Improvement and Efficiency
West Midlands

NHS
Midlands and East

# The Automated Pill Dispenser Project

The right pills at the right time delivering the right outcomes

# The Automated Pill Dispenser Project

## Introduction

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.

Take the case of 75 year old Mr F from Wolverhampton, who has diabetes and lives alone. He was discharged from hospital after a routine procedure with so much medication he was confused. As a result he accidentally overdosed, and was re-admitted to hospital the next day. He was so shaken by his experience he didn't want to go home, and was eventually moved into sheltered accommodation for his own safety.

However, since taking part in the Automated Pill Dispenser pilot, to test the effectiveness and safety of the device to control medication, his life has turned around completely.

After six months of using the dispenser, which is loaded with prescribed medication and sounds an alarm when it is time for patients to take their pills, Mr F is now thriving. He takes his drugs regularly, which mean his health has improved and he is less dependent on others. Without the stress, his advocate says, 'he looks ten years younger'.

His story is typical of the huge impact the device is having on the lives of the people who took part in the two and half year long pilot study involving local authorities, the NHS and pharmacists across the West Midlands.

Since it started in July 2009, the pilot has proved the pill dispenser to be invaluable in helping people who failed to take their medication properly stick to their prescribed regime.

Equally as important, it has also shown there is a strong business case for its wider use through making substantial savings for both the NHS and social care services.

Every year the NHS spends almost £9 billion on medication, issuing a staggering 927 million prescriptions, and the National Audit Office estimates 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 medication properly was estimated to be between £36m and £197m.

The pilot included 43 people who had been hospitalised after failing to take their medication properly in the six months leading up to the launch of the project. All of them were given the automated pill dispenser, and by the end of the project only four had been re-admitted.

**"This pilot project is important for so many reasons. We know that people have problems remembering to take their medicines and we need to find the best ways to use assistive technologies like the pill dispenser to help them.**

**The fact that the pill dispenser might also help save us valuable health and social care resources is a bonus. I'm really excited about how we can take the lessons learned from this project and translate them into real life services that will make a difference to people's lives."**

***Richard Seal** – Programme Consultant in Medicines Management. NHS Midlands and East*

[1] Source - Prescriptions dispensed in the community: England statistics for 2000-2010, The Information Centre.
[2] NHS Reference Costs 2006-07.

# How the project came about

In the West Midlands there was growing use of, and investment in, assistive technology to help vulnerable people to stay safe and in control of their own lives.

The West Midlands Telehealthcare Network and the Improvement and Efficiency Partnership (IEWM) were already working together to identify and support best practice and innovation in the region.

Through anecdotal evidence from carers and people who used the dispensers they became aware of the potential benefits of using an automated pill dispenser to help manage medication.

The device is programmed to dispense pills up to 28 times a day. At the pre-programmed times, the internal pill cassette rotates, the alarm sounds and the correct dosage comes into view through the opening in the lid. Once the alarm has sounded the pills are released by tilting the dispenser allowing them to fall into the hand or a suitable container. It can be used as a stand alone device or linked to a control centre.

Use of the pill dispenser was, however, limited to a case by case basis with no single organisation responsible for co-ordinating its use, or realising its full potential.

## Initial research

As a first step to endorsing its effectiveness the network secured funding for research by the University of Birmingham. This study of available data confirmed the dispenser was beneficial for the elderly and those with early dementia or Parkinson's disease, and could potentially help others, including those with learning difficulties or mental health problems.

It also suggested potential savings could be made for the NHS and social services, and recommended further research to evaluate and quantify the benefits.

## The project

Following the research, the IEWM proposed a large scale regional pilot to gain robust evaluation and evidence to support a business case.

The objectives were to:

- trial 500 devices across seven sites in the West Midlands for a six month period
- record the impact on the need for health and social care services
- form strong partnerships between Primary Care Trusts (PCTs), local authorities and pharmacies to raise awareness of the dispenser and enable easier access to the service
- evaluate the human experience of using the device.

Funding of £242,000 came from the NHS West Midlands Innovation Fund, with a further £92,000 for the project secured by the IEWM from the Department for Communities and Local Government.

The PivoTell dispenser was chosen for the trial. This was because it met the technical requirements, and its suppliers were open to suggestions for changes and improvement.

To kick start the project, IEWM organised a workshop on 3 July 2009 to bring together pharmacists, the PCTs and local authorities. The aim was to introduce the pilot, demonstrate the pill dispenser and gain their support.

It included guest speakers from the Strategic Health Authority (SHA) and the pharmaceutical industry. There was positive feedback from those attending, including practical advice on how to make it work.

