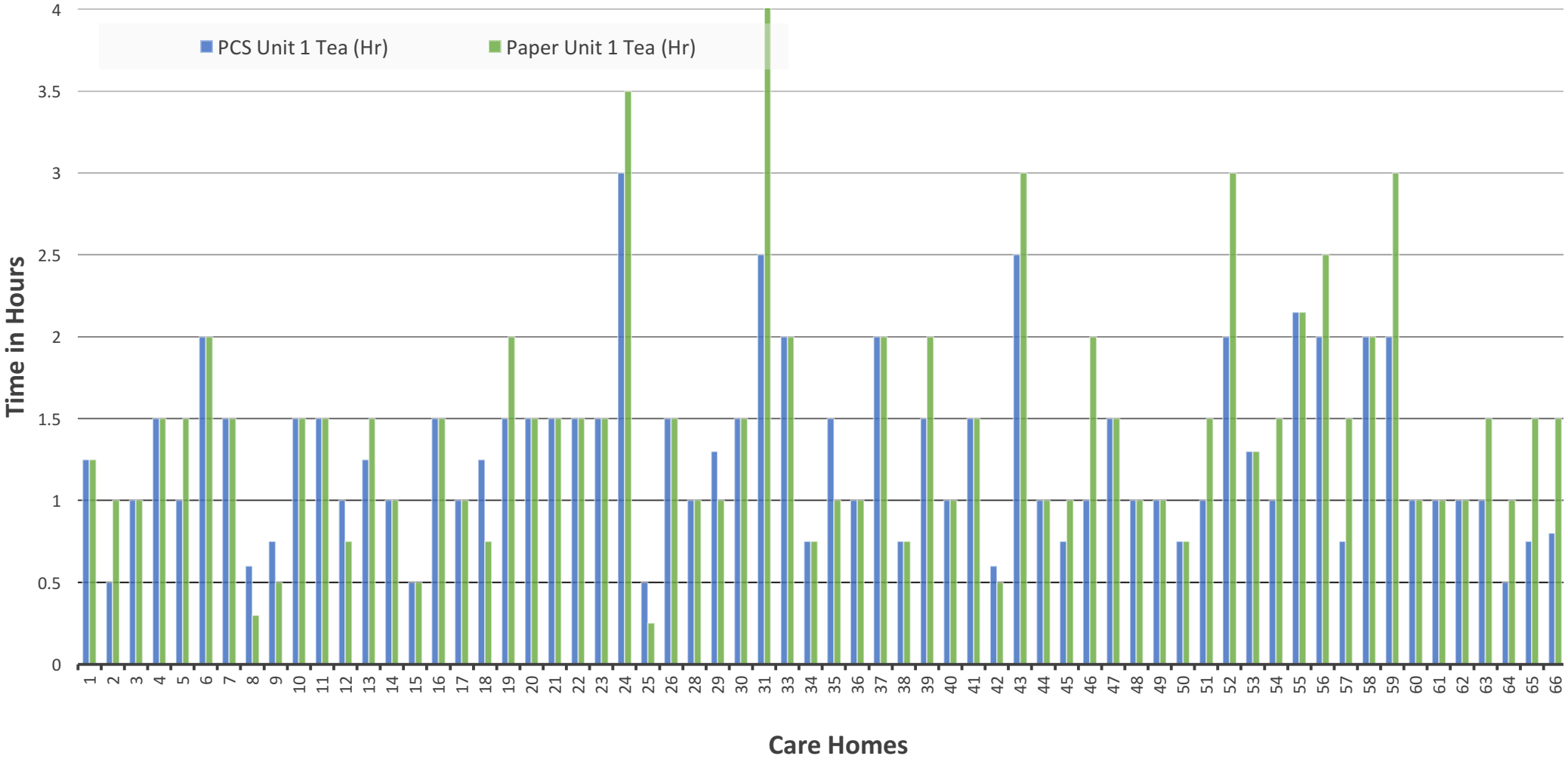
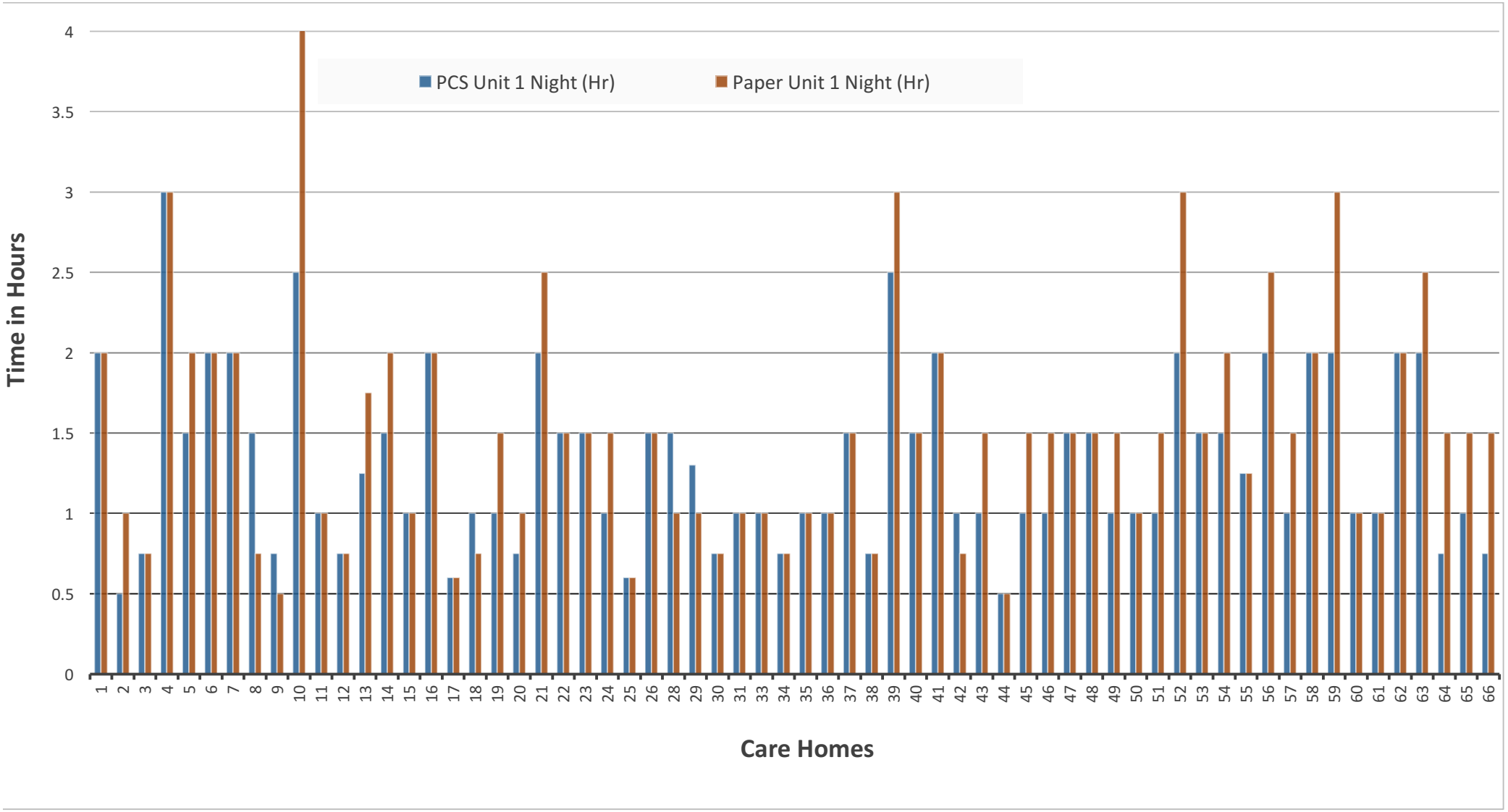


Figure 4 Time taken for the night time medication round with PCS and Paper base systems



2.3.3 Prescription ordering

The process of requesting prescriptions from surgeries starts with a review of stock holding for the medicines in the care homes followed by a calculation of the quantities required on the prescription and finally sending the prescription requests to the surgery. Care homes usually carry out this process monthly for medicines that are chronic. This process is known as the "monthly order" and is often performed by more senior staff.

Figure 5 presents the comparison in the time taken to place the monthly order with the PCS and Paper based systems. On average the care homes reported that they spend **1.7 hours** (range < 1 hour – 12 hours) on the monthly order process with the PCS system. With paper based systems the average time was **3.7 hours** (range < 1 hour – 12 hours).

There were 3 homes (care home 4, 19 and 27) for which a comparison could not be made because the home had no experience of placing orders with paper based systems or that the pharmacy had historically performed this process on behalf of the care home. Of the 63 homes where a direct comparison could be made, 51 reported that the process is shorter with the PCS system compared to paper systems. Ten care homes reported no difference in the time to place monthly prescription orders and two care homes (care homes 1 and 43) reported that the process with PCS takes longer.

The reduction in time to carry out the monthly order process was statistically significant (Student t test p=0.000000000041). Of the 51 care homes where a reduction in time was reported, the average time saving in the monthly order process with PCS was 2.54 hours, representing an average time saving of 63%.

2.3.4 Prescription checking

Following the placing of the prescription requests, the next process is to check the issued prescriptions to ensure that the medicines requested have been prescribed and if not to notify the surgery that the requests are still outstanding. This process is commonly known as "prescription chasing". Figure 6 highlights the length of time spent on this process with the PCS system and paper based systems.

On average the 66 care homes using the PCS system spent **1.43 hours** (range < 1 hour – 8 hours) per month, whilst with paper based systems responses from 62 homes indicated on average **2.56 hours** (range < 1 hour – 16 hours) are spent chasing outstanding prescriptions.

There were 4 homes where a comparison could not be made (care homes 4, 12, 19 and 27). These care homes had either not used paper based systems or they delegated this activity to their pharmacy. Thirty care homes reported that this process takes less time with the PCS system. For 29 care homes, there was not a difference in time for this process between the PCS system and the paper based systems. There were three care homes that reported that this process took longer with the PCS system as compared to the paper systems being used previously (care homes 10, 20, and 22).

The differences between the responses was tested for statistical significance. The Student t test for matched pairs was used and proved to be significant $p< 0.05$ (p=0.000075). The average reduction in time for the 30 care homes that reported a difference was 2.29 hours. This represents an average 66% reduction in this activity.

