

National Mobile Health Worker Project:

Progress Report

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National Mobile Health Worker Project

Progress Report

Prepared by the Mobile Health Worker Project Team:

Kathy Drayton - National Clinical Lead Mobile Solutions

Karen Robinson - Business Change Manager

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National Mobile Health Worker Project: Progress Report

Executive summary

The NHS currently spends more than £11bn every year on community services, yet on the whole community services have not received the same support for the modernisation of working practices that has been afforded to the primary and secondary care domains.

With Government policy increasingly encouraging a paradigm shift in the provision of clinical care to give patients more choice – including the choice to be treated at home – all community service providers are looking to introduce different ways of delivering care.

The use of mobile devices in clinical care has long been touted as a cost-saving, productivity-enhancing solution for clinicians, and in particular for community clinicians who provide daily care in patients' homes, at clinics, schools, nursing homes and other such disparate locations. However, very little in the way of quantifiable evidence has yet been recorded, making it more difficult for service managers to put forward the case for investment.

In the summer of 2010, a team of clinical and technical specialists from the Department of Health's Community Information Project (CIP), Panasonic and BT Healthcare set out to gather the information that they hoped would provide the missing link, shifting from the theoretical to the proven benefits of mobile working in community services. Led by the National Clinical Lead for Mobile Solutions, the team selected eleven pilot sites from more than thirty invitation responses and devised a methodology that would examine both the technical and the business change aspects of a mobile working deployment.

The initial capital cost of devices was funded by the Department of Health, with an understanding that the sites involved would take on the associated revenue costs of the devices in their project with the BT Managed Health Service Contract

The capital costs included the device with a smart card reader, N3 token set up costs and Microsoft office licence, with both the Project and business management and the training associated with deployment, and any changes required to the standard Gold Build on the device. The revenue costs per device which were the responsibility of the Pilot site included encryption, SIM Rental, BT Helpdesk, Mobile express connection and N3 Token rental.

The overall aims of the pilot study were:

- To better understand the requirements for mobile working to support community service modernisation;
- To evaluate whether the efficiency and effectiveness of using an existing mobile solution can improve the quality of care;
- To formulate guidance on the deployment of mobile solutions to community services, improving the level of understanding on how best to realise benefits;
- To demonstrate increased productivity and efficiency by reducing clinician travel time to and from community bases and by making changes to working processes;

- To increase the rate of mobile working adoption by building quantitative evidence from pilot site case studies, providing a solid economic basis for investment in and deployment of mobile solutions to community organisations.

From the information collected by the CIP team during the seven-month period of the pilot, it is clear that adoption and long-term use of appropriate mobile solutions has the potential to significantly improve efficiency, team-working and work-life balance for community clinicians of all kinds.

Key findings

The project findings are shared in this detailed report in the hope that they will enable the accelerated deployment of mobile technology and also provide a resource for community service managers to reference the benefits when they endeavour to secure funding and support for their own mobile implementation projects.

Metrics

Clinicians using the mobile devices were asked to record some simple metrics around their daily activities, both before and after the deployment of the equipment. These metrics were collected and collated by the MHWP team in the hope that they would provide an insight into the difference the devices could make to the daily working practices of the many different kinds of clinicians taking part in the pilot. Data was collected in such a way that it was possible to analyse it not only by site, but also by service, allowing study into the ways that mobile working affected clinical working within different clinical practices.

Key findings from this metric data are outlined below;

- The majority of sites demonstrated increased productivity after mobile devices were implemented (contacts increased)
- More time was spent with patients following deployment of mobile devices
- Journeys and total journey time were increased, although to a lesser degree than activity, indicating improved efficiency

Results varied significantly across the pilot sites and services, and are a reflection of the differing local processes and approaches.

In addition:

- Clinicians across the eleven pilot sites estimated that the devices allowed them to save 507 referrals, equating to a saving of nearly 9 percent across the pilot period.
- Clinicians across the eleven pilot sites estimated that the devices allowed them to avoid 49 admissions, equating to a saving of approximately 21 percent across the pilot period.

Financial savings

Whilst there are some clear financial benefits associated with the adoption of mobile working, it is stressed that just as the solutions are not 'one size fits all', neither are the benefits. Financial

savings will vary greatly across different sites and the different services within them, as demonstrated by this report.

However, as an illustration of the kind of savings and benefits made possible by the use of mobile devices, some simple calculations are presented below for consideration.

Assumptions:

- A referral will generate *at least* one visit for assessment, therefore a saved referral will save this visit
- An admission will cost *at least* an assessment in triage or A&E, the transport to get the patient there and the cost of an 'average' non-elective stay
- A no access visit costs *at least* the cost of a visit
- Average cost of a home visit = £42

Therefore:

- Each saved referral = £42
- Each saved admission = £1735
- Each no access visit = £42

(standardised costs taken from 'Unit Costs of Health and Social Care 2010' published by the Personal Social Services Research Unit, University of Kent)

Figures are for the two benefits periods (8 weeks), with an average 250 clinicians submitting data

507 referrals saved =	£ 21 294
49 admissions saved =	£ 85 015
218 No access visits saved =	£ 9156
Total =	£115 465

This equates to **£462** per clinician over 8 weeks or **£3002** per clinician per year

More detailed investigation into the financial benefits of mobile working will be carried out as the MHWP moves into its longer-term evaluation of the participating sites.