IEWM appointed a project manager to organise the pilot, and set up a project board with representatives from pilot sites, Alliance Boots and PivoTell.

Training sessions were held by the project manager and PivoTell for the 250 participating pharmacists and also for social care staff to explain the trial and demonstrate how the dispenser worked.

The pilot study was officially launched on 3 July 2009 with staggered roll out across the region.

**"It was a hugely exciting project that provided an integrated response to helping people manage their medication and have choice and control. It was an opportunity to test the device in different scenarios across the region, and gain rigorous evaluation and evidence to make a business case for its wider use. Equally as important, it stimulated culture change in the way medication adherence is viewed encouraging joint working between social care, pharmacies and the NHS to ensure a holistic personalised service."**

***Jim Ellam** – Assistive Technology Project Lead, Staffordshire County Council*

# Pilot sites

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.

Staffordshire North PCT and Herefordshire later withdrew, and Coventry City Council joined the project in March 2010.

## The participants

Those taking part in the pilot were selected because they were having difficulty taking their medication, and had unsuccessfully tried other devices, such as dossette boxes, calendar clocks, blister packs or talking labels.

Of the original 380 people who started on the project, 135 were over 85 years old, and 144 were aged between 75 and 84 years old, clearly showing that age was not a barrier to using the device. Approximately one third were in the early stages of dementia and about one fifth had physical disabilities, such as arthritis or visual impairment.

Most of the referrals came via social care teams and voluntary groups such as Alzheimer's groups and carers' associations, but as awareness of the project increased there were more referrals from health teams.

Quantitative and qualitative evidence of the people using the dispenser and their carers' experience throughout the trial was recorded online, and they were interviewed at the end of the pilot about how the dispenser had changed their lives.

**"The automatic pill dispensers can have a dramatic impact upon medication compliance and safety for older people, reducing hospital admission and improving quality of life. Our involvement has also provided excellent new opportunities to improve communication and sharing of ideas with colleagues in adult social care, and is acting as a catalyst for the wider development of joint working."**

***Dr Dawn Moody** – Leek Moorlands Hospital and Waterhouses Medical Practice*

## The pharmacy role

The pharmacists played a key role in the project. It was agreed that all dispensers used for the project would be filled by a pharmacist to ensure safety, and enable assessment of the suitability of the patient's medication for inclusion in the project.

Pharmacies were paid a monthly dispensing fee of £20 for each user.  A standard operating procedure was developed, which included guidance from the Royal Pharmaceutical Society. The pharmacist agreed a start date with the participant or carer and answered their queries.

They recorded any waste medications and the number of times the prescription changed mid-cycle.

**"The project has encouraged a culture change within our pharmacies where it challenged traditional working practices and allowed a more personalised approach towards medication management. This fits well with the new and exciting concept of Healthy Living Pharmacies, which we have embraced as the way forward for community pharmacy. Collaborative working with all parties is key to the success of the project, and has strengthened the working relationships between local authorities and community pharmacies."**

***Richard Smith** – Project Coordinator Murrays Healthcare*

# The human experience

Over 250 people completed the pilot, and from survey and anecdotal evidence, we know the pill dispenser has had a profound effect on their lives; both people who used the dispenser and their carers report gaining more control.

## John's Story

When 25 year old John from Staffordshire left his family home to live independently he struggled with managing his medication to control his epilepsy and the risk of seizures. He relied heavily on both community nursing support and social care staff.

His lifestyle suffered because he was experiencing absent periods following a seizure. This, coupled with unsettled nights, affected his ability to manage everyday living.

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, which helped to manage his epilepsy, and his seizures reduced significantly. His sleep improved and he had more energy to live his life.

He was able to rely less on his community nurse, and after two months they now only visited 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 has been the turning point for him in getting on with his life.

# The feedback

A third of all those that used the dispensers were asked for feedback and two thirds of those replied. Thirty carers also provided feedback. Their responses clearly demonstrate that using the pill dispenser to manage medication has been successful for both groups.

### People who used the dispenser

Overall this group felt the experience of using the pill dispenser to control medication was extremely positive. An overwhelming 96% agreed that the device had reminded them to take their medication, and as a result improved their health and made them more independent.

They were unanimous in saying they would like to continue using it, and 88% believed the device had improved the quality of their lives.

### Carers

The 30 carers who completed the form were equally as enthusiastic about the benefits of using the pill dispenser with 100% saying the pill dispenser had helped the person they cared for to be independent, and less reliant upon them to take their medication.

A majority of 85% of carers agreed the device had helped to improve the person's quality of life and 86% said it had improved their own quality of life.