Figure 5 Time spent on the Monthly Order Process with PCS and Paper based systems

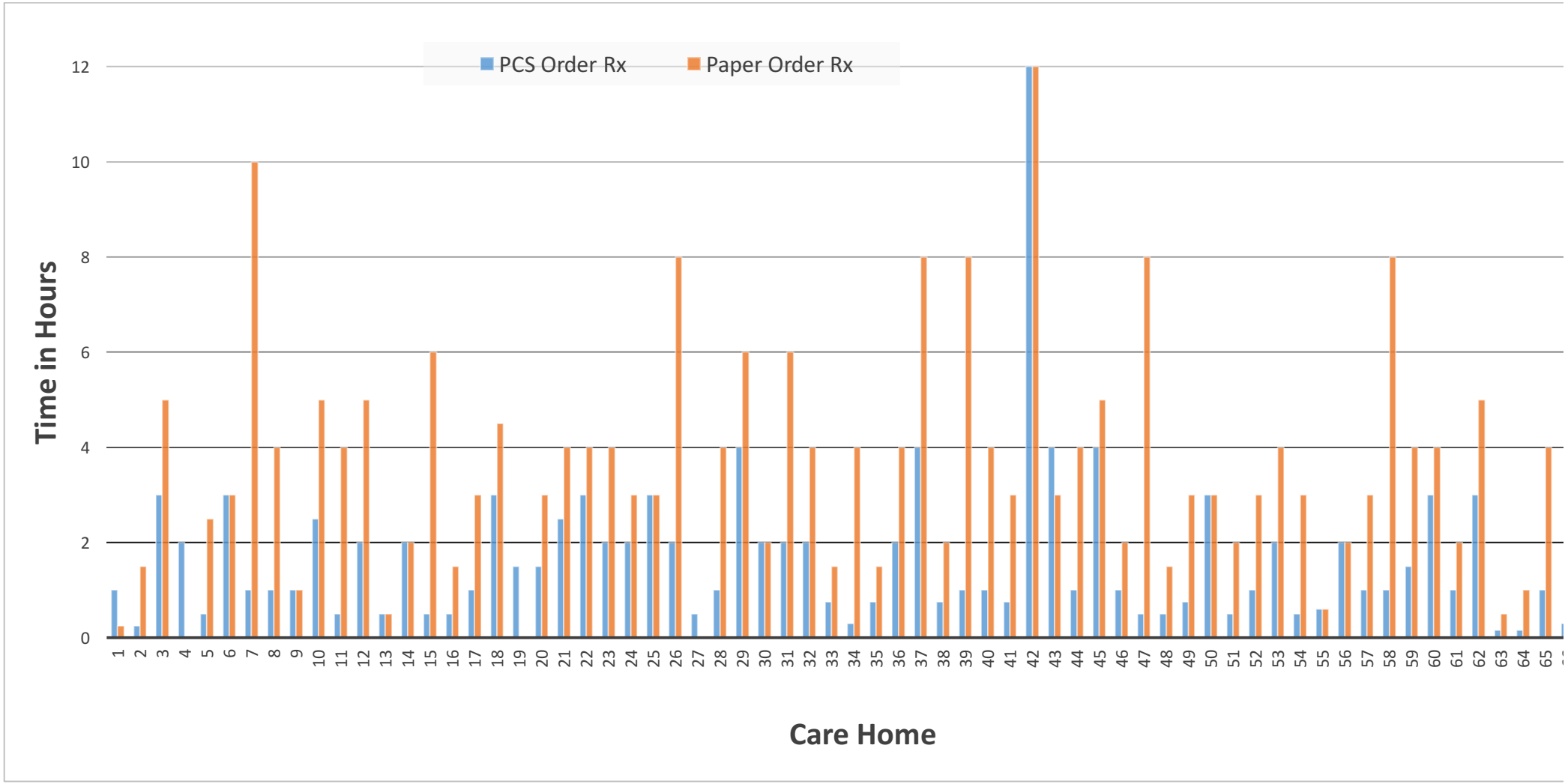
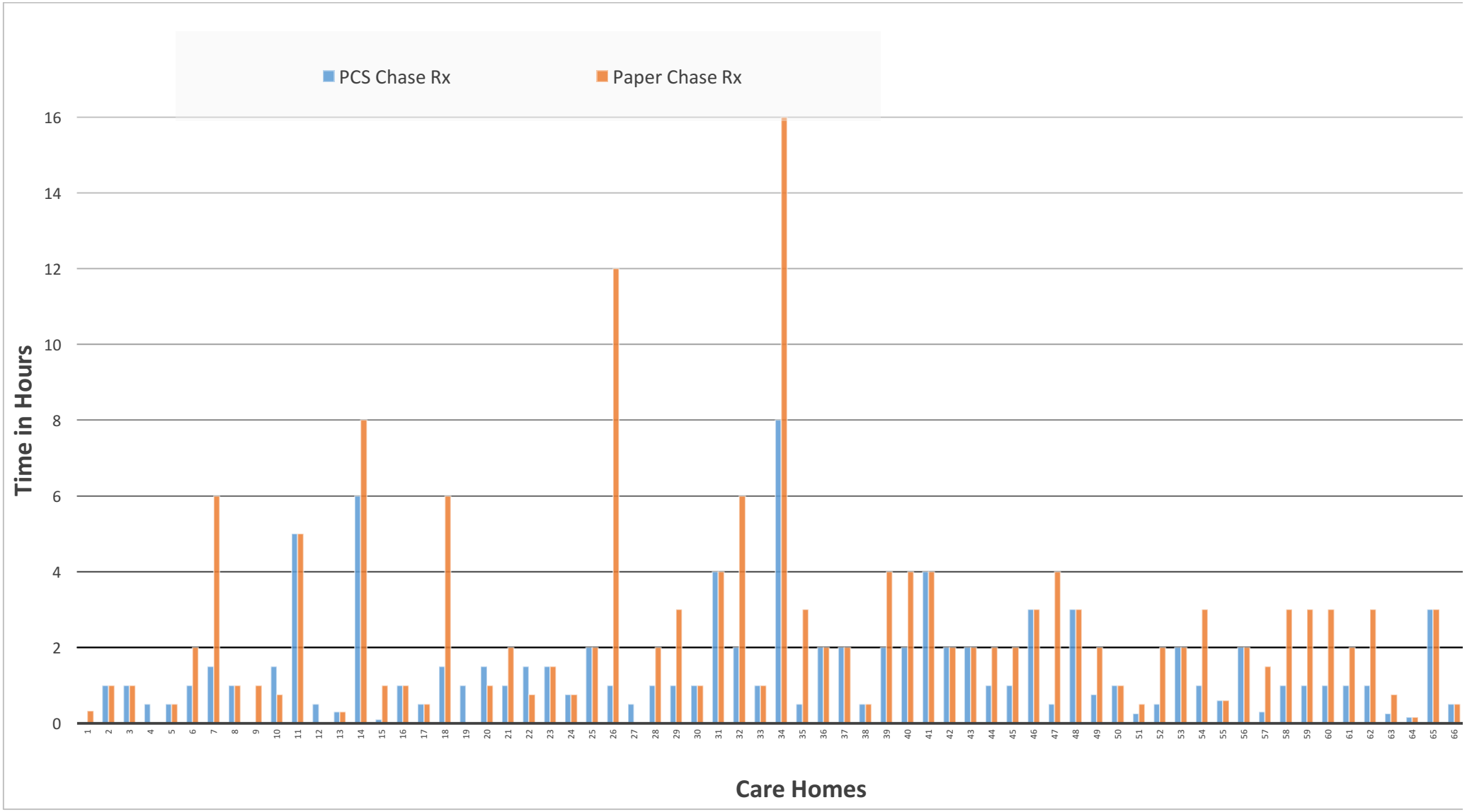


Figure 6 Time spent on the Prescription Chasing Process with PCS and Paper based systems



2.3.5 Making records of medicines received in to the care home

Care homes are required to account for all medicines received in to the care home. The process involves the identification of the medicines, confirmation of the quantity received and making records of the date that the medicines have been received and by whom. This process is known as "booking in". For an average care home, around 400 individual medicines need to be accounted for. Figure 7 shows the estimated time spent on the booking in process with PCS and paper based systems.

The time for this process ranged from 16 hours to 2 hours for paper based systems with an average of **5.4 hours**. The same process with the PCS system ranged from 8 hours to under 1 hour with an average of **2.1 hours**.

There was only one home where a comparison could not be made (care home 27) and 9 homes that reported there was no difference in the time taken for the booking in process. Out of the 56 homes that reported a difference in the time taken for this process, the average reduction was 3.71 hours representing a 64.5% reduction in time of the process. This difference was statistically significant $p < 0.05$ (Student t test p=0.00000000000018).

2.3.6 Changeover of monthly supply

The process of preparing for a new supply of medicines to be used in the care home is critical in ensuring continued care of residents. Within the overall process there are many activities that need to be performed including: accounting for and returning medicines that are no longer required; for stocks that are to be continued the quantity needs to be accounted for; the new supply physically put in to the medication trolley; checking medication administration records to ensure that any therapy changes indicated on the outgoing paper MAR charts have been updated on the new paper MAR charts.

This process with paper systems ranged from 18 hours to 0.75 hours with an average of **4.23 hours** per care home. The estimated time with PCS for this process ranged from 8 hours to less than one hour with an average of **1.61 hours** per care home. Figure 8 shows the responses received from each care home.

There were 2 homes for which a comparison could not be done (care home 27 and 32), and only one home that reported that the process with PCS takes longer (care home 23). Seven care homes reported no difference between the two systems for the end of the month process (Care homes 1,6, 15, 22, 24, 36 and 55). Of the 56 homes that said there was a reduction in the time taken for the process with PCS, the average time saving was 3 hours per care home representing an average of 65.6% reduction. This difference was statistically significant $p<0.05$ (Student t test p=0.0000000000022).

