

Improvement and Efficiency  
West Midlands



*Midlands and East*

# The Automated Pill Dispenser Project

The right pills at the  
right time delivering  
the right outcomes

## End Project Evaluation Report

March 2012



## Foreword

Medication can both prolong life and enable people to live independently in the Community. However, medication regimes for many people can become complex and overwhelming. Poor medication adherence can erode self-confidence and well-being. Health and social care agencies must intervene and help people at the right time before complex, costly and intensive interventions like hospital admission become necessary. For the individual this requires straightforward and easy to access support. This project has created new pathways between Local Authorities, PCT Clusters and Community Pharmacies.

Almost four hundred people have benefited from an Automated Pill Dispenser service that has helped them to self-manage their medication. This report outlines both the business case and qualitative data about the experience of people in the West Midlands using the Automated Pill Dispenser service. As Local Authorities and GP's assume more responsibilities for community based healthcare this work becomes ever more relevant. We have not yet explored the potential for GP's to directly prescribe this service. Equally there are areas across the rest of the country who are yet to explore the technology. We hope this report stimulates the reader to think about the art of the possible locally.

Our thanks go to NHS West Midlands, and Improvement and Efficiency West Midlands for funding the Project, all of the pilot sites, PivoTell and Andy Jackson - Project Manager from Charter & Plan Ltd.



Paul Davies

Executive Director of Adult Social Care and Inclusion - Walsall MBC

ADASS lead for Prevention and Early Intervention

# Contents

Executive summary .....	1
Introduction .....	3
Initial research - University of Birmingham .....	6
Project set-up .....	7
Referral and assessment .....	13
Client profile .....	16
The role of the pharmacy .....	17
Project impact evaluation .....	20
The human experience.....	25
Communications .....	26
Lessons learnt.....	27
Conclusion .....	29
Next steps .....	31
Recommendations .....	31
Acknowledgements .....	32
Appendix 1 - Project Board Representation .....	33
Appendix 2 - The PivoTell Automated Pill Dispenser Mk 3 .....	34
Appendix 3 - The Pilot Documentation .....	36
Appendix 4 – Parts 1 to 3 of the On-line Database .....	50
Appendix 5 – Pharmacy Database .....	53
Appendix 7 - Carer Questionnaire .....	56
Appendix 8 - Case Studies.....	58

## Executive summary

### Consequences of poor medication adherence

Everyone forgets to take their medication at one time or another. But for those on a complex pill regime, not taking prescribed drugs at the right dose and at the right time can have major consequences, particularly if they are elderly or vulnerable.

Every year the NHS spends almost £9 billion on medicines, issuing 927 million prescriptions, and it is estimated we return more than £100 million in unused drugs, which are then destroyed.

In 2006-07 the cost of hospital admission in the UK resulting from patients not taking their prescribed medicine properly was estimated to be between £36m and £197m

### Project mandate

A mandate for the project was provided by the Directors of Adult Social Services in the West Midlands (ADASS) and Medication Management Leads from corresponding Primary Care Trusts.

The aim was to test the assumption that by using an automated medication dispensing device, better self-management of medication enables people to enjoy improved quality of life, remain independent at home for longer and be less reliant on health and social care services (thus reducing costs to these economies)

### Who benefits?

Anyone who has difficulty remembering to take their medication benefited from the project. Approximately one third of the participants were in the early stages of dementia and about one fifth had physical disabilities, such as arthritis or visual impairment. Three quarters of clients were over 75 years old, showing that age was not a barrier.

### The business case

An important part of the project was to show how using the pill dispenser could make savings for the NHS and social care services. The data collected clearly demonstrates significant savings of £430k for health and social care, an average saving of over £1,700 per person over the six month period.

The two biggest areas of savings were fewer home visits to remind people to take their medication, and a reduction in hospital admissions as a result of accidental over- and under-dosing.

### Human experience

Feedback from participants and carers has been overwhelmingly positive. The pill dispenser has had a positive impact on their lives and many case studies have been collected, some of which are in the appendices of this report.

## Next steps

All the local authorities that took part have secured funding for at least the next financial year, either from their own budgets, or in conjunction with health. This will enable them to continue to support the people currently using the pill dispenser post-project. They also plan to make the device available to others as part of their mainstream assessment of individual needs.

It is hoped that others will follow the West Midlands' example and work jointly to ensure the pill dispenser is widely available through a variety of channels, including GPs, social care, hospitals and pharmacies, to help vulnerable adults control their medication.

## Introduction

### Background

Research published by Birmingham University<sup>1</sup> and an increasing body of anecdotal evidence from Adult Social Care teams in the region suggested that complex medication regimes with multiple dosages throughout the day posed particular challenges for older people with memory loss or cognitive impairment and people with mental health problems and learning difficulties.

The UK statistics provide a picture of the extent of the medication market:

- 927 million prescription items dispensed per annum<sup>2</sup>
- English average 17.8 prescription items per head of population<sup>2</sup>
- Older people receive an average in excess of 42.4 items
- Net ingredient cost of £8,834 million<sup>2</sup>

The use of prescribed medication is, however, extremely variable – there have been several studies of people’s behaviour and how closely they adhere to prescribed medication regimes:

- Some studies reported different ranges of adherence for adult patients (40–60%) and children (25–75%)
- Only 50% of people take their medicines adequately
- UK has about 42 million patients on prescription medications.
  - 1 in 6 “fully” adhere,
  - 1 in 3 adhere “satisfactorily,”
  - 1 in 6 adhere “poorly.”

The cost to the government in untaken medicines has been estimated at around £100 million per year<sup>3</sup>, although this is regarded as a conservative estimate. It is also believed that the costs

---

<sup>1</sup> Automatic Medicine Dispensers, A Review of Evidence and Current Practice, University of Birmingham 2008

<sup>2</sup> Prescriptions Dispensed in the Community: England, Statistics for 2000 to 2010, The Information Centre

<sup>3</sup> National Audit Office, 2007

associated with wasted medicines are probably insignificant in comparison with the lost therapeutic benefit that might result from inappropriate use of medicines.

The consequences of poor medication adherence, particularly in the case of people with long-term conditions, are loss of independence, increased GP visits and hospital admissions.

## Available solutions

There are various devices available either to help people to take their medication by simplifying administration, or by supporting them to remember to do so. These include (and the list is by no means comprehensive):

Pill reminder charts, drug diaries, calendar clocks, telephone prompting service, multi-compartment compliance aids (MCAs), talking labels, voice reminders, watch reminders, daily pill boxes and automated pill dispensers.

For many people, these are an invaluable aid to medication adherence and MCAs such as dosette boxes and blister packs are very widely used. Whilst these aids do work and many people have used them successfully for years, they do require the person using them (who will often be referred to as client in this report) to be able to manage the timing and frequency of consumption without prompting and these aids are often not adequate for people with more severe cognitive problems and some physical disabilities such as sight loss or dexterity problems. Compliance monitoring also becomes problematic, as there is no comprehensive means of determining whether or not pills were consumed as prescribed or thrown away.

The automated pill dispenser is a more recent development: it reminds the user with an alarm when it is time to take their medication and makes the pills available at the right time (see Appendix 2 for a detailed description).

## Barriers

Efforts to improve medication management were observed to be fragmented and inconsistent: although there is a general acknowledgement that poor medication management adherence has a significant effect on the health and wellbeing of vulnerable people and is the cause of unnecessary expenditure for both Health and Adult Social Care: there is little evidence of joint strategic approaches to this issue across the health and social care economies.

Commonly observed barriers are:

- Lack of co-ordination between health and adult social care assessments and provision of support
- Medication management is not seen as part of core business – it is often left to individual pharmacists who, though willing to help, often don't have resources for this

- Social workers not familiar with medication management issues, so care managers often fill the gap by providing domiciliary care medication reminders under the guise of care visits. This service is costly, at between £19 and £26 per hour<sup>4</sup>, depending on the resource used.

## Resources and challenges identified

In the West Midlands, there had been a growth of and increasing investment by Adult Social Care in telecare teams, with regional networks maturing and teams sharing ideas. Technical advances were also increasingly making telecare more accessible, available and acceptable to people.

Telecare and Telehealth teams were already starting to become involved in cases where dosette systems were no longer sufficient for medication management: there had been some innovation by teams using automated pill dispensers, which overcame some of the issues but teams were coming up against problems resourcing the filling the dispensers.

The West Midlands regional ADASS Telehealthcare Network identified this as an increasing challenge across the region and the issue was raised with the Regional Improvement and Efficiency Partnership (IEP), whose remit and resources are focussed on innovation and efficiency opportunities.

---

<sup>4</sup> Unit Costs of Social and Health Care, 2008, Personal Social Services Research Unit (PSSRU), University of Kent, funded by the Department of Health



## Initial research - University of Birmingham

### Research brief

Because there was no formal evidence of the benefit of the automated pill dispenser at that time, the West Midlands SHA and the West Midlands ADASS Telehealthcare Network commissioned the Health Services Management Centre at the University of Birmingham to carry out research, to:

- draw together existing evidence at any 'tier' (from randomised controlled trials published in peer reviewed publications through to unpublished "grey" literature)
- survey key contacts across the UK where such devices had been trialled or used extensively, to identify further locally-held evidence
- provide a report setting out what was already known to inform commissioners and to outline what further work was necessary to add to the knowledge around costs and benefits

### Methodology

An international literature review was undertaken, supplemented by telephone interviews with key contacts, including Local Authority and PCT staff, CSIP and other national and regional leads, representatives of pharmacy chains and suppliers of the device. Where respondents were able to share data on current practice, this was also analysed.

Provisional recommendations were debated at a dedicated event with 50 participants from local authorities, PCTs and the Care Services Improvement Partnership (CSIP).

In September 2008, the University of Birmingham's report concluded that the targeted deployment of the automated pill dispenser could be cost effective and that it appeared to be a valuable addition to the range of aids available to support medication adherence people to sustain health and independence.

## Project set-up

### Project sponsor

A mandate for the project was provided by the Directors of Adult Social Services in the West Midlands (ADASS) and Medication Management Leads from corresponding Primary Care Trusts.

### Assumption

- Better self-management of medication enables people to:
  - enjoy improved quality of life
  - remain independent at home for longer
  - be less reliant on health and social care services (thus reducing costs to these economies)

### Aim

To test this assumption by using an automated medication dispensing device and monitoring outcomes under controlled conditions.

### Evaluation criteria

1. Calculated cost savings across the Health and Adult Social Care economies
2. Improved quality of life for people who use services, and their carers

### Drivers

- The cost/benefit analysis undertaken by the University of Birmingham and findings from the research
- Emerging use of the devices by Local Authorities on an ad hoc basis
- A lack of visibility for the public about how to access the technology with a pharmacy-led service to fill them
- Disputes about liability to fund prescription charges between LAs and PCTs (no provision in the PCT contract with pharmacies about charging)
- A lack of evidence about the impact of the technology on medication compliance and the related cost of health and social care interventions
- Perceptions about risk amongst clients, pharmacists, GPs and commissioners

### Objectives

- Pilot 500 devices across 7 pilot sites in the West Midlands for six months
- Record the impact of the technology on the need for funded health and social care services

- Produce strong partnerships between PCTs, Local Authorities and pharmacies to enable straightforward access to the technology and pharmacy filling service
- Evaluate the human experience of using the devices

### Choice of equipment

The PivoTell dispenser was chosen, for the following tactical and pragmatic reasons:

- Already being used ad-hoc in the telecare teams
- Met the majority of technical requirements
- Supplier responsive to suggestions for changes and enhancements
- Dispenser filling already supported by Boots pharmacies in some areas

A full description of the PivoTell dispenser can be found in Appendix 2.

### Funding

Funding applications were submitted by Improvement and Efficiency West Midlands to the Communities and Local Government (CLG) Capital Efficiency Fund, which provided £92,000 to fund the cost of the technology for all of the participating pilot sites.

A further application to NHS West Midlands Innovation Fund provided £242,000, allocated to:

- Funding to pharmacies to cover the costs of filling the devices/disposable trays set at £20 per month per service user
- Project management
- Funding of the equipment

### Pilot site selection

All Local Authorities and Primary Care Trusts in the West Midlands were approached for expressions of interest in participating in the project.

The original pilot sites were Dudley Metropolitan Borough Council, Herefordshire County Council, Staffordshire County Council, Staffordshire North PCT, Telford and Wrekin Council, Wolverhampton City Council and Worcestershire County Council. Each site had a nominated lead.