Nearly all carers (98%) would like them to continue using the device at the end of the pilot study.


### 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 that significant savings have been achieved.

A record of services received in the six month period before starting to use the dispenser was collated for each participant. The level of publicly funded health and social care services was also monitored throughout the pilot period. This has enabled a robust database to be developed to measure the financial impact of the pilot.

# The feedback

Not all of the people who started the pilot went on to complete the full six months. This was because of deterioration in their health leading to hospitalisation, admission to residential care, or non-compliance with the dispenser. Those who did finish the pilot have generated 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 are fewer home visits to remind people to take their medication, and a reduction in hospital admissions.

Of all the people who completed the pilot, 74 were in receipt of at least one medication prompt visit per day. As a result of using the dispenser, the majority of these visits were no longer required. Over the pilot period this has made a saving in social care of £107k.

Similarly, a reduction in hospital admissions has saved £151k.

The 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. This calculation produced a figure of just 2.9%.

## KEY FINDINGS

- The pill dispenser is highly effective in helping vulnerable adults remember to take their medication. Of those asked, 96% said it worked and resulted in improved health, more independence and a better quality of life
- Although the device is aimed at people with poor memory such as those with Alzheimer's and dementia, it also benefited patients with Parkinson's, mental health issues, learning difficulties, physical difficulties, patients with long-term medical conditions on a daily pill regime, and the visually impaired
- The data collected showed significant savings have been achieved. In total the participants generated savings of £431k, an average of £1,700 per person over a six months period
- The two largest areas of savings are from reductions in medication prompting visits at the patient's home and reduced hospital re-admissions for those on the pill dispenser. Home visits amounted to £107k ie 52% of total social care savings, and hospital admissions amounted to £151k and ie 68% of total health saving

# What happens next?

The major multi-agency project has recorded data on almost 400 participants over two and a half years providing a strong body of evidence of its success. But this is just the beginning of the story.

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.

NHS North Essex has already commissioned an automated pill dispenser pilot, based on the interim results in the West Midlands.

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.

The feedback from pharmacies confirms that they are happy to continue to support existing patients and to consider new ones. Those pharmacies that took part in the project now see the automated device as a mainstream service, and are happy to support colleagues in social care in the referral process for potential new patients.

"More than 250 people have benefited from this project, which has helped them to self-manage their medication. We have outlined both the business case and the experience of people in the West Midlands using the automated pill dispenser service. As local authorities and GPs assume more responsibilities for community based healthcare this work becomes even more relevant. We have not yet explored the potential for GPs to directly prescribe this service. Equally there are areas across the rest of the country who are yet to explore the technology. We hope our success in the West Midlands will inspire others to follow."

***Paul Davies** – Executive Director of Adult Social Care and Inclusion, Walsall MBC. ADASS Lead for Prevention and Early Intervention.*

The full report including key contact details can be downloaded at:
**http://www.westmidlandsiep.gov.uk**

You can watch a short film about the Project at:
**http://nhslocal.nhs.uk/story/features/pill-machine-medicine-reminder**

# About us

Improvement & Efficiency West Midlands (IEWM) supports the public sector to transform and move towards new ways of delivering services. We play a key role in facilitating collaboration, stimulating innovation and mutually exploring 'what works' to both improve services and make them more efficient and sustainable.

NHS West Midlands (now NHS Midlands and East) is the Strategic Health Authority (SHA). As the headquarters of the local NHS, we are responsible for ensuring that investment in healthcare delivers better services for patients and value for money for taxpayers. Our Innovation Fund was established to trial new ways of working and accelerated delivery of the NHS QIPP (Quality Innovation Performance and Partnerships) priorities.

## Acknowledgements

The Project was made possible by resources from Improvement and Efficiency West Midlands and the NHS West Midlands Innovation Fund.

Thanks go to all of the participating pilot sites; especially Marie Spittle in Dudley, Jim Ellam in Staffordshire, Helen Rowney and Suzanne Cash in Wolverhampton and Dave Andrews in Worcestershire.

The Project would not have been possible without the participation and flexibility of Community Pharmacies – many thanks to all involved in the project; particularly Chris Glass (formerly of Alliance Boots UK) and Richard Smith from Murrays Healthcare

Caroline and Adrian Milne from PivoTell ran countless training and promotional sessions and ensured the technology continually evolved to meet the needs of people on the pilot.

Joanne Harding and Richard Seal from NHS Midlands and East played a key role in raising the profile of the Project within the region and beyond.

Andy Jackson from Charter and Plan Ltd. held the Project together and demonstrated great tenacity and pragmatism throughout.