Figure 7 Time spent on the Booking in process with PCS and Paper based systems

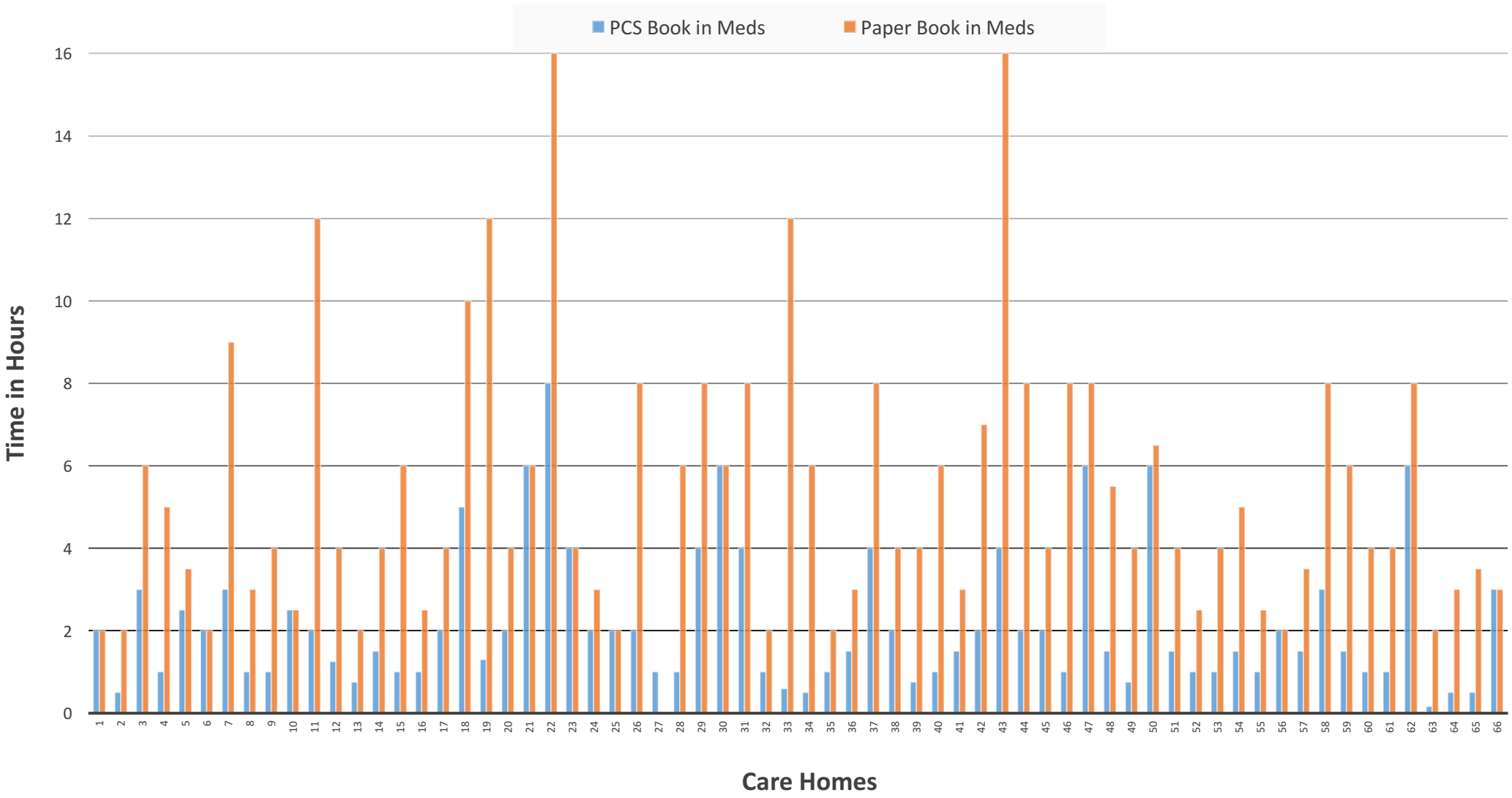
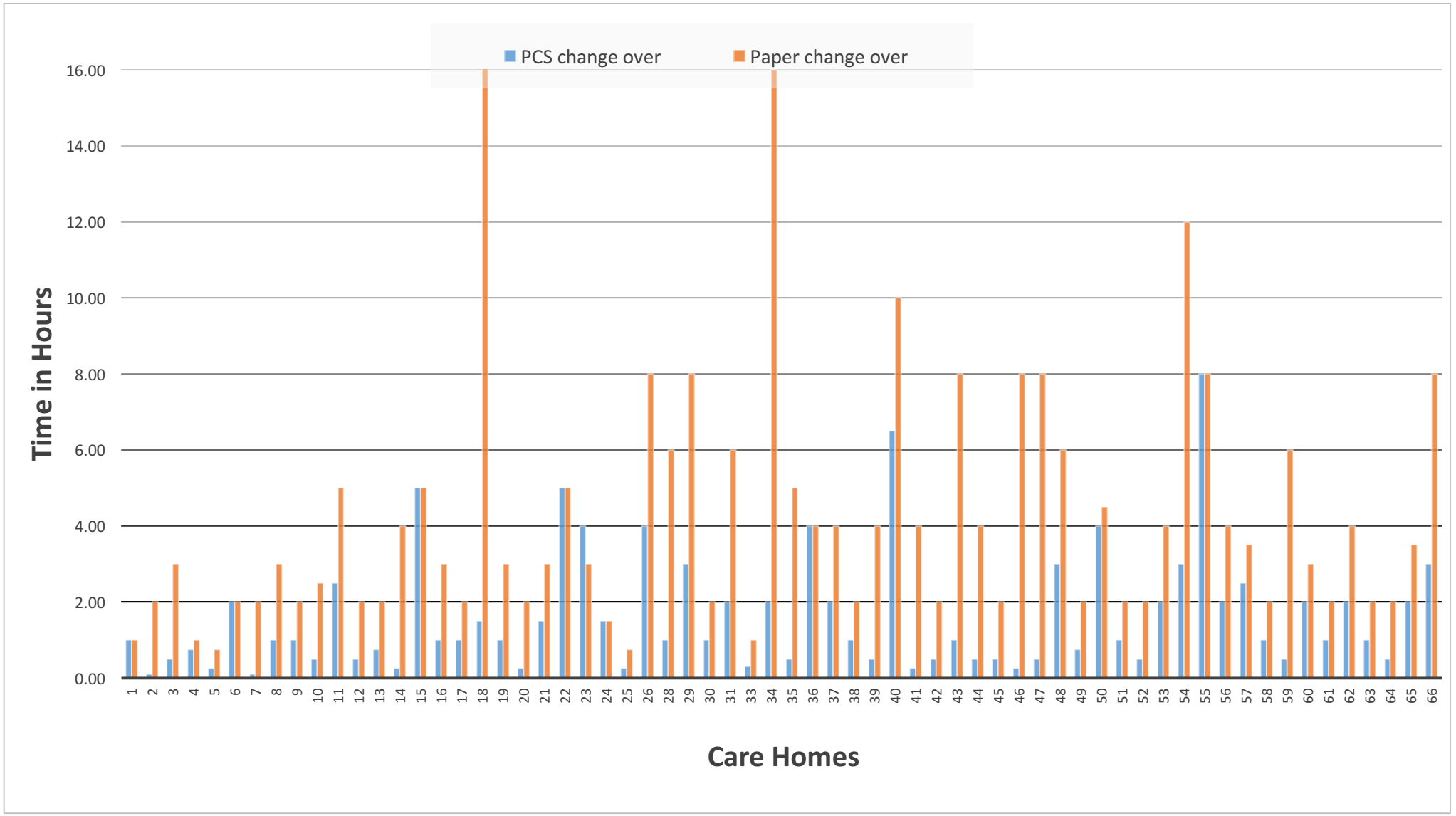


Figure 8 Time spent on the "changeover" process with PCS and Paper based systems



2.3.7 Audit of Medication Administration Records

The medication administration records in care homes are audited regularly to ensure that all medicine doses have been accounted for and that there are no "missing entries" or gaps in the records. This audit process can be time consuming depending on the number of residents and number of medicines in the care home. Figure 9 presents the results of the time spent on this activity with the PCS and paper systems. The responses for audit of paper based medication administration records range from 28 hours to less than one hour with an average length of time of **5.48 hours**. The audit of PCS medication administration ranged from 18 hours to less than one hour with an average of **2.10 hours**.

There were two homes where a comparison could not be made (care home 27 and 32). A single care home reported that the audit with the PCS system takes longer (care home 19) and 12 homes reported no difference in the time taken for audit. Of the 51 homes that reported a positive difference in the time taken for audit of medication administration records with PCS as compared to paper systems the average time saving was 4.3 hours representing an average reduction of 72 %. This difference was statistically significant p <0.05 (Student t test p=0.000011).

2.3.8 Audit of stock of medicines

Care homes are also required to have accurate stock counts for all the medicines in the care home. Figure 10 shows the estimated time for each care home with the PCS and paper based systems. The time taken for audit of stock with paper based systems ranged from 28 hours per month to less than an hour with an average of **3.75 hours**. The same process with the PCS system ranged from 14 hours to less than an hour with an average of **1.75 hours**.

There were 3 care homes for which a comparison could not be done (Care home 17, 27 and 32). There were 4 care homes that reported audit of stock counts with PCS took longer than with a paper based system (5, 21, 22, 56). Fifteen care homes reported no difference in the time it takes to audit stock counts with the systems. There were 44 homes that reported audit of stock counts with PCS is shorter than with paper based systems, with an average time saving of 2.91 hours representing an average reduction of 64%.

The reduction in time for audit of stock with PCS as compared to paper based systems was statistically significant p <0.05 (Student t test for matched pairs p=0.0001).