Within Staffordshire North PCT, the intention was to try the device with patients in Bradwell Hospital, Stoke. However, this was not possible due to the Safety of Medicines Act which would not allow the device to be left on the patient's locker (which from the project's perspective was necessary to test the patient's ability to operate the device independently) as other patients also had access to the medication.

Coventry City Council joined the project In March 2010, as Herefordshire withdrew due to resource issues.

## Project Board

### *Membership*

- Pilot sites (represented by Dudley, Staffordshire and Telford and Wrekin)
- NHS West Midlands (represented by the Medication Management Lead)
- Improvement and Efficiency West Midlands
- PivoTell (equipment supplier)
- Charter & Plan Ltd (project management capacity)
- Pharmacy representation (at the outset of the project this was Alliance Boots and latterly Murray's Healthcare)
- Simon Adams Consulting Ltd (evidence database)

### *Key tasks:*

- Development of a referral pathway for PCTs and Local Authorities
- Development of an assessment toolkit to determine suitability for the project (see Appendix 3)
- Development of an evidence base to monitor reliance on health and social care services pre and post intervention (see Appendix 4)
- Ensure availability of recording and reporting facilities for key evidence data
- Development and delivery of a rolling training programme for pilot sites and pharmacies
- Collation of key issues, barriers and a highlight report including cost/benefit analysis
- Facilitation of the Project Board
- Communications and final project report

## Project Launch

The project was launched in Birmingham on 3<sup>rd</sup> July, 2009. The invited audience included PCT prescribing leads, Local Authority and/or PCT Telecare Leads, Occupational Therapists, Independent Pharmacies, Social Workers/Care Managers, Elected Members with an adult social care portfolio, Voluntary Sector Representatives, Domiciliary Care providers, Local Authority Communications Leads and any other stakeholder with an interest in the project.

The keynote speaker was Eamonn Kelly, Director of Commissioning, NHS West Midlands.

## Selection criteria (target group)

Overall criterion for eligibility: that the client was having difficulty taking their medication that could not be resolved by other mainstream medication management approaches. Care was taken to ensure that other aids (e.g. dosette system or simple pill reminder) had been tried or considered and deemed unsuitable.

The pill dispenser acts as a medication reminder, so is not suitable for people with a history of deliberate non-adherence.

Careful selection of potential clients was found to be a key element for success. A flowchart was developed by Worcestershire County Council to aid assessment of people's needs for the project (see Appendix 3).

## Pharmacy engagement

It was agreed from the outset that all dispensers used for the project would be filled by a pharmacist, to reduce the potential for dispensing errors and to evaluate the pharmacies' experience of filling the dispensers. Pharmacies were paid a monthly dispensing fee of £20 per person.

A Standard Operating Procedure was developed and issued to all participating pharmacies who could then tailor it to suit their own specific ways of working.

Community pharmacies in the pilot site areas were given information about the project and invited to a briefing and training session run by PivoTell, the local pilot site lead and the project board pharmacist.

## Evaluation criteria

One of the most critical aspects of the project was to record the information to evidence:

- outcomes for individuals
- return on investment

Alongside improving the well-being and independence of people who used the pill dispenser, one of the key objectives was to evidence any savings achieved. Perhaps the most obvious example being where the pill dispenser replaced any medication prompt visits.

Whilst acknowledging that people's health was likely to improve with regular medication and adherence to prescribed regimes, this was agreed to be outside the scope of the evaluation.

In consultation with the pilot sites and in the light of experience of other regional evaluation projects (i.e. reablement and telecare), a series of key measures and indicators was designed, based on the evaluation criteria for the project.

## Recording the evidence base

### *Information about people using the service*

To record this information, a consistent method of data collection was needed that would be accessible to all the pilot sites, distributed across the region. Several options were explored, e.g. a standard Microsoft Office Excel or Access database, collected and collated at intervals. The solution that was eventually opted for was a bespoke web-based database with secure logins for each of the pilot sites.

The database design reflected the three stages of the process and was in three parts (See Appendix 4):

1. Stage 1: as the person started to use the pill dispenser, recording if the individual had received any health care or social care interventions in the 6 months immediately prior to using the dispenser, as a result of their medication problems.
2. Stage 2: within the first month of the start date, and included questions such as whether the pill dispensers were being delivered or collected and whether the person using the dispenser had needed any support in using it.
3. Stage 3: at the end of the first 6 months on the project, collecting information about health care or social care interventions during the project period to measure the impact of the pill dispenser on the level of interventions received. It also recorded if the person had left the project before the expected end date i.e. 6 months after the start date and, if so, for what reason.

To benchmark the costs of health and social care interventions, standard cost data was used, provided by Personal Social Services Research Unit, as an authoritative source of comparable data<sup>5</sup>. It is acknowledged that the exact costs of these interventions varies across councils but as the PSSRU benchmark is nationally recognised, it was considered more robust than using other local estimates.

### *Pharmacy evidence base*

A second online database was designed for pharmacies to complete. This was completed monthly for each person for the first 6 months on the project, when the pharmacy made up the next batch of medication for them. Typical questions included the number of untaken doses left in the returned dispensers or disposable inserts and the length of time it took to fill the dispenser (see Appendix 5).

---

<sup>5</sup> “Unit Costs of Health and Social Care 2008”, Personal Social Services Research Unit (PSSRU), University of Kent, funded by the Department of Health.

Data from the two information collection facilities was analysed and reported upon regularly to the Project Board throughout the course of the project.

Database design, development and support were provided by Simon Adams Consulting Ltd, with implementation and hosting by ViewsCount<sup>6</sup>.

---

<sup>6</sup> <http://www.viewscout.com> a part of Tribal Group plc.

## Referral and assessment

### Referral sources

Most of the referrals onto the project came via social care teams, rather than health teams, with hardly any from GP surgeries. This was largely due to an increased awareness of the devices across social care teams. Towards the end of the project, however, there was an increase in the number of referrals from health teams as the understanding of the devices spread across these teams.

### *GP surgeries*

At the end of 2010/11, the project was extended by one year and was therefore able to continue to recruit more clients to see if they would also produce the same results. It also presented an opportunity to work with GP surgeries to identify those patients who would benefit from the device who could either be referred to the project in the usual way or 'processed' by the surgery themselves.

Unfortunately, the timing of the project's extension also coincided with the formation of GP Consortia: the introduction of new administrative arrangements prevented their participation in the project and very few referrals came from GPs.

Risk Stratification Tool: this is produced by the SHA and sent to GP surgeries monthly. It could be interrogated at surgery level to identify patients who met specific criteria, e.g. (with particular relevance to the project) it could be used to identify patients on a high number of medications, patients who were admitted to hospital on a regular basis and patients with long-term conditions. The project was keen to promote understanding that it could be used to help surgeries identify those patients most in need of medication support.

### *Hospital discharge*

The project initially planned to provide pill dispensers to a number of patients who had been admitted into hospital, giving them the opportunity to become used to the dispenser while being monitored by nursing staff before discharge. However, several concerns prevented this from happening:

- Safety of Medicines Act: it wasn't possible to leave the patient's pill dispenser in their unlocked locker as other patients could have accessed the medication, which would have posed a risk to them.
- It wasn't feasible to store the pill dispenser in a locked cupboard away from the patient, for example at the nurses' station, as this would have prevented the patient from using the device independently which was the main objective.
- The nursing staff would have experienced an increase in their workload as they took on the extra duties associated with the project process, e.g. assessing the patients' suitability to use the device and liaising with the patient's own pharmacy.



## Case Study: Dudley

*Two patients admitted to hospital as a result of medication management problems were discharged home with the pill dispenser. Instead of leaving hospital with all their medication in original packs, the discharge planner faxed the prescription to the patients' usual community pharmacy for them to set up the pill dispenser. A member of the Telecare team visited the patient at home to explain how to use the device. This provided them with an organised medication regime: they were not re-admitted due to further medication issues.*

### Third sector

Working closely with third sector groups on the project proved very fruitful, in Staffordshire in particular. It offered a quick way to speak to people who might be wary of approaching health and social care agencies and allowed us to reach a wider audience of potential users and their carers.

Examples of the groups were Older People's groups, Alzheimer's groups, Stroke associations, MS groups and carers' groups.

Alzheimer cafes and the dementia navigators became effective referral routes for the project and they were able to identify and refer appropriate people to the project whilst signposting others to more appropriate advice and support. Peer support and personal endorsement encouraged people to seek referral.

### Referral processes

The process of identifying potential clients, screening them and referring them to the pharmacy was approached in different ways.

Some pilot sites resourced this from within the Local Authority Telecare Teams, others utilised front line operational staff (e.g. Social Workers or Occupational Therapists)

The standard referral process in these cases was:

- referral received
- visit to the person referred in their home: demonstrate the pill dispenser and explain about the project
- complete a referral form and list of current medication – pass to pharmacy
- pharmacy takes over the contact with the client, Local Authority team monitors progress of referral
- review one week after allocation of the dispenser, troubleshoot any issues

Staffordshire gained joint health and social care funding and employed two full-time pharmacy technicians: the operational teams simply referred potential participants to the technicians, who then completed the rest of the process.

This dedicated resource resulted in a speedier, more focussed process - 40% of the site's participants were recruited in 6 months by just the two technicians.

Referrals to the project came from either social care (56%), health (35%) via pharmacies and other healthcare professionals such as District Nurses and, latterly, from GP surgeries or relatives (9%).

### *Referrals not progressed to the project*

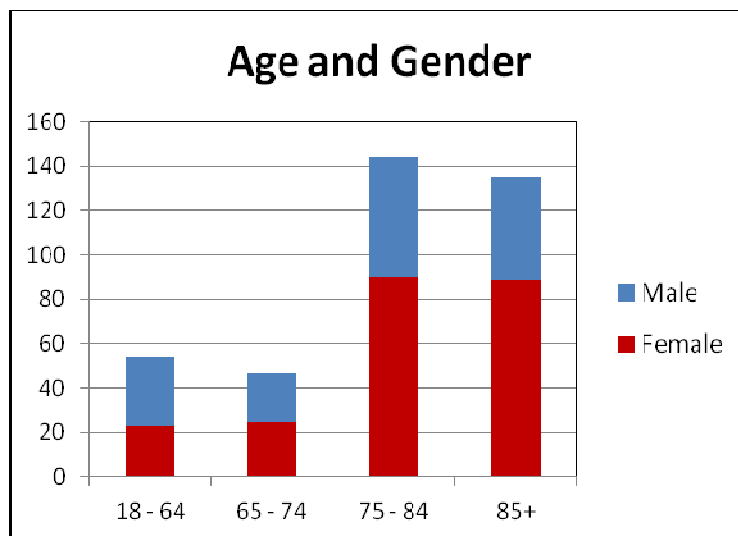
Around half of all potential participants who were referred on to the project did not ultimately join it, for the following reasons:

- didn't like the look of the dispenser – “looks too technical”
- didn't like the sound of the alarm
- felt that it was taking control of their medication regime and they wanted to retain the control (even though they were finding this difficult)
- where a spouse was responsible for their partner's medication some felt that the device took this responsibility away from them
- didn't want to take the device out with them to social events (although it is portable)
- several people that had a carer visit to remind them to take their medication did not want to lose that visit (conversely, some wanted to have the dispenser and no longer receive such visits).
- current pharmacy was not participating in the project and they did not want to change pharmacy
- too much of their medication was not suitable for placing in the dispenser
- Medication regime was not sufficiently stable (see “The role of the pharmacy” (page 18 below)
- preferred that a family member and not the pharmacy filled the dispenser (pharmacy fill was a condition of the project)

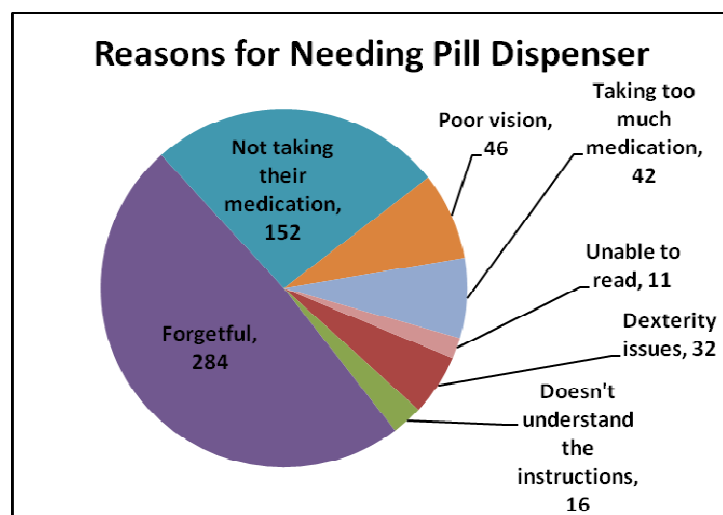
## Client profile

### Age and gender

Of the 380 people who started on the project, 135 of them were over 85 years of age and a further 144 were aged between 75 and 84.



### Reasons for needing the dispenser

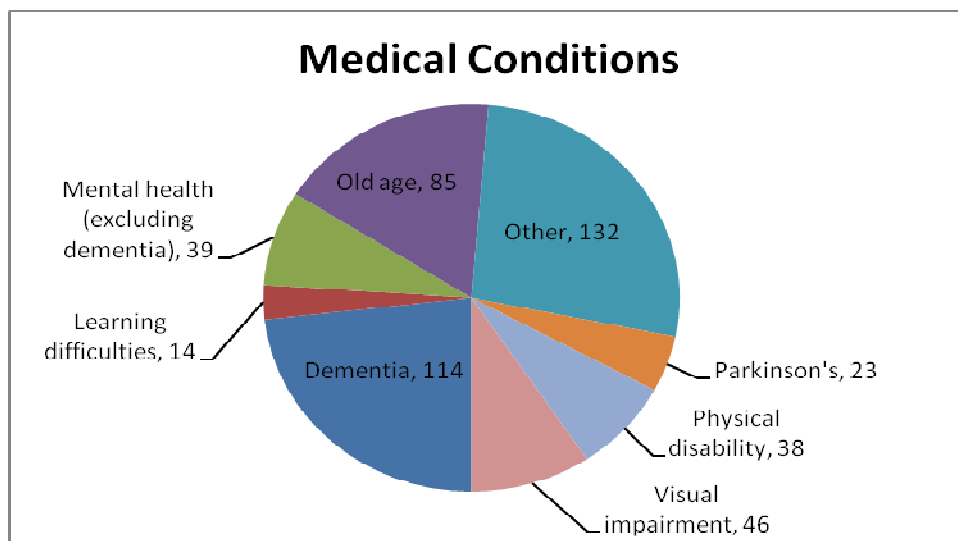


Most people who started using the dispenser cited 'forgetful' as the main problem being experienced with their medication, followed by 'not taking their medication'.

## Medical conditions

Approximately one third of those starting on the project were suffering from early stages of dementia and their current aid was now proving to be inadequate: they were forgetting to take their medication, or had taken it but couldn't remember having done so.

A further third of those selected were experiencing problems accessing their medication through physical disability (e.g. dexterity issues such as arthritis) and sensory disability (e.g. lack of visual capacity to distinguish medicines and directions). For this group of clients, the tipper was found to be a very practical solution (see Appendix 2)



## The role of the pharmacy

The pharmacists played a key role in the project with numerous responsibilities. Once a potential participant was referred to the pharmacy, the pharmacist would review their medication to assess its suitability for inclusion in the pill dispenser. In consultation with the client and often their carer (e.g. relative or a domiciliary care worker), they would agree a start date and whether to use one or two dispensers.

The pharmacy was often then the first port of call for the client or their carer should they have any queries about using the dispenser.

## Issues raised

In the early briefing sessions, many of the pharmacists' queries concerned the efficacy of tablets that had to be removed from their original air tight packaging to be placed in the pill dispenser. Some pharmacists believed that the pill dispenser wasn't suitable if the medication became less effective due to exposure to air, while others believed that it was better to take a tablet with reduced efficacy than not at all. On the other hand, reduced efficacy applies to all MDS aids and not just the automated pill dispenser. It should also be noted that such tablets account for a small percentage of all tablets.

Pharmacists were invited to participate in the project but some declined, for various reasons:

- the efficacy of medications
- concerns over their own resource capacity (perceived time involved)
- responsibility for changing over the devices and liability for possible tampering with medication placed in disposable inserts in the person's home

## Safety

The Royal Pharmaceutical Society of Great Britain was consulted regarding the use of the automated pill dispenser. They raised a number of requirements for the project which needed to be in place before the device was used, e.g. that the device should meet the labelling and leaflet requirements of dispensed medicinal products. All of the points raised were satisfied either through the design of the pill dispenser itself (e.g. the facility to lock it) or through the Standard Operating Procedure

In order to comply with RPSGB guidelines on labelling, PivoTell devised a method of securing the medication label to the device and this was achieved by a label holder being attached to the underside of the device.

People starting on the project needed to have a medication regime that had been stable for three months. This minimised any short-term and frequent changes in prescription which can often occur when a GP first



MEDICATION LABELLING

prescribes a new drug for a patient. This was particularly important for the pharmacies as their monthly dispensing fee was paid per person rather than per filling.

### Suitability of medication

The pill dispenser cannot cater for soluble medicines, creams, liquids, eye drops or other external products, so alternative arrangements had to be made. The pill dispenser's alarm could act as a reminder for these other medications, e.g. if the person were able to associate the evening reminder with putting in their own eye drops.

Some tablets are very well suited to the pill dispenser as they are time critical. For example, sleeping tablets would be presented to the user at bedtime, eliminating the possibility that they tried to take them too early during the day and potentially fall over through feeling drowsy while still moving around the house. Similarly, Parkinson's tablets are time-critical to avoid Parkinson's freeze and again the dispenser would present these tablets at the correct times during the day.

Eighty-five per cent of all tablets can be placed into the dispenser. However, some groups of tablets aren't suitable, because they:

- need to be refrigerated e.g. Florinef
- disintegrate when removed from their air tight packaging e.g. Sando K
- are too big e.g. Adcal
- lose efficacy when removed from their air tight packaging e.g. Persantin Retard, Epilim, although frequent, e.g. weekly re-fill, minimises the reduction in efficacy

Soluble tablets can be placed in the dispenser but the user needs to understand that they need to dissolve them in order to take them.

A key part of the assessment process was to identify the best solution for each person, taking into account their own capacity and local support network

### Filling and checking

The general consensus from the participating pharmacies is that the filling operation is no more time-consuming than any other MDS aid. However, the checking operation can be more difficult and therefore takes longer to complete because the compartments are smaller than most other MDS aids and it is more difficult to see individual tablets, especially if they are similar in shape and colour. Many pharmacists reported that they needed to use tweezers to move tablets around, or to lift them up, to identify each tablet during the checking process.

### Programming the device

Programming the dispenser to provide the medication at the required times is a straightforward process similar to setting a digital clock. Some pharmacies found it useful to have a pill dispenser on loan for practice prior to filling it for the first time.

## Project impact evaluation

Key elements of the evaluation are return on investment (ROI), potential for cost savings across the Health and Adult Social Care economies, and improved quality of life for people who use services and their carers.

### Business case summary

The project sought to achieve a clear cost benefit analysis of the impact of the automated pill dispenser for the health and social care economy. The key indicators of the data recording and reporting systems were designed to provide this evidence base. Headline comments are as follows:

1. The main saving to the NHS is reduced hospital admissions of £151k
2. The main saving to social care is reduced medication prompt visits of £107k
3. Share of savings are 48% social care v 52% health
4. Final return on investment (ROI) of £8.50 per £1 spent
5. Pharmacies reported untaken medication as just 2.9% of doses prescribed
6. Cost avoidance savings amounted to £709k

### *Main saving to the health economy: reduced hospital admissions of £151,000*

Of all the people who completed 6 months on the project, 43 went into hospital at least once in the 6 months prior to starting with the pill dispenser due to a medication related issue such as an accidental over- or under dose due to confusion or forgetting whether they had taken their medication or not. Only four of these patients were admitted to hospital while using the pill dispenser.

As well as the cost of the bed day, other associated costs are incurred when someone is admitted to A&E via an emergency admission (most of these patients), due to the fact that they had either over- or under-dosed. These associated costs are ambulance or paramedic call out, diagnosis and the paperwork required as a result of the admission itself. The cost of these services varies depending on the nature and severity of the emergency and so the most appropriate figures for the patients have been used.

For the above patients, the hospital admission savings were as follows:

Ambulance/paramedic call out.....	£4,500
Admission procedures .....	£3,600
Diagnosis.....	£22,600
Bed days .....	£120,100
Total .....	£150,800

### **Main saving to the social care economy: reduced medication prompt visits of £107k**

Of all the service users, 74 were in receipt of at least one medication prompt visit per day. Some of these visits were carried out by in-house staff and some by externally commissioned staff and the relevant cost has been included in the figures. Some people were also in receipt of a non-medication related visit e.g. helping the user get out of bed in the morning. Such costs have been excluded from the figures as this early morning visit would need to continue irrespective of the pill dispenser. However, if such a client used to have a midday medication prompt visit which ceased as a result of the pill dispenser, then this saving has been included. Not surprisingly, the majority of these pre-pilot medication prompting visits were no longer required while using the pill dispenser.

For the clients above, the costs and savings of the medication prompting visits were as follows:

	Pre-pilot costs	During pilot	Savings
In-house medication prompting visits	£91,300	£16,500	£74,800
Externally commissioned prompting visits	£43,000	£11,000	£32,000
Total	£134,300	£27,500	£106,800

### **Share of savings: 48% social care - 52% health**

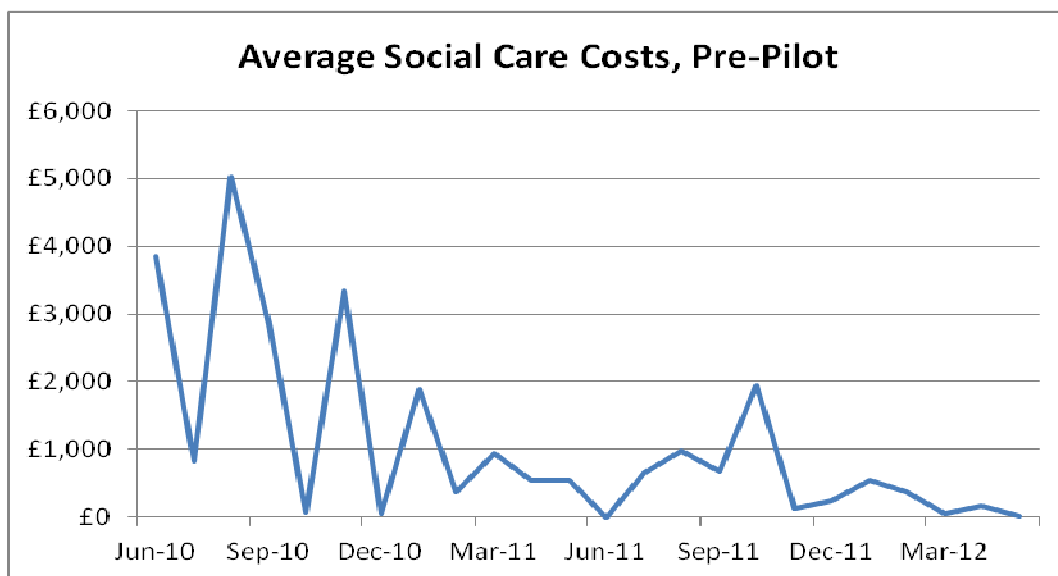
This share has been calculated by breaking down the total savings between health and social care. Initially, this share was 70%/30% in favour of social care. However, the levelling up of the share to almost parity is largely due to the increased use of the pill dispenser during 2011, mainly by social care teams as a preventative intervention.

### **Final Return On Investment (ROI): £8.50 per £1 spent**

The average saving over 6 months was £1,700 per person. The associated costs for the same period of time were £200 ie 6 months of dispensing fees at £20 per month and the initial cost of the pill dispenser of £80 per device (purchased in June 2009 with volume discounts).

The ROI for a year increases to £10.63 per £1 spent. This assumes savings of £3,400 (ie £1,700 x 2) and the costs are £320 (i.e. 12 x £20 plus the fixed cost of £80).