Figure 9 Time spent on the auditing of Medication Administration Records with PCS and Paper based systems

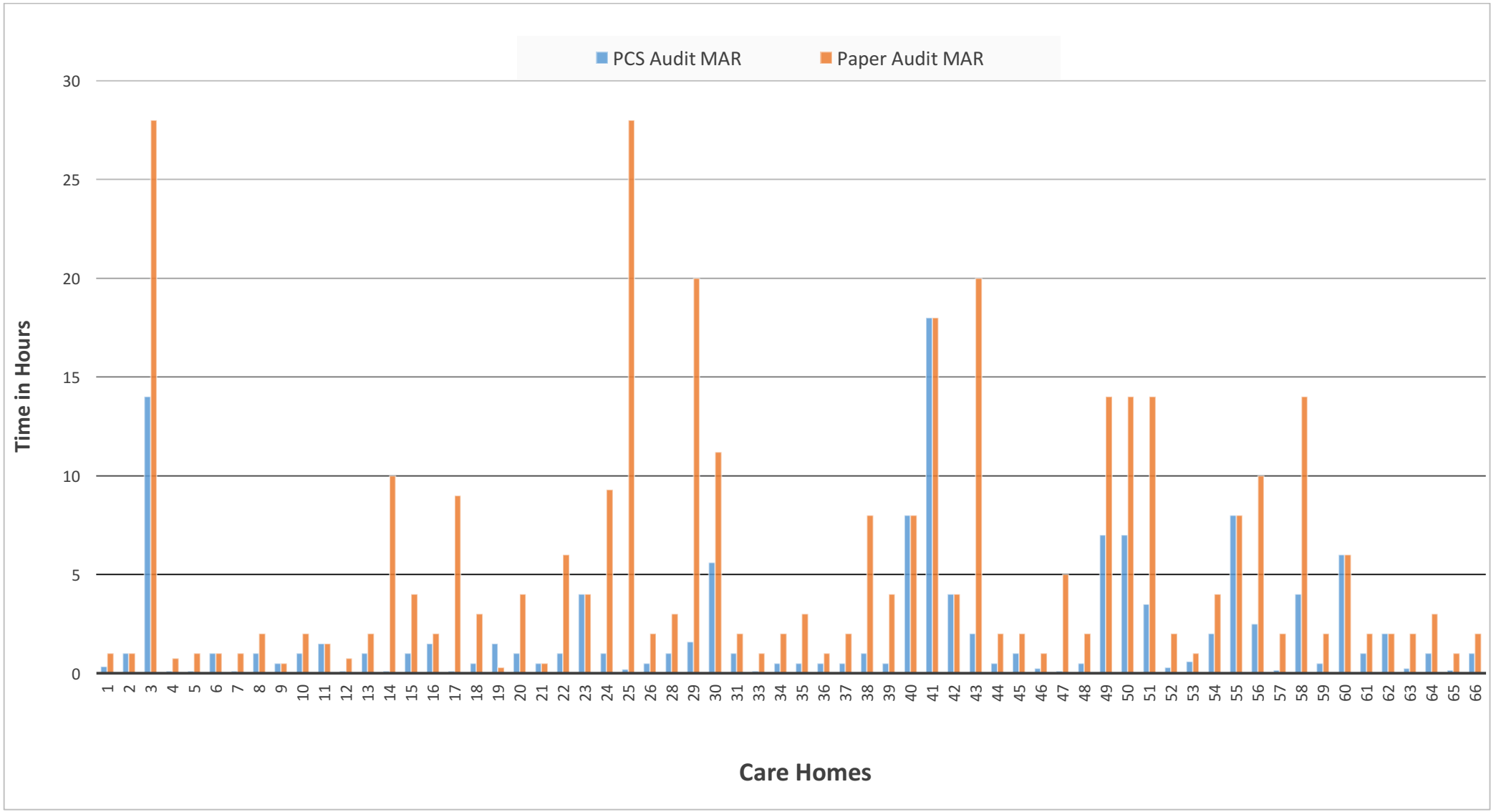
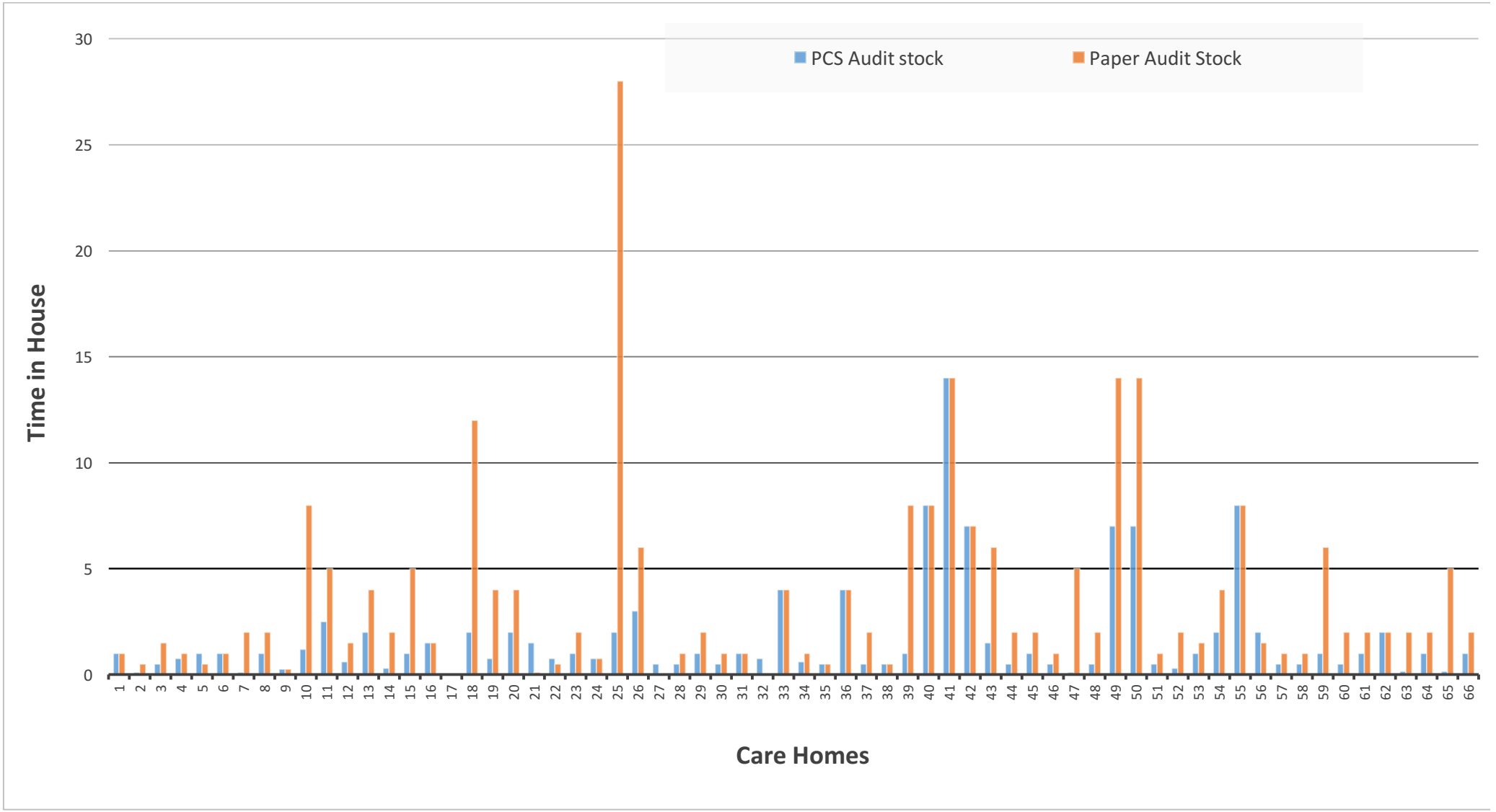


Figure 10 Time spent on the auditing stocks of medicines



2.3.9 Total time for medicines management

A direct comparison could only be made with 58 care homes (Care homes 1, 4, 9, 12, 17, 19, 27 and 32 were excluded). For the 58 care homes in the analysis, the average overall time per month in medicines management with paper systems is **351.9 hours** (range 137 to 1371 hrs) and with the PCS system is **286.4 hours** (range 79 to 902hrs). This equates to an average saving of **65.5 hours** (range 1 to 469 hrs) per month representing an overall time saving of 17.4% in one month. This difference is statistically significant $p<0.05$ ($p=0.044$).

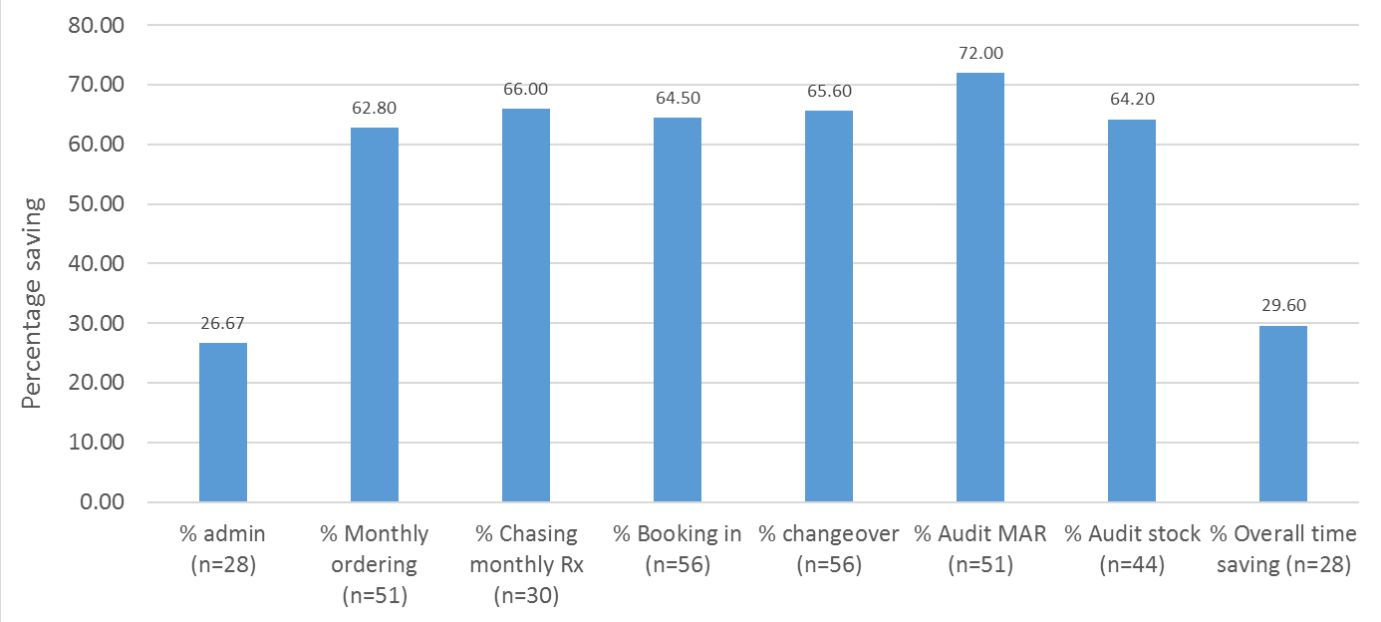
Table 4 below summarises the time spent on the different medicines management processes from the previous sections. For each process, there is a statistically significant reduction in time.

Table 4 Time devoted to medicines management process with paper and the PCS system

Process	Average time per care home per month using Paper systems (hrs)	Average time per care home per month using PCS system (hrs)	Student t test for matched pairs
Administration of morning medicines (n=64)	294.8	264.8	0.0000010664756
Ordering of Monthly prescriptions (n=63)	3.73	1.70	0.000000000041
Chasing of Monthly prescriptions (n=62)	2.6	1.5	0.000075
Booking in (n=65)	5.4	2.1	0.00000000000018
Changeover (n=64)	4.2	1.6	0.000000005
Audit of MAR charts (n=65)	5.42	2.01	0.000012
Audit of Stock (n=65)	3.76	1.73	0.0001
Overall time in medicines management (n=58)	351.9	286.4	0.0438

Error! Not a valid bookmark self-reference. highlights the average percentage reduction in time for each process where the time with PCS for the process was reported to be shorter compared with the traditional paper based systems. This graph shows a high proportion of care homes used the device in such a way to produce reductions in time for each process with an average of 27% reduction in time associated with administration of medicines, to reductions in the order of 60-70% with other processes and the overall percentage reduction of 30%.

Figure 11 Average percentage reduction possible for each medicines management process



2.3.10 Qualification of staff involved in medicines management

The respondents were asked to provide the qualification of staff who perform the different medicines management activities. Table 5below presents the qualifications of staff for each process. In general, the process other than medicines administration are often performed by senior staff with higher qualifications. This is especially the case for the processes of prescription ordering, audit of administration records and audit of stock counts.

The difference in the qualification of staff performing the monthly order and administering medicines was significant (Student t test matched pairs p=0.0015). This indicates that medicines management involves different grades of staff within the care homes.

Table 5 Qualification of staff involved in different medicines management activities

Qualifications	Medicines Admin	Prescription Ordering	Prescription checking	Booking-in	Change-over	Audit MAR	Audit Stock
NVQ 2	14	10	11	12	12	16	11
NVQ 3	37	30	31	30	30	25	28
NVQ 4	1	2	2	2	2	0	2
NVQ 5	1	5	5	6	5	4	5
Nurse / Manager	14	19	17	16	17	27	18

2.3.11 Costs of medicines management

The survey collected data on how long each medicines management process takes and the qualification of staff involved in each process. This information allows for the calculation of costs of staff involved in medication management for each care home.

When calculating staff time cost, it is important to base calculations on two key components:

1. Direct cost of employment

2. Utilisation – how much actual productive working time is achieved (taking account of training time, holiday, sickness, breaks, meetings, etc.)

Direct cost of employment should include hourly rate but once an employee is earning over £8k per annum, employers NI becomes payable at 13.8%. In addition, there may be other benefits that are employee orientated such as uniforms, meals and stationary that need to be taken in to account.

Utilisation cannot be more than 89% and that is assuming that someone is 100% productive for every hour that they are at work, never have breaks, never have training and are never sick. A 75% utilisation rate is a reasonable assumption; the rate was developed in conjunction with Vinven chartered accountants (registered number 7107090).

Considering the above and for simplicity, it can be argued that the direct cost of employment for a business is 25% of basic pay. Table 6 below shows the costs of different qualifications of staff.

Table 6 Staff costs versus qualifications used to calculate cost of medicines management

Qualification	Hourly rate	Cost to Business
NVQ Level 2	£8.00	£13.33
NVQ Level 3	£10.00	£16.67
NVQ Level 4	£13.00	£21.67
NVQ Level 5 / Manager	£15.00	£25.00
Nurse	£17.00	£28.33

A calculation of the cost of each medicines management process can now be made and an overall cost saving for using the PCS system can be estimated.

Table 7 shows the average cost of different medicines management processes with paper and the PCS system for the 58 care homes where a direct comparison could be made (Care homes 1, 4, 9, 12, 17, 19, 27 and 32 excluded). The average cost saving per care home per month for medicines management is **£1353.30** with the PCS system.

Table 7 Costs of medicines management process with paper and the PCS system (n=65)

Process	Average cost per care home using Paper systems	Average cost per care home using PCS system	Average cost difference
Administration medicines	£6305.57	£5240.22	**£1065.35**
Ordering of Monthly prescriptions	£74.72	£32.18	**£42.54**
Chasing of Monthly prescriptions	£49.81	£28.71	**£21.10**
Booking in	£101.90	£43.69	**£58.21**
Change over	£89.23	£35.10	**£54.13**
Audit of MAR charts	£113.38	£44.19	**£69.18**
Audit of Stock	£78.57	£35.77	**£42.79**
Overall costs	£6813.16	£5459.86	**£1353.30**

2.4 Summary and Discussion

This survey was designed following the qualitative themes that emerged from the usability study in the initial evaluation of the PCS system. In that study a theme that was rated highly was the effect of introducing the PCS system on other areas of medicines management and care. The aim of the survey was to determine if there were time savings in medicines management activities using the PCS device compared with the traditional paper based systems.

The method of structured telephone interviews was used to ensure that the right person within the care home provided the responses to the questions regarding the different medicines management processes. Responses were received from individuals who were involved in all medicines management processes and on average had 12 years' experience in the sector. The responses were from 66 care homes representing both nursing and residential providers served by multiple and independent pharmacies.

The greatest proportion of time allocated to medicines management in any given month is devoted to administering medicines to residents. On average, almost 6 hours per day is devoted to this activity, almost 300 hours per month.

The process of booking in of medicines in to the care home and the auditing of MAR charts on average takes up over 5 hours per month. Ordering of the monthly prescriptions, the changeover process for the new supply and audit of stock on average takes about 4 hours per month. The chasing of outstanding prescriptions takes up almost 3 hours per month. Overall on average more than 350 hours are devoted to medicines management, representing 2.34 full time equivalent members of staff.

Using the PCS, the process of administration of medicines is on average 5 hours per day totalling an average of 265 hours per care home per month. Auditing of administration records and booking in of

medicines takes on average 2 hours per month with the PCS, whilst ordering of monthly prescriptions, the monthly supply changeover process and auditing stock takes 1.7 hours per month.

The unique processes afforded by the PCS system and the integration with the pharmacy produces statistically significant time savings compared to traditional paper based systems for each process and in terms of the overall time devoted to medicines management. Overall there is an average time saving of 65.5 hours per care home per month.

The greatest percentage reduction in time using the PCS was for the process of auditing medication administration records (72%) followed by the process of checking prescriptions have been issued (66%), the new monthly supply changeover process (65%), the booking in of medicines (64%) and monthly ordering of prescriptions (62%). Time efficiencies for the administration of medicines with the PCS of an average of 30% were also achieved by 28 care homes.

The qualification of staff involved in medicine administration was different to other medicines management activities. Senior staff with higher qualifications were more involved with activities such as requesting prescriptions and auditing.

From the time devoted to each activity and the involvement of which level of staff an estimate of costs associated with medicines management can be calculated. On average the overall cost associated with medicines management using traditional paper systems is £6813.16 as compared to £5459.86 when using the PCS. This is an average saving of £1353.30 per care home per month in staff costs

In conclusion, whilst savings will vary by home, the medicines management processes enforced by the PCS system and the unique integration to the pharmacy system produce significant efficiency and cost savings in medicines management which could be devoted to other areas of care within the care home.

3 Post Implementation Survey

3.1 Background

The change to a new medication system can be disruptive in any care home especially considering that often a new pharmacy supplier is also associated with this change. The change to an electronic medicines management system brings further challenges of introducing technology to a sector whose staff and infrastructure are at the start of the digital transformation journey. Leadership, support, training, and a robust implementation process is critical in ensuring the successful transition from a paper based system to an electronic system.

The trial of the PCS system in care homes in South Wales as part of the Welsh Health Technology and Telehealth fund had a six-week implementation process which included: a leadership event; project management; e-learning courses; on-site training and a full day of on-site support on the first day live with the system. This process led to the successful implementation of over 30 care homes involved in the project.

The initial evaluation of the implementation of the Proactive Care System (PCS) in care homes in South Wales included a study on the usability of the system. In that study, semi-structured telephone interviews were held with care home managers. The usability study concluded that the care homes involved welcomed the PCS system and recognised its many benefits on the day to day administration of medicines and improvement on patient safety. The study also made recommendations relating to the implementation process that included the following:

- Further training for staff when implementing the system so that care home staff have more confidence and access to resources
- Extension of the period of initial support to care homes

Using the feedback from the usability study, the implementation process was adapted and extended as described in the following section. In addition, it was decided to survey the views of care home managers on the implementation process soon after they had started to use the PCS. The aim of the survey was the following:

- To measure the success of the implementation process
- To receive early feedback on the system and to act promptly to meet the needs of the individual care homes.

The following sections describe the implementation process and the results of the “Post implementation” survey.

3.2 The implementation process

3.2.1 Responsibilities in implementation

The implementation process involves the care home, the supplying pharmacy, Beacon Digital Health and Invatech Health. The responsibilities of the care home, the pharmacy, Beacon Digital and Invatech Health are documented in Table 8.

In brief the care home is required to ensure all policies reflect the new electronic system that is to be implemented and that all staff are registered on Invalife, complete their e-learning and attend the on-site training. The pharmacy is required to ensure all the required prescriptions are received and medicines and associated equipment is delivered at the appropriate time. The pharmacy is also required to deliver training on the PCS system and support the care home on the day that they first start using the PCS system, the 'Go-Live' day.

Beacon Digital's responsibility is to provide project management support and to ensure that there are appropriate resources to help the care home and pharmacy to fulfil their responsibilities in the implementation process. Invatech Health are responsible for ensuring the PCS, Invalife and CAPA software systems are available at all times and to provide a second line technical helpdesk.

3.2.2 The stages involved in the implementation process

The implementation process starts with a leadership / preparation phase where the date the care home will "Go Live" with the PCS must be agreed with all parties involved. Once date is determined then a project plan can be worked out that involves more than 60 steps which begins 6 weeks prior to the "Go Live" date. The main stages in the implementation processes are described below and presented in Table 8 Key Leadership Responsibilities in implementing the PCS electronic medicines management system

Care Home Manager	Pharmacy Manager	Beacon Digital
Regulatory compliance: policies, training competencies; CSSIW	Regulatory compliance, SOPs, training, competencies, T&C of Beacon Digital	To oversee the Me Management Proje
Roles and responsibility for project within the home and communicate to residents, relatives and GPs	Roles and responsibilities within the pharmacy and communicate to colleagues and GPs	To ensure that all Pharmacy impleme delivered per plan
Identify key lead person to support implementation and cascade training	Identify key lead in the pharmacy to support implementation	To provide implem
Ensure all staff (agency) complete e-learning and attend training sessions and are competency assessed assessed	Ensure all staff complete e-learning, attend and deliver training days and Go Live support	To provide suitable learning courses fo

Ensure all elements of the Pharmacy/Care Home SLA are supported	Ensure all elements of the Pharmacy/Care Home SLA are supported	
To escalate all operational and technical issues	Respond to care home queries	
Confidentiality of Records	Confidentiality of Records	Confidentiality of F
Review Monthly and Interim orders	Conduct clinical reviews and order medicine appropriately	
Review PCS performance	Review CAPA performance	

Figure 12.