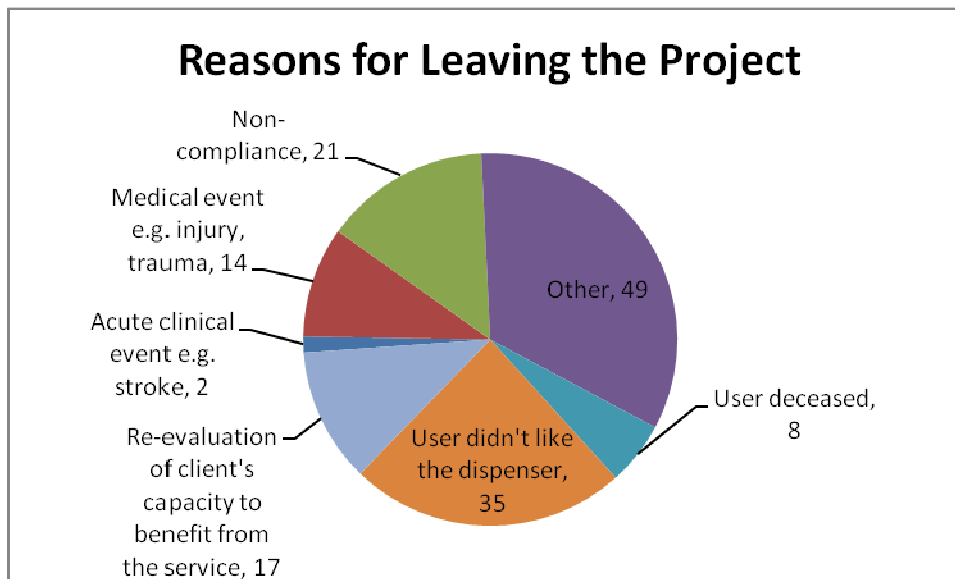
The ROI fell from £14 per £1 spent to £8.50 per £1 spent during 2011 as pilot sites recognised that the pill dispenser was a cost prevention solution rather than a cost reduction one.

### *Pharmacies reported untaken medication as just 2.9% of doses prescribed*

On the pharmacy database, pharmacists recorded the number of doses in each pill dispenser once they had filled it and the number of doses remaining in the dispenser when it was returned to the pharmacy. Both of these numbers represent what is definitely known, i.e. what was placed in the dispenser and what was left in it. This calculation produced a percentage of just 2.9%. What isn't known from this exercise is how many doses were removed from the dispenser in the client's house and then not taken. So, the 2.9% represents the lowest level of untaken medication.

Although it isn't possible to be certain about the levels of untaken medication, there are other indicators which suggest that this must be a low figure:

- a) The vast majority of the participants are compliant anyway. They were assessed before starting on the project and if the assessor thought that the person was unlikely to adhere, they would not have been given a pill dispenser.



Only 21 people left the project due to non-compliance out of a total of 114 people who left the project early. Note that the reasons above add up to 146 as some people expressed more than one reason for leaving the project.

- b) Pharmacists believe that the level of untaken medication feels low. This is based on their experience of other MDS aids that they have filled in the past or are currently filling.
- c) The level of interventions across both social care and health care have dramatically reduced for all people since using the pill dispenser, hence the savings that have been reported earlier in this section. The conclusion from this must be that the participants were compliant and that they were not discarding their tablets when the dispenser presented them at the dosage times.
- d) One of the pilot sites, Worcestershire, conducted some research of their own in which they discovered that during 2010/11, 41 people were prevented from requiring medication prompt visits because they had been given a pill dispenser.

### *Cost avoidance savings amounted to £709k*

On the database, referrers were asked to record which services, if any, the client would have needed had they not been given a pill dispenser.

Ongoing monitoring and analysis of the data showed that the ROI fell from £14 per £1 spent to £8.50 per £1 spent during 2011. Further investigation revealed that the pilot sites were starting to use the pill dispenser as a cost prevention solution rather than a cost reduction. A further data item was added to quantify this, asking what resource/cost would have been required if the dispenser had not been available. This was either based on their own judgment or in consultation with others who knew the client's history. Whilst this was never set up to be an absolute science, it would provide a good indication as to what using the pill dispenser contributed to cost avoidance.

Of the 251 people who completed 6 months, referrers completed entries on the database for 117 people who had not been in receipt of any medication prompt package in the 6 months prior to using the dispenser. Referrers felt that these people would have needed a medication prompt package, varying from once per day to seven times per day, with the most common frequency of visit being twice per day.

Before the pill dispenser, social care teams would have implemented a medication prompting package for those clients who needed help with their medication and for whom other MDS aids were no longer effective. On the other hand, towards the end of the project they were more likely to recommend that such people received a pill dispenser as a cheaper method of achieving medication compliance. A consequence of this was that the pre-pilot social care costs were either reduced or were eliminated completely. As the pre-pilot social care costs fell, so too have the associated savings at the end of the six months monitoring period because in some cases there was nothing to save.

Using conservative domiciliary pay rates these visits would have cost £421,000 over a 6 months' period. If those people for whom no alternative support was suggested followed the same pattern, the total saving would be around £709k based the average cost of domiciliary care.

## The human experience

### Feedback from people using the dispensers

Just as important as the financial impact is the impact on the lives of the clients and their carers. On the database, the following questions were asked at the start and end of the project:

- What practical problems with daily living does this cause the user?
- How do these problems make the client feel?
- What practical problems does this cause the client's family?
- How do these problems make the family feel?

Typical responses from both participants and carers to describe how they felt before they started using the pill dispenser were 'anxious', 'frustrated' and 'stressed'. However, having used the dispenser for 6 months, those responses became 'relieved', 'calmer' and 'happy'. Although positive responses were expected from the participants themselves, the positive impact the pill dispenser was having on the carers' lives was surprising, yet gratifying.

Towards the end of the project a sample of participants and carers was asked to rank a series of measures to formally record the impact the dispenser was having on their lives. The responses were very positive with 91% of replies scoring either 'strongly agree' or 'agree' with the statements – the full set of key measures and responses are to be found at Appendix 6

### Quotes from people who used the dispensers:

*"Pleased with self-medicating and wish to continue." - Wolverhampton resident*

*"It's [the pill dispenser] the best thing on the market and you are not having it back!" - Mrs J, Dudley resident*

*"It's the greatest thing since sliced bread." - Mr C, Worcestershire resident*

*"Excellent - this has really helped me, and my family are less worried about me now." – Worcestershire resident*

*"It is very good, has taken a lot of worries off my mind. It is a life saver in a way." – Staffordshire resident*

## Carers' evaluation questionnaire

Likewise, the full carers' questionnaire is detailed in Appendix 7: 89% of replies scored either 'strongly agree' or 'agree' with the statements.

### Quotes from carers

*"It's a godsend." – Mrs K, Worcestershire family carer*

*"I am very pleased with the pill dispenser and thanks for all the help with setting it up. Mum now gets the right medication twice a day." Worcestershire carer*

*"It is my considered opinion that the pill dispenser is invaluable to the user in affording them the dignity of taking their own medication while giving the carer the satisfaction of this knowledge." – Dudley carer*

*"Thinks it's fantastic and would very much like to carry on using it." – Staffordshire carer*

## Case studies

A number of case studies have been gathered and are included in Appendix 8. In summary, they unanimously indicate that the pill dispenser has had a positive impact on the lives of the people that used the dispensers and their carers.

## Communications

Over the course of the project, there have been numerous communication events using all media.

During the summer of 2010, a DVD (<http://nhslocal.nhs.uk/story/features/pill-machine-medicine-reminder>) was produced telling the story of a client in Dudley, Mr John Barber, and his carer, his daughter. It showed how the dispenser works and Mr Barber and his daughter gave their thoughts on the device. A case study and general project information are included on the above website.

Numerous presentations have been delivered at events such as:

- Healthcare Expo, March 2010, London
- Assistive Technology Showcase, March 2010, Birmingham
- Worcestershire Assistive Technology Conference, November, 2011, Worcester
- TSA Conference, November, 2011, London
- Department of Health, January, 2012
- Two press releases have been produced for inclusion in relevant journals.

The communications and the information on the website have generated many calls for more information about the project, specifically about pharmacy participation and savings realised. As a result of an enquiry from North East Essex PCT, a similar project has been set up there.

## Lessons learnt

### Fit with existing systems

The service is incredibly flexible and therefore should work with diverse groups of adults. However, it needed to be integrated to work with assessment systems from the beginning. Attempting to set up the project on a piecemeal basis did not work – an assessment for Telecare, specifically in relation to medication, took place as part of the process. Liaison with pharmacies was a critical part of the process and worked best where a good relationship was established.

### Safety is paramount

For someone to be included in the project, devices and replacement trays could only be filled by a pharmacy. Each participating pharmacy had a standard operating procedure that included guidance approved by the Royal Pharmaceutical Society of Great Britain. Individual circumstances were factored in by the referring body (typically Local Authority or Primary Care Trust) and by the pharmacist before the person commenced on the project.

### Cultural shift

The project encouraged a cultural shift particularly within pharmacy where it challenged traditional working practices and allowed a more bespoke or personalised approach towards medication management and fits well with the advent of healthy living pharmacies. However, despite the free offer and repeated correspondence and discussion, the project struggled to get GP engagement and it is hoped that this will come over time as prevention gets a higher profile in health through risk stratification.

Working together on the project also strengthened relationships between Local Authorities and pharmacies.

## Success takes time

Getting referral processes in place and pharmacies on board took time. Equally, identifying the right people who could benefit from joining the project required dedicated capacity and expertise. Typically, each pilot site took at least three months to get fully operational. However, once the service was fully operational significant benefits were realised.

## Senior management support

Within each pilot site, senior management support of the project was absolutely critical. Not only did this release the appropriate resource to focus on what was necessary to kick start the project but it also made it a priority and gave it an impetus.

## Stakeholders

Getting stakeholders on board was an essential part of the project and this took time to achieve at the start. There was a delayed start to the project due to a need to contact all the Medicines Management Teams in the PCTs of the pilot sites to explain what the project objectives were and the approach to recording evidence. This led the project to invite a West Midlands SHA member to the Project Board to ensure that PCTs were represented, enabling this Board member to feedback to colleagues in the PCTs at regular PCT meetings on the project's progress.

## Preventive use of the dispenser

The reduced amount of either social or health interventions while using the pill dispenser, as recorded on the database, clearly demonstrates that the patients' medication adherence was greatly improved. A natural consequence of medication adherence is clinical benefit as patients' conditions and symptoms are controlled. The project has not attempted to measure the financial value of this benefit although there clearly is one.

## Finances

Transferring budgets from the SHA to the individual PCT Finance Departments, which was used to reimburse the pharmacies for filling the dispenser, was difficult as was the ongoing monitoring of cumulative spend within the PCTs.

## Pilot leads

Having someone in the pilot site who had accountability for the project at Local Authority level was invaluable. The pilot leads had a number of roles:

- acted as a point of contact for the project team
- acted as a point of contact for the client
- briefed relevant social care teams about the project
- developed the generic process so that it would work at a local level

- visited potential clients to explain the project and demonstrate the device or ensured that there was resource to do this
- secured resource to load required data on the database
- communicated with pharmacies to enlist them to the project
- passed referrals to pharmacies and kept in touch with them until the decision was made as to whether the referral was suitable to join the project or not
- secured funding for pharmacy dispensing fees to ensure that the provision of the pill dispenser to the clients could continue post-project

## Conclusion

### Project aims

The aim of the project was to test the effectiveness of the automated pill dispenser in supporting people towards better self-management of medication. This would be evidenced by:

- improved quality of life for people and their carers
- increased capacity to remain independent at home and
- reduced reliance on health and social care services

### Target group

The device is aimed at people with memory issues and many of the medical conditions recorded for patients on the project supported this premise eg Alzheimer's and dementia. But the device also benefited patients suffering from a range of other conditions such as Parkinson's, mental health issues, learning difficulties, physical difficulties, patients with long-term medical conditions who have to take many different tablets per day as well as the partially sighted and blind.

Increased awareness of the pill dispenser amongst social care and the growing evidence base that showed that it was preventing medication prompt visits to people's homes meant that increasingly, referrers were suggesting the device instead of recommending a medication prompt visit, thus saving money and maintaining the person's independence.

### Outcomes for people using the service

The feedback from both clients and carers about the impact the pill dispenser has had on their lives has been overwhelmingly positive.

Although the project did work with the third sector, this was only done on a small scale and therefore, the opportunities here were not investigated as much as they could have been.



## Savings

The data collected clearly demonstrates that significant savings have been achieved. In total the 251 participants have generated savings of £430k, an average saving of £1700 per person over a six-month period.

The two largest areas of savings are home visits to prompt people to take their medication and an absence of hospital admissions for anyone using the pill dispenser. Home visits amounted to £107k and 52% of total social care savings and hospital admissions amounted to £151k and 68% of total health savings.

## Local support

The project was most successful in those pilot sites where there was a 'champion' to really drive through the project and the process; and within each pilot site, where a firm proponent of the project existed whether that was a pharmacy, an assessor or referrer.