1. Leadership and Preparation stage
    a. Pharmacy, care home and Beacon project manager to agree Go Live and other key dates and consider the change management process
    b. Pharmacy and care home each appoint a lead for the implementation
    c. Care home to notify GP surgeries and incumbent pharmacy of change to a new supplier and system

2. Care home and pharmacy staff to register on Invalife
    a. This ensures unique log in details to PCS and CAPA
    b. Invalife allows access to several e-learning courses (see below)
    c. There are various resources available on Invalife such as template letters and best practice guidance regarding changes in policies

3. Pharmacy to update records on CAPA and Care home to place prescription requests
    a. The pharmacy inputs new patient and medication details on to CAPA from a copy of the care home's paper Medication Administration Records
    b. The care home to place prescription requests with the surgery

4. Equipment delivered and e-learning completed
    a. E-learning to be completed by care home and pharmacy staff prior to their on-site training
    b. CAPA is installed in to the pharmacy at least three weeks prior to care home Go Live date and on-site training provided.
    c. PCS and other equipment delivered to the care home at least 2 weeks before the Go Live date

5. Pharmacy to dispense prescriptions and deliver medicines and the care home's on-site training day.
    a. Pharmacy to dispense prescriptions using the CAPA system to print barcodes on dispensing labels and deliver medicines to the care home

b. Beacon trainer to provide two training sessions at the care home so that staff who have already completed their e-learning courses become even more familiar with the use of the PCS.
c. Care home staff are shown how to book in the monthly medicines received and if new trolleys are being used to set these up ready for the Go Live date.
d. Final check of medication records on the PCS against the current paper MAR charts being used.

6. Care Home Go Live date
    a. Beacon trainer, Care home and pharmacy leads present at the care home to provide support

7. Post Go Live support
    a. Care home to contact pharmacy for first line day to day medicines management queries
    b. Pharmacy to contact Beacon Digital helpdesk for technical queries relating to the PCS device
    c. The Beacon trainer to contact the care home one week after the Go Live date to ensure the care home places the monthly prescription requests on the PCS and the pharmacy is notified of the details of the order on CAPA

Following the feedback from the surveys in the usability study described above a number of further post go live support was implemented

1. Telephone calls to the care home and pharmacy from the Beacon trainer on Days 1,2 and 3 post Go Live. During these phone calls the care home are supported in scenarios where dosages and or administration times need to be changed. In addition processes for business continuity are reinforced so that care homes are prepared for any eventualities.
2. Telephone call to the care home from the Beacon Trainer on day 14 post Go Live to provide a training sessions on the different features and reports available on Invalife
3. Telephone call to the care home from the Beacon Trainer on day 21 post Go Live to ensure that they receive and act on the “outstanding prescription report” from the pharmacy.

3.2.3 Invalife and e-learning

The Invalife website is a key component of the electronic medicines management solution. Invalife provides the following functions:

- A method for secure registration and verification of users of PCS
- A method for the care home manager to set the roles and access periods of different members of staff
- Secure access to and storage of pharmacy and care home records
- Access to resources such as implementation templates, help files and best practice guidance

- A vehicle for communication with the technical help desk via notifications and a chat facility
- Secure storage of documents used in the various medicines management processes eg monthly and interim ordering
- A learning management system where e-learning courses can be uploaded and staff scores and training are recorded.

Three e-learning courses were made available to the care home and pharmacy staff.

1. Getting started with PCS: this course was designed to provide the basic knowledge that a member of staff would need to be able to administer medicines with the PCS. Completion of this course is a mandatory requirement for all staff who are to administer medicines with the PCS and pharmacy staff are also required to complete this course to be able to support their care homes. This course takes between 30 to 45 minutes to complete and staff are required to get a score of 100% in the quiz associated with this course to complete this e-learning.

2. Keeping records with PCS: this course was designed to provide further knowledge and understanding of how to use PCS to improve medicines management in the care home. This course is aimed at staff members who take a lead in medicines management in the care home. It is recommended that this course is completed by the end of the first month of using the PCS. This course takes about 45 minutes to complete and the pass mark for the quiz is 80%.

3. Medicines handling and management with PCS: accredited by the Royal Pharmaceutical Society of Great Britain, this course is designed to facilitate the requirement by regulatory bodies that all staff involved in medicines management have completed an appropriate accredited course. This course takes between 1.5 to 2 hours to complete. The pass mark for the quiz is 80%.

The advantages of providing an e-learning course on Invalife, is that staff can complete the courses at their own time and pace. Care home managers can see the progress of the staff with each course and the completed training records and scores on Invalife can be used as evidence to regulators.

To October 2016 over 5000 people have registered to use Invalife.

Table 8 Key Leadership Responsibilities in implementing the PCS electronic medicines management system

Care Home Manager	Pharmacy Manager	Beacon Digital	Invatech Health
Regulatory compliance: policies, training competencies; CSSIW	Regulatory compliance, SOPs, training, competencies, T&C of Beacon Digital	To oversee the Medicines Management Project	To ensure installation of working PCS and CAPA software,
Roles and responsibility for project within the home and communicate to residents, relatives and GPs	Roles and responsibilities within the pharmacy and communicate to colleagues and GPs	To ensure that all care home and Pharmacy implementation is delivered per plan	
Identify key lead person to support implementation and cascade training	Identify key lead in the pharmacy to support implementation	To provide implementation support	To provide help desk support
Ensure all staff (agency) complete e-learning and attend training sessions and are competency assessed assessed	Ensure all staff complete e-learning, attend and deliver training days and Go Live support	To provide suitable and accredited e-learning courses for care home staff	
Ensure all elements of the Pharmacy/Care Home SLA are supported	Ensure all elements of the Pharmacy/Care Home SLA are supported		To remedy all technical issues
To escalate all operational and technical issues	Respond to care home queries		
Confidentiality of Records	Confidentiality of Records	Confidentiality of Records	Confidentiality of Records
Review Monthly and Interim orders	Conduct clinical reviews and order medicine appropriately		
Review PCS performance	Review CAPA performance		Ensure PCS and CAPA performance

Figure 12 The Implementation Process Milestones and Time line

3.3 Methodology

A short questionnaire was designed focussing on the high-level implementation processes such as communication of timelines and milestones; registration on Invalife; the e-learning courses; the on-site training; the support on the Go Live day and an indication of the overall satisfaction with the process. Likert type scales were used to obtain satisfaction scores for each element of the implementation process. An opportunity to write further comments was also provided.

The questionnaire was administered via SurveyMonkey. A link to the survey was sent to the care home managers by email shortly after the Go Live date. The care home managers were then required to access the survey on-line and complete each question. Reminder emails and telephone calls were made to care home managers to encourage the completion of the questionnaires.

3.4 Findings

3.4.1 Care home and respondent characteristics

Out of 206 homes that the link to the survey was sent to, responses were received from 118 homes representing a 58% response rate.

There was almost equal representation of residential and nursing home registered care homes. The average number of beds per care home is 45 in two units per care home. Care homes served by both multiple and independent pharmacies were represented.

Characteristics of care homes	Numbers
Total number of homes	118
Residential homes	57
Nursing home / dual registration	61
Average number of beds	45
Average number of units	2
Served by Multiple Pharmacy	105
Served by Independent Pharmacy	13

3.4.2 Communication of the implementation milestones and timeline

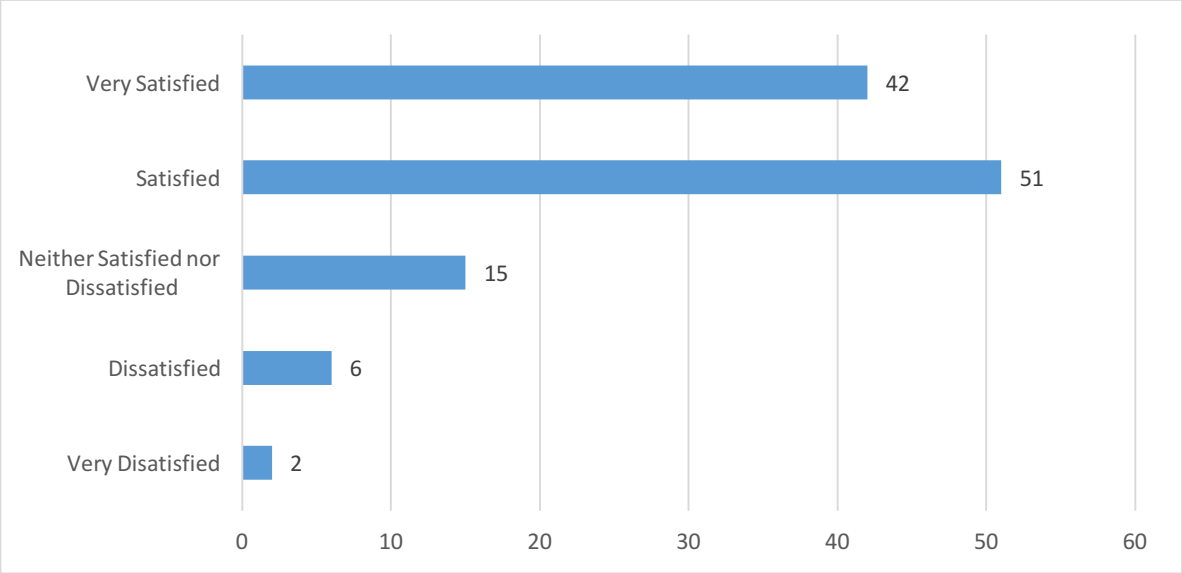
Communication of the responsibility for the different tasks and their time line leading up to the Go Live day is critical in the implementation process. The survey asked respondents to indicate their satisfaction with the communication regarding the implementation process.

Responses were received from 116 care homes, the results of which are presented in Figure 13 . The clear majority of the respondents, 80%, indicated that they were either Very satisfied (42) or Satisfied (51) with the communication of the time lines of the implementation process.