## Reliability

The project has found the device to be reliable with few faults or issues reported; perhaps the most common example being operator error where some people took a few days to get used to it and often needed a reminder of how the device works and what to do when the alarms sound.

## Working with other agencies

The whole process associated with setting a patient up with a pill dispenser works best where good working relationships are in place across the professional spectrum of social care staff, pharmacist and GP. There was a greater willingness for people to co-operate where such positive relationships existed before the project started or were achieved during its duration. A good example being where two pharmacy technicians in Staffordshire employed to deal with the end to end process received many referrals from their colleagues in other pharmacies and relieved the assessment burden on their social care colleagues.

The project did not succeed in working with hospitals, specifically considering patients about to be discharged who could be given a pill dispenser while still in hospital so they are able to go home with organised medication.

## Referral sources

The majority of referrals received were from social care teams rather than health teams and while this shows the success achieved within the social care sector, it leaves an opportunity to do more with the health sector. Despite attempts to do so, the project did not manage to engage sufficiently well with GP surgeries (with a few exceptions) and so this potential source of referrals was not proven. Surgeries have access to invaluable patient data that shows, for example, those people who are admitted to hospital regularly and those on high numbers of medication.

## Next steps

Given that the project has had a life cycle of 2.5 years and the large number of participants for whom data has been recorded, there is a lot of credibility in the evidence collected. It is a robust set of data and there is no reason why the West Midlands' success cannot be replicated elsewhere. Indeed, North East Essex PCT also commissioned an automated pill dispenser project, based on the interim results in the West Midlands.

Based on the above, the Local Authorities at each of the pilot sites have decided to continue with the pill dispenser post-project in two ways. Firstly, to continue to support those people currently using the pill dispenser and secondly, to make the device available to any future clients by continuing to assess potential participants as part of their business as usual processes.

Local Authorities have needed to secure funding for two types of expenditure – the device itself and the pharmacy dispensing fee. Whilst the exact detail varies across the region, the general rule of thumb is that the equipment will be purchased from the Local Authorities' Assistive Technology budgets. As far as the pharmacy dispensing fees are concerned, all Local Authorities have secured funding for at least the 2012/13 financial year, either through their own budget provision or through joint funding.

Feedback from pharmacies has confirmed that they are happy to continue to provide the service asked of them i.e. medication reviews, programming, filling and changeover.

## Recommendations

1. Local Authorities and their health colleagues should work together to identify individuals who might benefit from the automated pill dispenser.
2. GP surgeries to identify those patients who may benefit from the automated pill dispenser and follow the whole process within the surgery
3. Hospitals to provide the automated pill dispenser for appropriate patients as they are discharged, potentially along the lines of the Dudley success.
4. Local Authorities to develop links with the third sector as a potential source of referrals
5. Increase the awareness of the pill dispenser and its benefits amongst all groups e.g. pharmacies, LA's, surgeries, hospitals and the public.

## Acknowledgements

We are indebted to the following individuals and organisations for their support and participation in the project:

Mr John Barber and his daughter, Jacqueline Parsons, who told one of the many stories arising from the project and kindly took part in the project DVD.

Margaret McArthur, Senior Associate, Health Services Management Centre, University of Birmingham, author of 'Automatic Medicine Dispensers, A Review of Evidence and Practice'.

Improvement and Efficiency West Midlands  
West Midlands SHA  
Charter & Plan Ltd  
Simon Adams Consulting Ltd  
ViewsCount (Tribal Group plc.)  
Murrays Healthcare  
PivoTell Ltd

## Pilot sites

Listed below are the pilot sites and contact details where applicable. They all provided a pilot site lead and appropriate resource to deal with referrals, assessments, liaison with pharmacies and database administration:

Coventry City Council  
Dudley Metropolitan Borough Council, [karen.bridgewater@dudley.gov.uk](mailto:karen.bridgewater@dudley.gov.uk)  
Staffordshire County Council, [jim.ellam@staffordshire.gov.uk](mailto:jim.ellam@staffordshire.gov.uk)  
Telford and Wrekin Council  
Wolverhampton City Council, [suzanne.cash@wolverhampton.gov.uk](mailto:suzanne.cash@wolverhampton.gov.uk)  
Worcestershire County Council, [athelpdesk@worcestershire.gov.uk](mailto:athelpdesk@worcestershire.gov.uk)

In addition to the above, Telford and Wrekin provided the initial set of documentation on which the generic project documents were based and Worcestershire County Council produced the screening flowchart.

## Pharmacies

Pharmacies in the West Midlands were responsible for medication assessment, dispensing into the pill dispensers and, arranging delivery and collection.

## Appendix 1 - Project Board Representation

Organisation	Project Board Representation	Sponsor	Budget Holder	Pilot Site Lead	Pilot Site Resource	Project Mgmt Support	Database Design	Pharmacy	Equipment Provider
Improvement and Efficiency West Midlands	Yes	Yes	Yes						
West Midlands SHA	Yes	Yes	Yes						
Dudley Metropolitan Borough Council	Yes			Yes	Yes				
Staffordshire County Council	Yes			Yes	Yes				
Charter & Plan Ltd	Yes					Yes			
Simon Adams Consulting Ltd	Yes						Yes		
Murrays Healthcare	Yes							Yes	
PivoTell	Yes								Yes

## Appendix 2 - The PivoTell Automated Pill Dispenser Mk 3

The PivoTell automated pill dispenser has been available in the UK since 1998. PivoTell became the exclusive UK and Eire distributor in 2002. The mark 3 model was used during the project and is described below.

It holds up to 28 days worth of medication securely in its integral medication tray. It reminds the user with an alarm and flashing light when it is time to take their medication and makes the pills available at the right time in an opening in the lid. It can be programmed to alarm from once up to 28 times daily.

Typical users are those taking time sensitive medication (for example those with Parkinson's disease), who have some confusion (e.g. early dementia) or those with learning difficulties.

It can be simply programmed to alarm and present the pills in the lid opening when they are due. Only the medication that is due at that time can be taken.

It is programmed using the three programming buttons which are used to set all of the functions including the time, number of doses per day and the alarm times. When it is time to take medication the internal tray rotates, the alarm sounds and the light flashes. The user then simply picks up the dispenser and tilts it to take the medication in the hand or suitable container. This cancels the alarm and flashing light. The dispenser will then wait until the next alarm time and repeat the process. To view a video of this, go to <http://www.pivotell.co.uk/pivotell-mk3-videos.htm>



FIGURE 1

Pills can be dispensed directly into the integral re-usable tray, as shown in Figure 1, or they can be placed into a disposable insert which is inserted into the re-usable tray, as shown in Figure 2.

With Figure 1, the client would need to have 2 dispensers, one at their home being used and one at the pharmacy, filled and ready to be delivered or collected. The advantage of this set up is that the pharmacy can lock the dispenser before it leaves the pharmacy

knowing that the medication cannot be accessed by anyone. The drawback is that the delivery or collection must take place between the time of the last dose in the dispenser in the home and the time of the first dose in the dispenser at the pharmacy. This time window could be quite long if, for example, the client is on a twice per day regime at breakfast and evening; or quite short if the user is on a four times per day regime where there may only be 2 or 3 hours between doses.

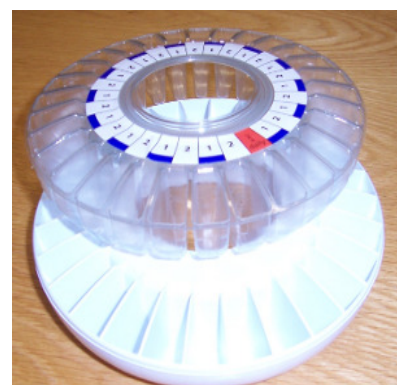
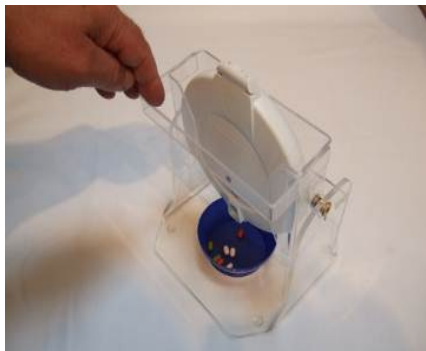


FIGURE 2

With disposable inserts, the delivery/collection time window is not an issue as inserts can be left with the user at more or less any time before the date and time of the last dose in the insert in the dispenser at the client's home. For example, if a user is on a four times per day regime, an insert will last for 1 week, as there are 28 compartments. A pharmacy could deliver 4 weeks' worth of inserts at one time several days before the last dose is due as long as the user or their carer can



TIPPER MECHANISM IN PLACE

replace the empty insert with the new one. The drawback to this method is that the medication is accessible to either deliberate or accidental mis-use/tampering. Some pharmacists were concerned about their liability should this occur and for this reason insisted on the client having 2 dispensers.

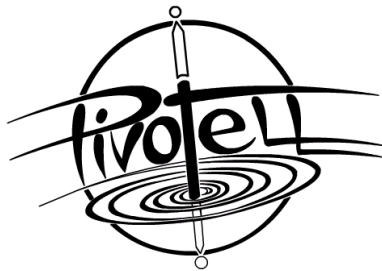
For people with physical and visual disabilities, the tipper was found to be a very practical solution. The pill dispenser sits in the tipper and when the dose is due to be taken, the alarm sounds in the usual way. The client tips the dispenser and the tablets fall into the cup beneath it.

## Appendix 3 - The Pilot Documentation

### 1) Suggested Guidelines for Inclusion in Pilot

- a) Client able to give informed consent. Clients must have capacity as determined by Mental Capacity Act 2005, generally speaking it would not normally be a requisite for use of the medication dispenser but for the purpose of the pilot clients must be able to understand the implications of agreeing to participate in the programme.
- b) Client is given a small folder containing 3 client information documents, 'Pilot Confirmation', 'Consent Form' and 'PivoTell Instructions' and is given time to raise any questions about the pilot.
- c) Client is in receipt of services or receiving support from health or social services.
- d) Client is experiencing ongoing difficulties with managing medication, forgetting occasional doses etc.
- e) Client understands issues affecting personal concordance and is accepting of the need to take medication as prescribed.
- f) Pharmacist will determine suitability of client's medication for inclusion in the dispenser and therefore suitability of inclusion in the pilot. Some medication is not suitable for the dispenser by virtue of physical properties, size and /or legal requirements.
- g) Client is happy to give feedback at the end of the pilot on their experience of using the equipment and that data about the usage of the dispenser will be recorded.
- h) Client accepts that for the purpose of the pilot they may be using a different pharmacy to their usual one.
- i) Client understands that once pilot period is over there is no guarantee that the council will continue to sustain the service.
- j) Client understands that the service is free of charge during the pilot but that this may not be the case after the pilot is completed.
- k) Referrer should undertake any follow up interviews with the client and their experience with the equipment and its effectiveness, as required by the Pilot Lead.
- l) If required, to be in a position to collect and return any unwanted or unsuitable equipment to the Pilot Lead/dispensing pharmacist.
- m) To be willing to deal with any feedback or enquiries regarding the client's usage of the equipment from the dispensing pharmacist.
- n) To be willing to deal with any issues raised by the client and to work with the Pilot Lead.
- o) In the event of the device proving unsuitable for the client or their medication, to put in place alternative support to meet the client's needs around medication eg the use of other devices.

## 2) Referrer info, demonstrating the dispenser and disposable tray



### **Automatic Medication Dispenser Pilot** **Demonstrating the Dispenser** **Demonstrating the Disposable Tray**

#### 1. **Demonstrating the Dispenser**

##### **Using a dispenser for the first time:**

1. Remove the dispenser from its packaging.
2. Open the cover to the battery compartment (underneath the dispenser) and remove the battery isolating strip.
3. Open the lid of the dispenser and check that the LCD display is active –if not, roll the batteries in their positions to ensure a good electrical contact. Replace the battery cover.
4. Set the time as per the Operating Instructions (optional)
5. Remove the re-usable medication tray from the dispenser. Place a day / time disc (4 x daily) on the re-usable dispenser tray and fold down the tabs to keep in position (a touch of adhesive can be helpful). Replace the tray in the dispenser ensuring that the red section on the disc is positioned in the lid opening – the right side of the pill compartment being flush with the right side of the opening.
6. To demonstrate to a user quickly using the inbuilt test function:
  - Press button 3 for a few seconds.
  - Press button 1 repeatedly until “TEST” is displayed
  - Press button 3 again and close the lid
  - The tray will rotate and the alarm will sound. Tilt the dispenser through 90° to stop the alarm.
  - Repeat as often as required until the client is familiar with the way the dispenser operates and is able to tilt the device to stop the alarm
  - Hold button 1 down to return to clock



2.

Alternatively if time permits:

Set the clock

Set the number of doses to '4'

Set the alarm times to be at 2 minute intervals, with the first alarm time 2 minutes after the time indicated on the clock- e.g.:

**Clock time: 12.00**

1<sup>st</sup> alarm: 12.02

2<sup>nd</sup> alarm: 12.04

3<sup>rd</sup> alarm: 12.06

4<sup>th</sup> alarm: 12.08

Place the dispenser on a table near the user and wait for the first alarm.

The user then gets the benefit of seeing the dispenser operating in its normal mode and will get a better understanding of how it works.

7. It is recommended that the device is stored with one or more batteries removed to preserve battery life, or with all batteries in place, replace the battery isolating strip.

**Information for the carer / agency staff / pharmacist:**

## 8. Batteries

Batteries ( 4 x AA Alkaline) are supplied with the dispenser when new. Batteries will last in normal use for at least 12 months.

Battery life can be checked using the following procedure:

1. Insert batteries in the dispenser.
2. Immediately watch the LCD display for the indication BATLEV.
3. At full charge a reading of 1600 (or more) will be shown.
4. At a reading of 1325 the battery warning indicator "LOWBATT" will initiate
5. At a reading of 1275 the unit will not operate.

Note: Rechargeable batteries should not be used as they have an insufficient charge to reliably operate the unit.

Remember when changing batteries to insert them to correct way around (see figure 3 – Page 3)

## 9. Fault Handling

The alarm will sound continuously in the event of the dispenser failing to rotate properly. This might be caused by an obstruction between the body of the dispenser and the internal tray. In this event the display will show "ERROR". A battery should be removed and then replaced. Any obstruction should be removed.

3.

### Demonstrating the Disposable Tray

**Note: It is important that the disposable tray and lid are not separated or joined unless the tray is in position in the reusable plastic tray. This is to ensure that medication is not spilled and that the disposable tray compartments are not damaged (preventing the disposable tray fitting in the reusable tray.)**

The disposable tray will be delivered complete with its lid to the user in a sealed cardboard box.

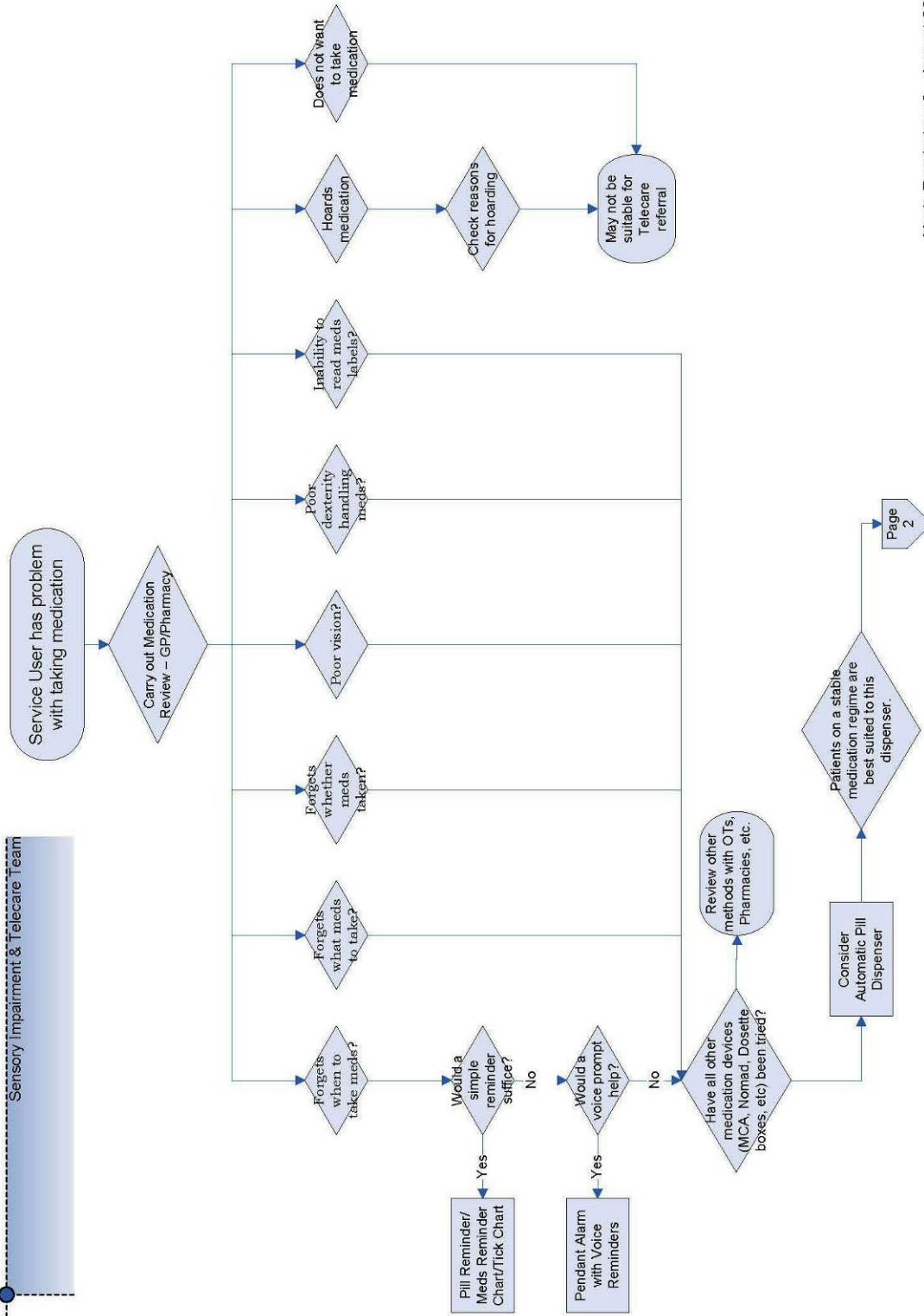
1. Remove the disposable tray from the box.
2. Place the disposable tray in the reusable plastic tray.
3. Separate the lid from the tray by lifting the lid with fingers either side and inserting them between the lid and the tray. The lid will ease off and separate from the tray with a 'click'.
4. Replace the tray in the dispenser ensuring that the red section on the disc is positioned in the lid opening – the right side of the pill compartment being flush with the right side of the opening.
5. To demonstrate again, leave the tray in position in the plastic tray, align the sections of the lid and disposable tray, and 'click' into position by pressing on the centre circle of the lid. Remove the disposable tray and lid.

Pivotell Ltd  
29.07.2009

### 3) Assessment flowchart

# Medication Reminders

Sensory Impairment & Telecare Team



Meds Reminder v3 - August 2010



#### 4) Assessor info, pharmacy referral form

### **PAGES 1 AND 2 TO BE COMPLETED BY ASSESSOR**

Assessor's Name:		Number:
<b>Service User's Details</b>		
Name:		
Address:		
Telephone number:		
Date of birth:		
Service User Ref No:		
NHS Ref No:		
Next of Kin Name:		
Next of Kin Address (including email)		
Next of Kin Telephone numbers:	Home:	Mobile:
	Work:	
GP Name:		
GP Surgery Address:		
GP Telephone number:		
Current Pharmacy Name:		
Current Pharmacy Address:		
Current Pharmacy Telephone number:		
Is the service user able to visit the pharmacy in person for a medicine's usage review, should this be required?	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Write any notes for the pharmacy here including which device will be used:		

<b>Medication</b>						
Please list as fully as possible all the medication currently prescribed for the service user						
<b>Medication Name</b>	<b>DOSE</b>					
	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>
<b>Medical History</b>						
Please provide a brief medical history for this service user (or attach the printout from EMIS).						
<b>Medication Compliance History</b>						
Please give a brief summary of the reasons for the service user's current compliance and the solutions considered.						

**Assessor to complete pages 1 & 2 and send to the service user's pharmacy or, if that pharmacy is not participating in the pilot, to a new pharmacy as agreed with the service user. Assessor to keep a copy on file.**

**PAGES 3 AND 4 TO BE COMPLETED BY PHARMACIST**

Outcome of Referral	Tick if Yes
Medicines Usage Review undertaken for service user	
<b>Solution identified (choose A or B)</b>	
<b>A:</b> Automated pill dispenser and disposable inserts	
<b>B:</b> 2 automated pill dispensers	
Order disposable inserts from PivoTell	
Non-automated compliance aid	
Other	
If an automated device is considered <b>unsuitable</b> , please state why.	
If a non-automated compliance aid or other solution is being offered, please state what aid is being provided.	

Operational Arrangements	
Dispensing cycle start date	
Name and contact number of person responsible for notifying pharmacy of changes to medication (if different to next of kin identified on page 1)	Tel:
Name and contact number of person responsible for notifying pharmacy of admission to/discharge from hospital/residential care (if different to next of kin identified on page 1)	Tel:
Name and contact number of person responsible for collecting / delivering medication trays to service user (if different to next of kin identified on page 1)	Tel:
Name and contact number of person responsible for loading medication trays into dispenser (if different to next of kin identified on page 1)	
Method of providing medication trays to service user	<b>Delete as applicable</b> Collection Delivery
Serial number of automated pill dispenser	
Signed:	Date:
Name:	Telephone number:
Team:	

**Pharmacy to complete pages 3 & 4 and send to the assessor. Pharmacy to keep a copy on file.**



## 5) Client info, pilot confirmation

### Automated Pill Dispenser Pilot

Thank you for agreeing to take part in the Automated Pill Dispenser pilot. Please take time to read the following information carefully and discuss it with others if you wish. If there is anything that you are not clear about, or if you would like more information, please ask.

This is a new social care service that we are piloting, under the heading of Assistive Technology. We are piloting the service first to see how well it works and to find out how much demand there will be for it. The pilot will last for up to six months.

**Please remember:** it is your decision to take part in this pilot. If you don't like using the dispenser, you don't have to continue to use it but please let us know so that we can come and remove it. If you decide not to continue using it, it will not affect any help or care you get here or anywhere else, now or in the future.

#### **What is Assistive Technology?**

Assistive Technology is any piece of equipment that helps you to carry out everyday tasks with less effort or less risk. It ranges from simple gadgets, such as walking sticks and grab rails, to very sophisticated equipment that helps severely disabled people to open and close doors, windows and curtains or use their television, telephone or computer.

The service may help older or disabled people to carry on living at home and keep their independence. It could also mean that people can return home from hospital more quickly.

#### **Who is the dispensing pharmacist?**

Due to the specialist nature of this equipment we have for the purposes of this pilot utilised the services of a pharmacist with a special interest in assistive technology, who has agreed to undertake all the normal pharmacist's duties whilst you are using this Automated Pill Dispenser. The pharmacy that has agreed to assist us during this pilot is

#### **Name and address of Pharmacy, phone number**

## Is there a charge?

There is no charge for the Automated Pill Dispenser while you are trying it as part of this pilot. After the pilot, dependant upon its outcome, you may be offered the opportunity to keep it. If you decide to keep it we cannot guarantee that your normal pharmacist will agree to the ongoing maintenance of the dispenser. There may be a monthly pharmacy charge for keeping the dispenser.

## Compliments, Comments and Complaints

We are happy to hear when things go well and whether you have any ideas or suggestions to improve our services in the future.

If you are not happy with the service provided please contact the Service Standards Unit on **insert phone number**.

We want to provide a fair service to everyone, whatever their background. Tell us if you think we are not and we'll try to put it right.

## Contact Information

**To be completed by each site.**

You can contact us during office hours Monday to Friday 9am to 5pm.  
You can also write to us, visit us or go to our website, **insert here**

We can make this information available in Panjabi, Urdu or Chinese and in other languages, free of charge.

Please call us on **insert here** to request this.