Positive additional comments included:

"the communication was very clear and helpful"
"good flow of communication both by phone and visits"
"you can always ring anytime
*particularly P**** C**** she was a great support, everyone else was friendly and supportive, easy to get on with. which makes a big difference. thanks to all the team"*

Figure 13 Satisfaction with the communication of the Implementation process



Fifteen respondents were neither satisfied nor dissatisfied with the communication process, 6 were dissatisfied and 2 were very dissatisfied. The comments relating to these experiences from these included:

1. Where the implementation process started sooner than the recommended minimum of 6 weeks prior to Go Live:
   "Needed more information sooner ' felt rushed'"
   "Initial paperwork was received after deadlines for completion of each of the initial steps."
   "Staff feel that it should have been implemented over a longer period."

2. Where initial dates of implementation were changed:
   "we did have a number of date changes but prior to the go live date lack of communication around set up, as wrong information was inputted."
   "Both training timelines and milestones were altered / moved as yet we have not

adhered to any dates/milestones advised to us during training"
"we were told that it would be implemented sooner that it was"

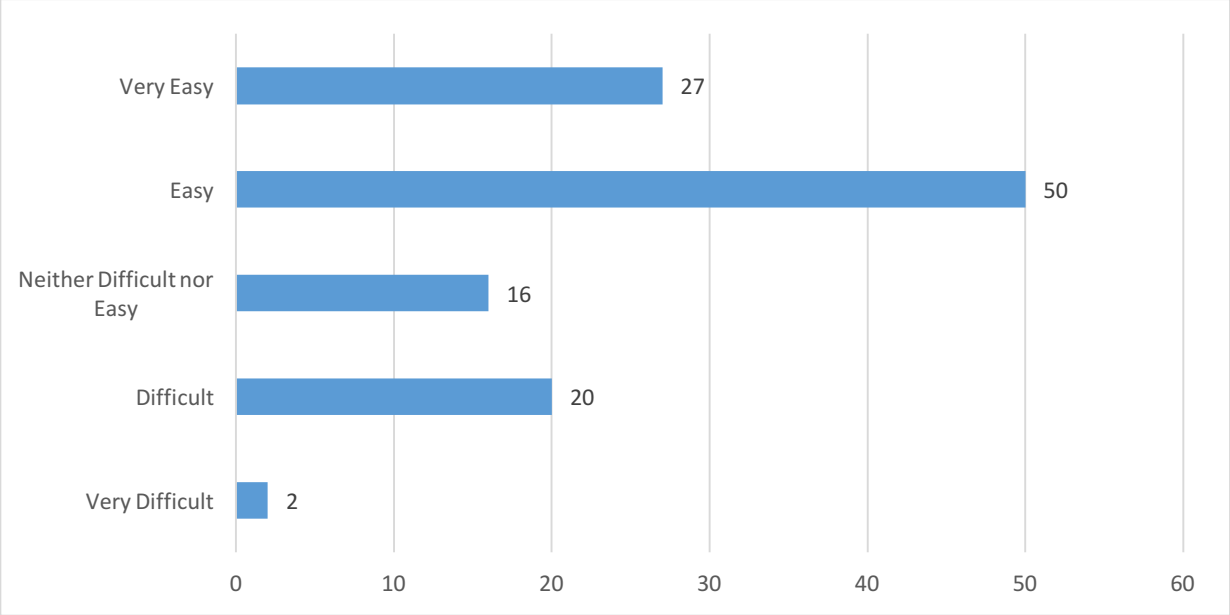
3. Coordination of the delivery of associated equipment such as medication trolleys and cabinets
   "I was very disappointed that I did not receive adequate timings for both the delivery and installation of the medication cabinets."

4. Where the initial information regarding the proposed Go Live date was incorrect.
   "There was a hiccup at the home that the start date had been communicated incorrectly - this was within the care home group"

3.4.3 Registration on Invalife

One of the early requirements of the implementation process is for care home staff to self-register on Invalife where their registration is verified by the care home manager who also sets their role and access period. Once this is done, the staff member can access Invalife to complete their e-learning course and to use their log-on details for the use of the PCS device. Respondents were asked about experiences of the Invalife registration process. Figure 14 shows that 77 out of 115 respondents (67%) found this process very easy or easy.

Figure 14 Experiences of registering on Invalife



Sixteen found this process neither difficult nor easy whilst 20 respondents reported that they found registration on Invalife difficult and 2 respondents found it very difficult.

The comments relating to difficulties in registering were traced to staff not having email addresses which is a pre-requisite for using the system. In these scenarios care home mangers had to support staff in firstly setting up email addresses and then with the registration process:

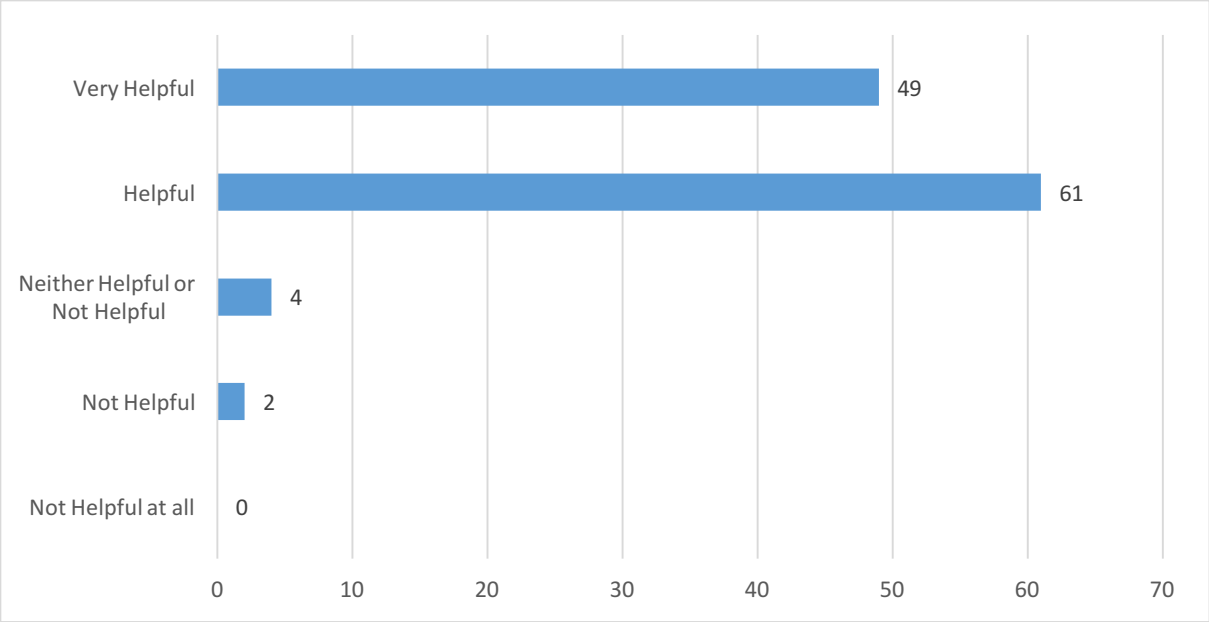
"Some staff who did not have an e-mail address found it difficult needed additional support having to create a log in and then having to log in to register"

*"P*t and I supported most staff to do this. It was easy and worked well."*

3.4.4 Views of the e-learning courses

Once registered on Invalife, staff are required to complete the basic "Getting Started with PCS" e-learning course prior to their on-site training day. In addition there are two more courses entitled "Keeping Records with PCS" and "Medicines Handling and Management. The "keeping records with PCS" is essential for medicines leads and recommended to be completed in the first month of using PCS. The "Medicines Handling and Management" course is accredited by the Royal Pharmaceutical Society of Great Britain and is designed to meet the requirement for training of staff who administer medicines. Figure 15 shows the responses to helpfulness of the e-learning course. Ninety five percent of the respondents found the courses either very helpful or helpful. Only 2 respondents did not find the e-learning courses helpful and only 4 reported the courses were neither helpful or not helpful.

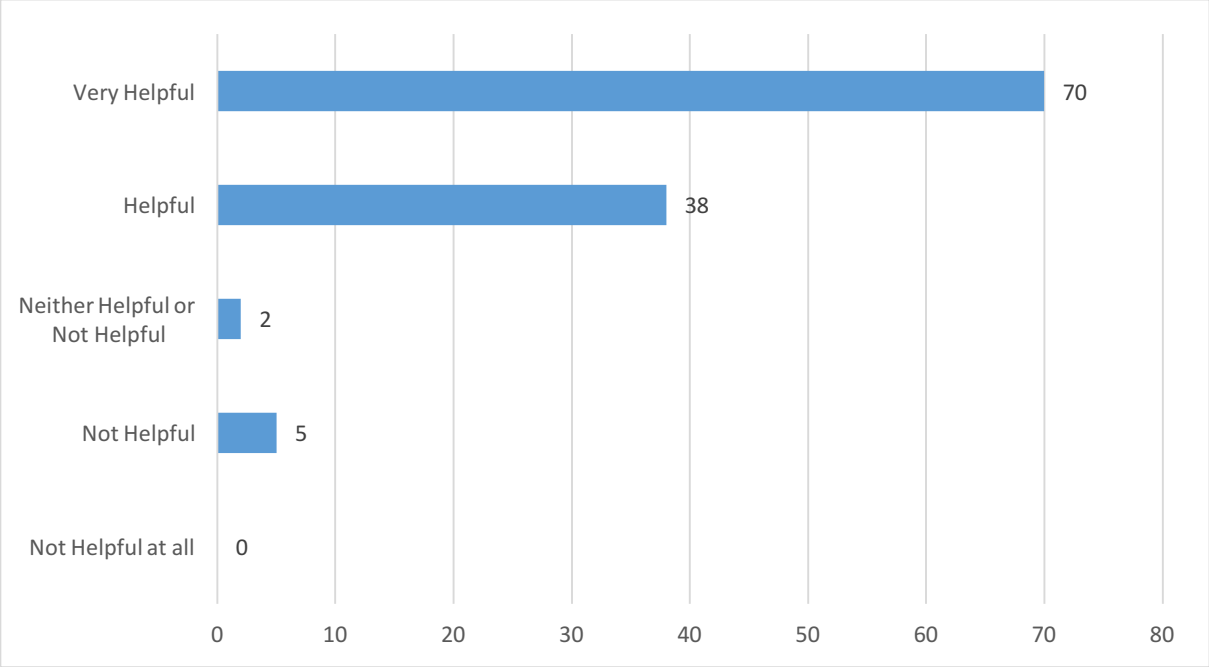
Figure 15 helpfulness of e-learning courses



3.4.5 On-site Face to Face Training

In addition to the e-learning courses that staff can complete in their own time, two on-site training sessions on a single day are offered to care homes as a minimum. Two sessions are offered so that care home managers can organise as many staff to attend as possible. Similar to the e-learning, 94% found the on-site face to face training very helpful or helpful, see Figure 16. Only 4 reported that the on-site training was neither helpful or not helpful and only 2 reported that it was not helpful at all.