如果你想利用我們的免費中文協助來幫助你明白這份資訊，  
請打電話 01952 382121 與泰爾福&瑞慶區政府聯絡。

ਜੇ ਤੁਸੀਂ ਇਸ ਜਾਣਕਾਰੀ ਜਾਂ ਪਰਚੇ ਨੂੰ ਆਪਣੀ ਬੋਲੀ ਵਿਚ ਸਮਝਣ ਵਾਸਤੇ, ਟੈਲਫੋਰਡ ਐਂਡ ਰੀਕਿਨ  
ਕਾਉਂਸਿਲ ਦੀ ਮੁਫਤ ਸੇਵਾ ਲੈਣੀ ਚਾਹੁੰਦੇ ਹੋ ਤਾਂ ਉਹਨਾਂ ਨੂੰ 01952 382121 ਉੱਤੇ ਫੋਨ ਕਰੋ।

اگر آپ کو اس دستاویز میں دی گئی معلومات کو اپنی زبان میں سمجھنے کیلئے کسی بھی قسم کی مدد کی  
ضرورت ہے تو برائے مہربانی ٹیلیفون ڈائریکٹری کو نسل کو 01952 382121 پر فون کریں۔

To request this information in large print, on audio tape or in Braille please phone  
**insert here**

## 6) Client info, Pivotell instructions

### **TAKING YOUR MEDICINE WITH AN AUTOMATED PILL DISPENSER**

The Pivotell Automated Pill Dispenser that has been provided will help you remember to take your pills.

The dispenser holds 28 doses, so, if you take medication 4 times a day, it will hold a week's worth of medication.

The dispenser will be programmed and filled by a pharmacist.

#### **To take your medicine:**

When your pills are due, the internal pill tray will rotate, the alarm will sound and the red light on the lid of the dispenser will flash (for up to 60 minutes). You will be able to see your pills in the opening.

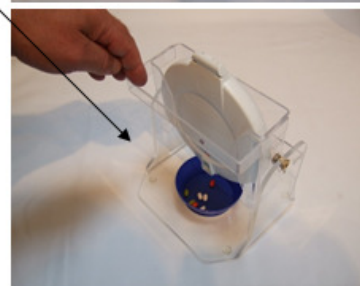
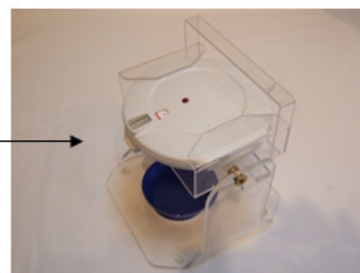
To take your pills, pick up the dispenser, and turn it over so that the pills fall out into your hand or a bowl. Then swallow your pills with a glass of water

If lifting or turning the dispenser is difficult and you have been provided with a tipper, tip the pills into the bowl provided and then swallow your pills with a glass of water.

The internal pill tray will be refilled when you have taken all 28 doses in the dispenser, so you do not need to worry that you will run out of pills.

If you have any questions please contact:

-----



Pivotell Ltd, P.O. Box 108, Saffron Walden CB11 4PE  
Tel: 01799 550979 www.pivotell.co.uk

Document 6

## 7) Client info, consent form

### 1. CONSENT FORM – AUTOMATED PILL DISPENSER PILOT

Client Name

Client ID

Pilot ID Number

Name of Referrer

NHS Number

*Please initial box*

1. I confirm that I have read and understood the information leaflet and have had the chance to talk about the pilot.
  
2. I confirm that I have had sufficient time to consider whether or not I want to be included in the pilot.
  
3. I confirm that I have been shown how the pill dispenser works and how to use it.
  
4. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason, without my care or entitlement to services becoming affected.
  
5. I understand that my prescription and an overview of my medical needs will need to be disclosed to the pharmacist to ensure my ongoing safety and the suitability of my prescription for inclusion in the pill dispenser.
  
6. I agree that personal information will need to be recorded to enable the pilot team to decide how successful the pill dispenser has been.
  
7. I agree to take part in the above pilot.

Signed

Date

User/Carer (please delete)

1 form for client; 1 copy for pilot documentation

## Appendix 4 – Parts 1 to 3 of the On-line Database

### PART 1 (To answer before the user gets a pill dispenser)

- 0 Local Authority name (Telford & Wrekin; Worcestershire; Wolverhampton; Herefordshire; Dudley; Staffs; Hospital)
- 1 Name of person completing this form (Name)
- 2 Client unique ID - SWIFT ID or other unique identifier for the client, e.g. NHS Number, CISS number (ID)
- 3 What is the pill dispenser's serial number (Number)
- 4 Who referred the user (on to the pilot)? (Name)
- 5 What is the referrer's role? (Role)
- 6 What is the user's gender? (Male; Female)
- 7 What is the user's date of birth? (Date of Birth)
- 8 What is the user's condition? (Dementia; Mental health (excluding dementia); Parkinson's; Learning difficulties; Physical disability; Old age; Visual impairment; Other)
- 8a Is the user currently using a medication compliance aid? (Yes/No)
- 8b What type? (Pill reminder; Pendant alarm; Dosette box; Blister pack; other)
- 9 What problems is the user having taking their medication? (Forgetful; Poor vision; Dexterity issues; Doesn't understand the dosage instructions; Unable to read; Other)
- 10 What practical problems with daily living does this cause the user? (Free text)
- 11 How do these problems make the user feel? (Free text)
- 12 What practical problems with daily living does this cause the user's family? (Free text)
- 13 How do these problems make the user's family feel? (Free text)
- 14 Has the user needed a Social Care intervention as a result of their medication problems in the last 6 months? (Yes/No)

#### Adults with a Learning Disability (18-65) Externally Commissioned Service

- Residential Care - permanent (week)
- Supported Living Schemes (week)
- Day Care (session)
- Adults with Mental Health Problems (18-65) Externally Commissioned Service
- Residential Care - permanent (week)
- Acute Inpatient Care (day)
- Day Care (day)

#### Older People (65+) Local Authority Service

- Residential care - short term (week)
- Residential care - permanent (week)
- Intermediate Care: Nursing-Led Inpatient Unit (NLIU) (day)
- Day care (session)
- Sheltered housing (week)
- Domiciliary Care (In-House Service) (Hours/week)
- Domiciliary Care (Externally Commissioned) (Hours/week)
- Very sheltered housing (week)
- Rehab/Intermediate Services for Older People

- Hospital based rehab care scheme (week)
- Day care (visit)
- Intermediate care based in residential home (week)
- Intensive case management for dementia (visit)
- Family Support Worker for carers (hour)
- Housing Association Services for Older People
- HA Sheltered housing (week)
- HA Very sheltered housing (week)
- Private Sector Services for Older People
- Private nursing home (week)
- Private Residential care (week)
- Voluntary Services for Older People
- Voluntary Day care (day)
- Voluntary befriending service (week)

16 Has the user needed a Health Service intervention as a result of their medication problems in the last 6 months? (Yes/No)

- A&E visit (visit)
- Hospital admission (bed day)
- Outpatient hospital visit (visit)
- Walk-in centre (visit)
- Outpatient follow-up visit (visit)
- Paramedic Unit call-out (call-out)
- Emergency ambulance call-out (call-out)
- Patient transport service (call-out)
- Rapid Response Service (call-out)
- Community Nurse Home Visit (visit)
- GP Practise Nurse Home Visit (visit)
- GP Surgery Consultation (visit)
- GP Home visit (visit)
- Mental Health Nurse Home Visit (hour)
- Other

18 Was the client issued with a pill dispenser? (Yes/No)

**To answer for those users who don't take part in the pilot**

- 19 The user has decided they don't want to use the pill dispenser and be part of the pilot? Why? (Will miss the carer's visit; Looks too complicated to use; Nervous about it; Family doesn't want it; Issue with user's pharmacy; Other)
- 20 The user has been considered for the pill dispenser but didn't pass the screening process and the reason is... (Medication isn't suitable for the dispenser; Medication Review simplified the current regime; MUR simplified the regime; Frequent medication changes; Short-term medication)
- 21 Installation date of the pill dispenser (Date)

**PART 2 (To answer only if the user is issued with a pill dispenser)**

- 22 Where was the Client living during the time they were using the pill dispenser? (Own home; Living with friend or relative (not in own home); Sheltered accommodation; Extra care accommodation; Residential / nursing home; Other - please state)
- 23 What 'changeover' service has been agreed? (Pharmacy delivery to user; Collection from pharmacy; Via the post; Other)
- 23a Who takes delivery of the new inserts? (User; Prof carer; Family member; Other)
- 24 Who changes the inserts? (User; Prof carer; Family member; Pharmacy; Other)
- 25 Is the user having problems using the pill dispenser? (Yes/No)
- 26 What practical problems with daily living does this cause the user? (Free text)
- 27 How do these problems make the user feel? (Free text)
- 28 What practical problems with daily living does this cause the user's family? (Free text)
- 29 How do these problems make the user's family feel? (Free text)
- 30 Has the user needed any support visits to help them use the dispenser? (Yes/No)
- 31 Total hours of additional support provided (Hours)

**PART 3 (at the end of the pilot period)**

- 32 Has the user needed a Social Care intervention as a result of their medication problems while using the pill dispenser? (Yes/No)  
(Responses as per Q15 above)
- 35a Health Service Interventions (How many occurrences?)  
(Responses as per Q16 above)
- 36 Did the user decide NOT to continue with the pill dispenser before the end of the pilot period? (Yes/No)
- 37 Why has the user decided not to continue with the pill dispenser? (Acute clinical event eg stroke; Medical event eg injury, trauma; Personal event eg bereavement; User didn't like the dispenser; Re-evaluation of client's capacity to benefit from the service.; Non-compliance ; User died; Other)
- 38 On what date did the above withdrawal happen? (Date)
- 39 Will this decision now lead to a different type of support? (Yes/No)  
(Responses as per Q15 above)
- 41 End date of the pilot period (Date ended)

## Appendix 5 – Pharmacy Database

### Pharmacy Questions

- 1 Pharmacy Name
- 2 Pharmacy Postcode
- 3 Name of person completing this form
- 4 Is this a new referral?
- 5 How many minutes did it take to complete the pharmacy section of the Referral Form?
- 6 How many medicines were prescribed for the user?
- 7 How many doses were placed in the dispenser?
- 8 How many compartments had tablets left in them at the end of the cycle?
- 9 How many compartments had tablets in them at the start of the cycle?
- 10 How many minutes did it take to fill the pill dispenser?
- 11 What is the daily frequency?
- 12 Is the dispenser delivered by the pharmacy to the user's address?
- 13 If yes, who delivers it? – (Pharmacist, Dispenser, Driver, Other)
- 14 How long does it take to deliver?
- 15 Is the dispenser being refilled outside of the normal routine dispensing cycle  
(e.g. due to change of medications)?
- 16 If so, how many days of medication were discarded?
- 17 Have you been asked to get involved with the user/carer, in addition to the routine filling  
of the dispenser/disposable inserts?
- 18 If so, for what reason? – (Dispenser not working, Medicines advice, Other)
- 19 How much time has this taken you in minutes?



## Appendix 6 - Client Questionnaire

Thank you for participating in the Automated Pill Dispenser Pilot. We have sent you this questionnaire as we would like your views on using the dispenser.

We would be very grateful if you would spend 10 minutes of your time to complete this questionnaire. All information will be kept confidential and anonymised.

Please tick the answer that best represents your view, adding any additional comments you may feel useful to us under the 'Other Comments' section.

Before You Had the Pill Dispenser	Strongly Agree	Agree	Neither Agree Nor Disagree	Disagree	Strongly Disagree
I was given enough information regarding the pill dispenser prior to agreeing to participate in the pilot	48%	38%	8%	4%	2%
Any questions or concerns I had were fully answered prior to the start of the pilot.	39%	47%	6%	6%	2%

While You Had the Pill Dispenser	Strongly Agree	Agree	Neither Agree Nor Disagree	Disagree	Strongly Disagree
The pill dispenser has helped me to remember to take my medication at the correct times, as prescribed for me.	63%	33%	4%	0	0
When using the pill dispenser, I feel less anxious and/or worried about taking my medication.	53%	33%	10%	4%	0
Having the pill dispenser has enabled me to be independent of others.	42%	42%	13%	2%	0
Having the pill dispenser has enabled me to remember to take my medication, ensuring I do not forget any doses.	51%	43%	6%	0	0

Evaluation of the Pill Dispenser	Strongly Agree	Agree	Neither Agree Nor Disagree	Disagree	Strongly Disagree
Having the use of the pill dispenser has helped my health to improve as I am now taking my medication as prescribed.	32%	50%	12%	6%	

If I had any concerns in using the pill dispenser I was able to speak with someone who answered my questions promptly and efficiently.	35%	58%	6%		
On completion of the pill dispenser pilot, I would like to continue using it.	73%	27%			
I believe that using the automated pill dispenser has improved my quality of life.	51%	37%	10%	2%	
Have the living arrangements changed for you during the pilot period? Please circle Yes or No and then circle the statement that describes your current circumstances.	Yes	No	Living in own home	Living with relative / carer	

OVERALL COMMENTS	Excellent	Good	Average	Fair	Poor
I would evaluate using the pill dispenser as:	78%	20%	2%		

#### Other Comments

If you have any comments or views that you would like to tell us about, please use the space below **(please continue on a separate sheet if necessary)**.

## Appendix 7 - Carer Questionnaire

We have sent you this questionnaire as we would like your views on the automated pill dispenser which your relative is currently using.

We would be very grateful if you would spend 10 minutes of your time to complete this questionnaire. All information will be kept confidential and anonymised.

Please tick the answer that best represents your view, adding any additional comments you may feel useful to us under the 'Other Comments' section.

### Section A: Before Using the Pill Dispenser

1. Sufficient information was given to me that answered all my questions prior to my relative agreeing to participate in using the pill dispenser pilot.

Strongly Agree	Agree	Neither Agree Nor Disagree	Disagree	Strongly Disagree
67%	27%	3%	3%	

2. Any concerns that I had as a carer were addressed for me by my relative's care coordinator promptly and efficiently before the pilot started.

Strongly Agree	Agree	Neither Agree Nor Disagree	Disagree	Strongly Disagree
53%	30%	10%	7%	

### Section B: While Using the Pill Dispenser

3. Using the pill dispenser has helped my relative to be independent and less reliant upon me to remind him/her to take their medication.

Strongly Agree	Agree	Neither Agree Nor Disagree	Disagree	Strongly Disagree
57%	43%			

4. Using the pill dispenser has enabled me to feel less anxious/worried about my relative during the day, knowing he/she is using the device to take their medication.

Strongly Agree	Agree	Neither Agree Nor Disagree	Disagree	Strongly Disagree
53%	43%	0%	3%	

5. Since my relative started using the pill dispenser, the demands placed upon me on my daily routine have been reduced.

Strongly Agree	Agree	Neither Agree Nor Disagree	Disagree	Strongly Disagree
38%	38%	21%	3%	

6. With my relative now using the pill dispenser, I worry less during my working day about whether he/she has taken their medication or not?

Strongly Agree	Agree	Neither Agree Nor Disagree	Disagree	Strongly Disagree	Not Applicable
48%	34%	14%	3%		

### Section C Evaluation of the Pill Dispenser

7. As a result of my relative using the pill dispenser, I believe this device has helped to improve his/her quality of life?

Strongly Agree	Agree	Neither Agree Nor Disagree	Disagree	Strongly Disagree
38%	45%	17%		

8. As a result of my relative using the pill dispenser, I believe this device has helped to improve my quality of life as a carer?

Strongly Agree	Agree	Neither Agree Nor Disagree	Disagree	Strongly Disagree
38%	48%	10%	3%	

9. As a result of my relative using the pill dispenser, I would like to see him/her continue to use the device at the end of the pilot phase?

Strongly Agree	Agree	Neither Agree Nor Disagree	Disagree	Strongly Disagree
76%	21%	3%		

### 10. Other Comments

If you have any other comments or views that you would like to share with us that have not been covered above, please use the space below to address these. (Please continue on a separate sheet if necessary).

## Appendix 8 - Case Studies

### Dudley

#### Case Study 1

Mrs J suffers from Asthma and Chronic Obstructive Pulmonary Disorder (COPD) and was struggling with her medication. She was also responsible for making sure that her husband was taking the correct amount of medication at the right time: he had lots of health problems and was constantly getting his medication mixed up.

Due to health problems, Mrs J was not able to go out unaided and when she was taken out she got very anxious in case she could not get back to Mr J in time to give him his medication. To help him regulate his medication Mrs J bought a weekly pill box from the pharmacist that she filled but this caused problems as Mr J was still taking the doses at the wrong times.

A case manager for health could see the distress it was causing Mrs J and the detriment it was having on her health so she referred Mr & Mrs J to the pill dispenser project.

The first week on the project Mrs J and the case manager were shown how to use the pill dispenser followed by a visit the next week to show Mrs J how to change the inserts in the dispenser. Mrs J was happy with changing the inserts herself and did not have to rely on the case manager to do it. Mr J was later introduced to the pill dispenser and was able to take the correct medication at the correct time and change the carousel over on a weekly basis.

Both Mr and Mrs J's health improved and Mrs J is much more confident about medication. She is now able to go out without worrying about getting back.

#### Case Study 2

Mr Barber took part in a DVD and his story can be seen at:

<http://nhslocal.nhs.uk/story/features/pill-machine-medicine-reminder>

### Staffordshire

#### Case Study 1

John is 25 and recently left home to live independently. He struggled with managing his medication which helped control his epilepsy and reduce the risk of tonic-clonic seizures.

As a result he relied heavily on both Community Nursing support and social care staff. He was frequently visited by paramedics and hated the ambulance trips to hospital. He acknowledges that he didn't like so much attention, which although necessary, impinged on his lifestyle.

His lifestyle also suffered because he was experiencing absent periods following a seizure, mainly in the mornings. This coupled with unsettled nights affected his ability to function and manage everyday living. His home was in a poor state and his landlord was threatening to ask him to move. His family was worried for him and his friends were visiting less, worried by his seizures. He was reluctant to engage in voluntary work in case he had a seizure.

In June 2010 John started using the pill dispenser and within a week his medication compliance improved, this meant his medication started to help manage his epilepsy and his seizures reduced significantly. His sleep improved and he had more energy to live his life. He started to tidy up his home and his friends started visiting again reassured by his improved health.

He was able to rely less on his Community Nurse and after two months they now only visit on a planned basis to monitor. His care team visits have also reduced so John has regained control of his life to the delight of himself, his family and friends. His confidence has grown and now he has achieved his goal of working with a community agency greeting visitors to a local leisure centre.

John has said using the pill dispenser was been the turning point for him in getting on with his life.

### **Case Study 2**

During Mrs H's assessment she was upset and cried and her self-esteem was very low because she felt she wasn't coping. Because her medication regime was hit and miss, her son was popping in frequently and calling her to ensure she was taking her medication to keep her well. This was becoming very stressful as he works full time.

Although it was clear Mrs H needed help with her medication regime there was concern that she may struggle with the pill dispenser and that she would initially need a lot of family support to help her get used to a new routine. As Mrs H was compliant and wanting to try the pill dispenser and her son was willing to provide the extra support initially required she was put forward for the device.

A couple of weeks after Mrs H had been using the dispenser her son reported that he was delighted with how things were progressing and the pill dispenser was becoming automatic for her to use on hearing the alarm prompt. Her self-esteem had improved and she was enjoying being more independent, giving her a real boost in confidence.

### **Case Study 3**

Mrs R was assessed after a referral from her social worker. She had received a brain injury a few years earlier which had left her with memory loss and epilepsy. Her quality of life had declined because her husband had to work away, which meant she was forgetting to take doses of her medication and had to rely on her children to remind her to take her tablets. Because she was forgetting her medication she was suffering more epileptic seizures which made her feel very self-conscious and not wanting to go out unaccompanied.

After using the pill dispenser for a couple of weeks later, she was very happy with it and she was taking her medication much more reliably. This meant her seizures were now improving, giving her much more self-confidence, improving her quality of life and giving her husband much more peace of mind whilst working away.

## Telford and Wrekin

### *Case Study 1*

Mrs M was becoming forgetful and missing medication doses and even when the carers called to remind her to take her tablet, she wasn't always taking it. She was referred to the project and the pharmacist felt that an automated pill dispenser would be suitable. Before being referred to the project, Mrs M was taking one tablet once a day. She now has a multiple dose regime and has not missed a single dose in over two years. She feels happier and more confident since she has had the dispenser.

### *Case Study 2*

Due to a visual impairment, Mrs W was unable to distinguish the sections on her dosette box, resulting in her taking tablets on the wrong day or at the wrong time. She has been using the pill dispenser for nearly two years and has not missed a single dose. She finds the dispenser a great help.

### *Case Study 3*

Mr T has a cognitive impairment which made it difficult for him to take his medication as prescribed. His wife, who was his main carer, also has memory problems. He has been using the dispenser for over 12 months now and has not missed a dose in that time. He enjoys using the device and shows it off to visitors.

## Wolverhampton

### *Case Study 1*

There is a supported living scheme that provides 24 hour support to the tenants with a learning disability. Staff within the scheme until recently would have administered the tenants' medication.

Mr C is aged 60 years and had been previously living in a residential care home since 1972. In February 2007 the care home closed and he was asked if he would like to live more independently. He was very reluctant to move into supported living.

Professionals also expressed concerns regarding his capabilities to live independently. However since this time he has embraced the changes within his life and achieved many personal goals in all aspects of his life and continues to be a positive role model to others.

In March 2011 joined the pill dispenser project and embraced this change. He had never been able to administer his own medication as staff held the view that he was not capable of doing so.

He was given a tipper along with the dispenser and now manages his own medication. This has made a dramatic change to Mr C's life. It has increased his self-confidence and motivation in a positive way. Staff now only need to monitor and will ask him if he has taken his medication. Family have also noticed what a positive impact the pill dispenser has had on him.

Mr C's is very proud of his achievement and has recently become an ambassador for independent living and is looking to 'champion' the use of assisted technology to other people within Wolverhampton.

### *Case Study 2*

Mr and Mrs K are an elderly married couple who live together in a privately owned house and prior to recent medical problems both were very independent and required no assistance from formal services.

In December 2010, Mr K had a stroke resulting in memory problems and was discharged home with the support of a re-ablement service who were visiting 4 times daily to assist with meals and prompt medication. He was keen to regain his independence and manage his medication independently.

After a few weeks, visits were reduced to twice daily but Mr K was regularly forgetting to take his medication.

In April 2010, Mrs K was diagnosed with mild cognitive impairment and adjustment disorder with mixed anxiety and depression, and prescribed medication.

She admits she was double dosing at times as she could not remember if she had taken her medication.

Family was concerned and consequently arranged for private carers to visit and prompt them both with medication. Both were not keen having carers coming into the house and wanted to regain independence around medication compliance.

Mr and Mrs K were referred by a social worker for a pill dispenser and were visited in April this year with their son present. Mr K was assessed first and deemed a suitable candidate for the pill dispenser trial. Mrs K was assessed a few weeks later, she was keen to try the pill dispenser as she was familiar with her husband's and felt it would be beneficial for her.

Mrs K was also recommended for the trial; a tipper was required as Mrs K had difficulty handling the dispenser and containing the medication in her hand.

Both have now had the dispenser for several months and carers no longer visit to prompt with medication. The devices are clearly labelled, have different alarm alerts and are kept in separate places so they do not get mixed up.

The dispenser works very well for them and Mrs K advised it has stopped her making dangerous mistakes with her medication. Both are very happy with the dispenser and relieved that they no longer have to rely on others to prompt them with their medication.



## Worcestershire

### *Case Study 1*

Mrs C was admitted to hospital with breathing problems which appeared to be as a result of her forgetting to take her medication. She was provided with a PivoTell but declined any other support.

Mrs C's daughter says the PivoTell is 'brilliant' and a 'life saver'. She said it has very much helped as her mother requires steroids to help her eczema. As she was taking these regularly the eczema has got much better and the dosage is being decreased slowly. She also said that she showed her mother's GP who was impressed with the device.

### *Case Study 2*

Mr J suffered a brain haemorrhage last year which also caused a stroke. The stroke led to left sided weakness. He is an insulin dependent diabetic, has asthma and thyroid problems.

Mrs J, wife, said that they both her and her husband think the PivoTell is 'brilliant, a godsend'. There have been no problems. She thinks it is 'amazing and I don't know how we managed without it before'. She said it has taken the pressure off her as she doesn't need to prompt him with his tablets. She does however still need to prompt with insulin at times.

### *Case Study 3*

Mr F was admitted to hospital with a general health problem, when he was discharged he had so much medication that he did not know what to take and was taken back into hospital a day later with an accidental overdose. He spent a long time in hospital and initially did not want to leave. He moved into sheltered accommodation and was provided with a PivoTell and orientation clock. Mr F states that the PivoTell is going well for him. He says he takes his medication when the box tells him to when it alarms. He has had no problems with it at all. Spoke to his advocate to see how he thinks things are going with the clock and PivoTell. He advised that it is all working very well. He said that Mr F 'looks ten years younger' as his medication is now being taken regularly and helping him health-wise. He said that Mr F is on minimum support from his supported housing accommodation as he has managed to become largely independent again due to his, now correct, medication management. Advocate said he 'could not speak any more highly of the service provided'.