Figure 16 Views of On-site Face to Face training



Positive comments about the training included:

"Very clear and understanding."
"She was very approachable and she adapted her training to suit the abilities of each individual so that we all could gain the correct understanding of the system by the end of the session."
"<Implementer> was very helpful."

Feedback for improvement of the training sessions related to the following themes:

1. Abilities of individual trainers / implementers

"the first training by <Implementer> was thorough but <Implementer2> on the second day didn't seem to have the same knowledge"

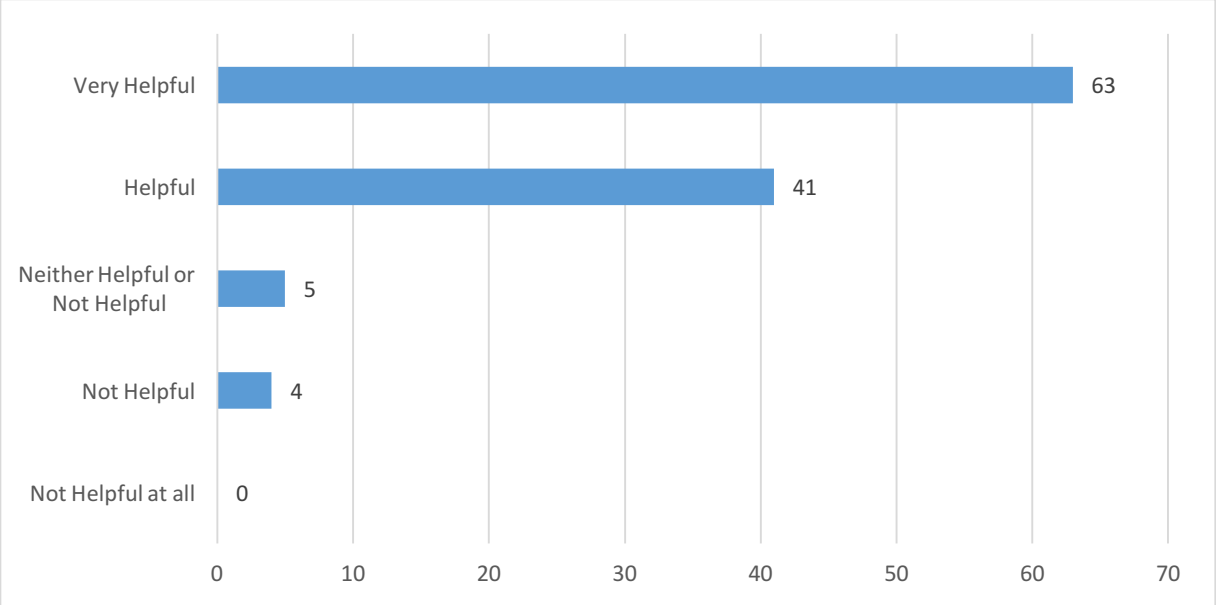
2. The number of training devices available at the training sessions
   "group had to share on PCS device"

3. Training sessions on one day
   "sessions given on a one day and not flexibility given ,I was lucky to have that day . but this was certainly not enough and as I have a day and a night team i was not able to train all my staff"

3.4.6 On-site Go Live Support

On the day that the care home starts using the PCS for medicines management, the Go-Live day, a trainer or implementer is sent to provide support. Care home managers were asked to indicate the helpfulness of the support on this day see Figure 17. Ninety two percent of the respondents found this support very helpful or helpful. Only 5 respondents said that this support was neither helpful or not helpful and 4 respondents said that this support was not helpful.

Figure 17 Views of Go Live On-site Support



Positive comments included:

"We had someone here for support if we needed it."
"We all felt very supported and knowing we can pick up the phone will any issues and someone will help us is very helpful"
"<Implementer> was excellent we had a lot of problems with barcodes and medication not scanning he real helped to resolve these issues and talk to the right people to do so."
"The support was available and staff felt that their issues were dealt with."
"Pharmacist came all day and offered support which was fantastic and helped the first day go well."

Feedback comments for improvement included the following themes:

1. Longer on-site support

   "I feel that the go live should be delivered over a period of days rather than one day to enable all staff members who will be using the PCS all have access to this"

2. Support was used to carry out preparatory tasks that should have been done prior to the Go Live

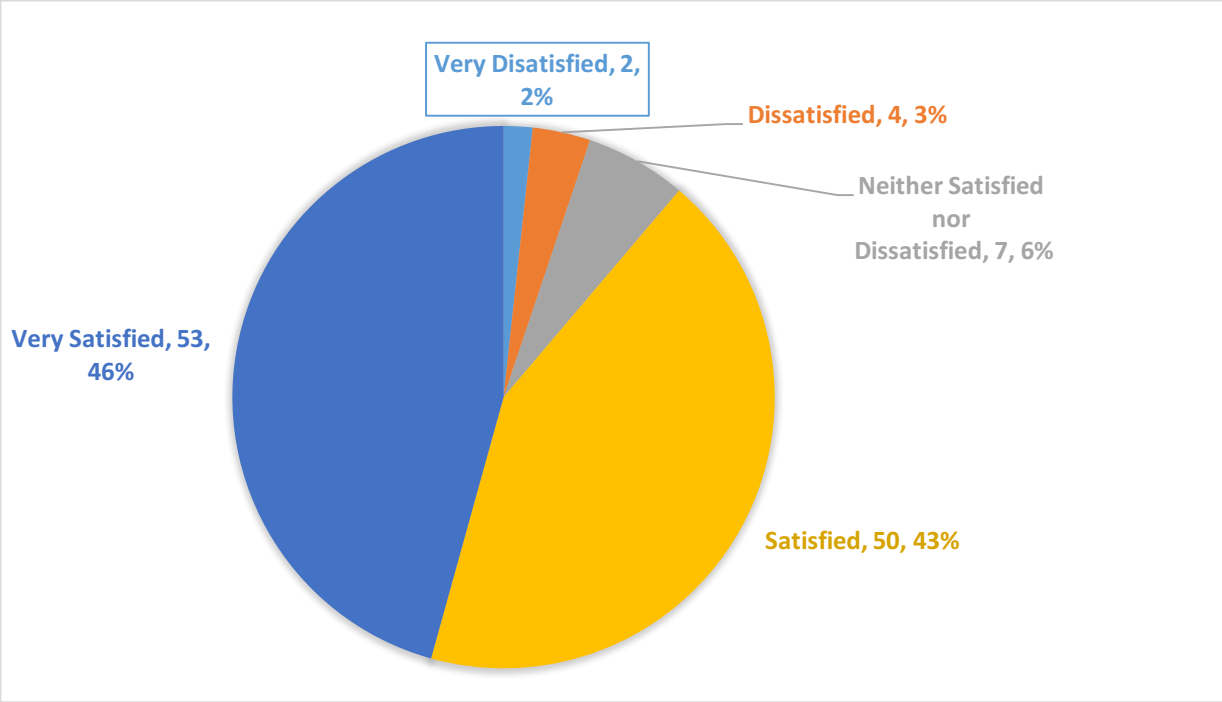
"we also found that all residents had been allocated to Garden View PCS handset instead of split between the three."
"The initial period of support in attendance on Go Live day was spent booking meds in"

3. Logistics of delivery of medicines
"he did help and also sorted out the non arrival of the ordered medications"
"the pharmacy went sick so our meds remained in Southampton until the pharmacist returned, in the meantime we were not able to check and correct or chase any outstanding meds for Monday morning, we had to use our own return meds so our residents had medication"

3.4.7 Overall experience of the Implementation process

The respondents were asked to indicate their overall satisfaction with the implementation process. The majority 89% (103) of the respondents were either very satisfied or satisfied with the implementation process.

Figure 18 Overall Satisfaction with the Implementation process



There were many positive comments with themes relating to care home managers expecting to have some teething issues but that overall the implementation had gone well:

"I think that once we all have pin numbers sorted out and got used to the pcs again it will be lovely to have a safe way to administer medication"
"it is early days but first indications and feedback is positive"
"We have had a few hiccups but over all the PCS is very good and easy to use."
"Think it's going well, very easy to use, few teething problems, but good support"

"our first impressions of the PCS, are very favourable all staff are happy with the new system and feel valued because we are at the forefront of technology"

Seven respondents indicated that they were neither satisfied nor dissatisfied. Analysis of the themes relating to the source of the dissatisfaction were the following:

1. Expectations of a greater level of support
   "I feel that the challenges are the lack of on-site practice support during the implementation, but I do appreciate that this is difficult taking into account where most of your support team are based."

2. Logistics of medication deliveries
   "Errors with mere delivered etc"

3. Logistics of equipment delivery
   "Equipment not delivered on times promised."

4. Misunderstanding around some of the medication processes
   "I was told I did not have to have witness pins as the nurses can witness but this was certainly not the case . I had been prepared to start the pin access procedure two weeks ago then having been informed I didnt go ahead , then I discovered that a witness , as is always required is needed to input new drugs etc,"

3.5 Summary and Discussion

The implementation process for the PCS involves multiple agencies and has detailed steps which cover planning, leadership, change management, training and support. Each step has to be delivered in a coordinated and timely manner. The model adopted by Beacon Digital is to provide a standard template and required resources that the pharmacy and the care home can use to implement the PCS system. The implementation process was adapted following feedback from the initial evaluation to include more support post Go Live for the care homes. In addition, it was decided to survey care home managers soon after the Go Live day. This section has reported on the findings of the "post implementation surveys". This evaluation is unique to the PCS's implementation process and, to date, is the only one available for electronic medicines management providers in the market.

Responses from 118 surveys were collected representing a 58% response rate. Eighty nine percent of the respondents (103) said that they were at least satisfied with the implementation process. For each stage of the implementation process the vast majority of the care home manager provided positive responses: 80% were satisfied with the communication regarding the implementation process; 67% found the registration process on Invalife very easy or easy; 95% and 94% found the e-learning courses and on-site training very helpful or helpful and; 92% found the Go Live support at least helpful. Qualitative feedback was mainly positive which is not surprising as 89% were satisfied with the overall implementation process.