For more information on the data and how it was collected and analysed, please refer to the methodology section of this report.

Conclusions and lessons learned

Of equal importance to the analysis of metrics are the lessons learned at the pilot sites around the importance of planning for business change and the absolute necessity of involving clinicians in projects at all levels to achieve the greatest benefit from the investment, financial or otherwise.

The MHWP pilot study has highlighted several key points for consideration when implementing mobile solutions:

- Frustrations with connectivity and session persistence are the major barriers to smooth adoption of mobile devices. Projects must be willing to experiment with different network providers to find the best levels of coverage for users, and to centrally coordinate the development of robust connections. In addition to improving the connectivity capability of devices, the applications that run on them must be developed further to support mobile services through use of approaches such as store and forward. Such approaches would allow clinicians to work continuously and seamlessly even during periods of time when they are out of range of network signal, with data being temporarily held locally and securely on the device and uploaded to central servers when an internet connection becomes available.
- Mobile deployments in community settings can be successful, and when correctly planned, implemented and supported are extremely popular with clinical staff.
- Clinicians in the NHS are not resistant to change or innovation, they will embrace it and make it work for them in unexpected ways provided that they are supported and engaged in the project as a whole.
- Community clinicians are perfectly positioned to meet the challenges demanded of them in a 'less for more' economic climate, provided they are equipped with the technology and the skills they need to move services forward.
- Mobile devices are key to ensuring that community services don't get left behind as the NHS undergoes changes in the way care is commissioned and provided. Mobile devices will bridge the information gap that currently exists around community care, making the forthcoming Community Information Data Set (CIDS) far easier for organisations to collect and submit.
- Mobile deployment is not just about the technology. Finding the right equipment is only the start of the process; engaging and supporting the users is critical to ensuring success and full benefits realisation for mobile projects.

All participating pilot sites have been involved in the development of this report, with participants given the opportunity to contribute to the validation of data recorded and to the documentation of lessons learned. Through the use of open feedback sessions, it is hoped that the site evaluations presented in this report accurately reflect the pilot experience, unique to each site, thereby giving the reader a full and accurate insight into the processes and pitfalls of adopting mobile working for clinical workers.

Further work

Although the TCS Programme has now drawn to its conclusion, the Mobile Health Worker Project is continuing into 2011/12. The MHWP team is continuing to work with the 11 sites to evaluate the use of the devices over a longer period of time, to build up a long term picture of the effects of the devices understanding how the benefits may change and whether the process changes become embedded. They are also working with six of the pilot sites from within the existing cohort to implement whole-service transformation; identifying full teams that would benefit from the deployment of mobile devices to all clinicians. The MHWP team is working closely with project staff to measure outcomes having taken into account the lessons

already learned. Measurements will continue over a longer period of time and without the pressure of TCS deadlines there will be less constraint upon the amount of preparation and analysis that can be undertaken by site project teams. A follow-up report detailing this work is expected to be published in 2012.

Introduction

Project Origins

Transforming Community Services

Effective and efficient community services are the foundation of healthcare in the NHS. They help people stay healthy and care for them through debilitating illness or at the end of life. Community services are a lifeline for some of the country's most vulnerable people, and at their best are innovative, flexible and personal.

The Transforming Community Services programme – completed in March 2011 – was established to support providers and commissioners to make changes to community services that would provide better health outcomes for patients, families and communities, as well as increasing efficiency through modernisation of care.

The Mobile Health Worker Project (MHWP) formed part of the TCS programme's Reforming Systems work stream. When the TCS Programme came to a close the MHWP project continued in its own right.

Precedents for mobile working

Mobile working for clinicians working in community services is not a new concept, with some organisations pioneering new devices and working processes for several years before the commencement of the Mobile Health Worker Project in August 2010. However, very little structured measurement of benefits has been undertaken, making it difficult for organisations seeking funding to provide evidence of savings.

Yorkshire and the Humber Programme for IT undertook a large-scale implementation of mobile devices and mobile working in Kirklees, completed in summer/autumn 2010. Kirklees undertook the project as a business change exercise rather than a technical deployment, and the metrics collected around benefits resulting from changes to working practices were extremely encouraging. The Kirklees work was a pioneering step towards understanding the business change required to release the benefits of mobile working in community; however, a lack of baseline measurements upon which to base the benefit projections limited the robustness of the metrics recorded when attempting to apply the findings nationally.

The MHW Project aimed to build on the foundations of previous successful implementations, creating a solid foundation of quantitative measurements and anecdotal evidence around a varied group of sites, thereby providing some benefits measurements that could be realistically scaled up and applied at a national level.

The Pilot Sites

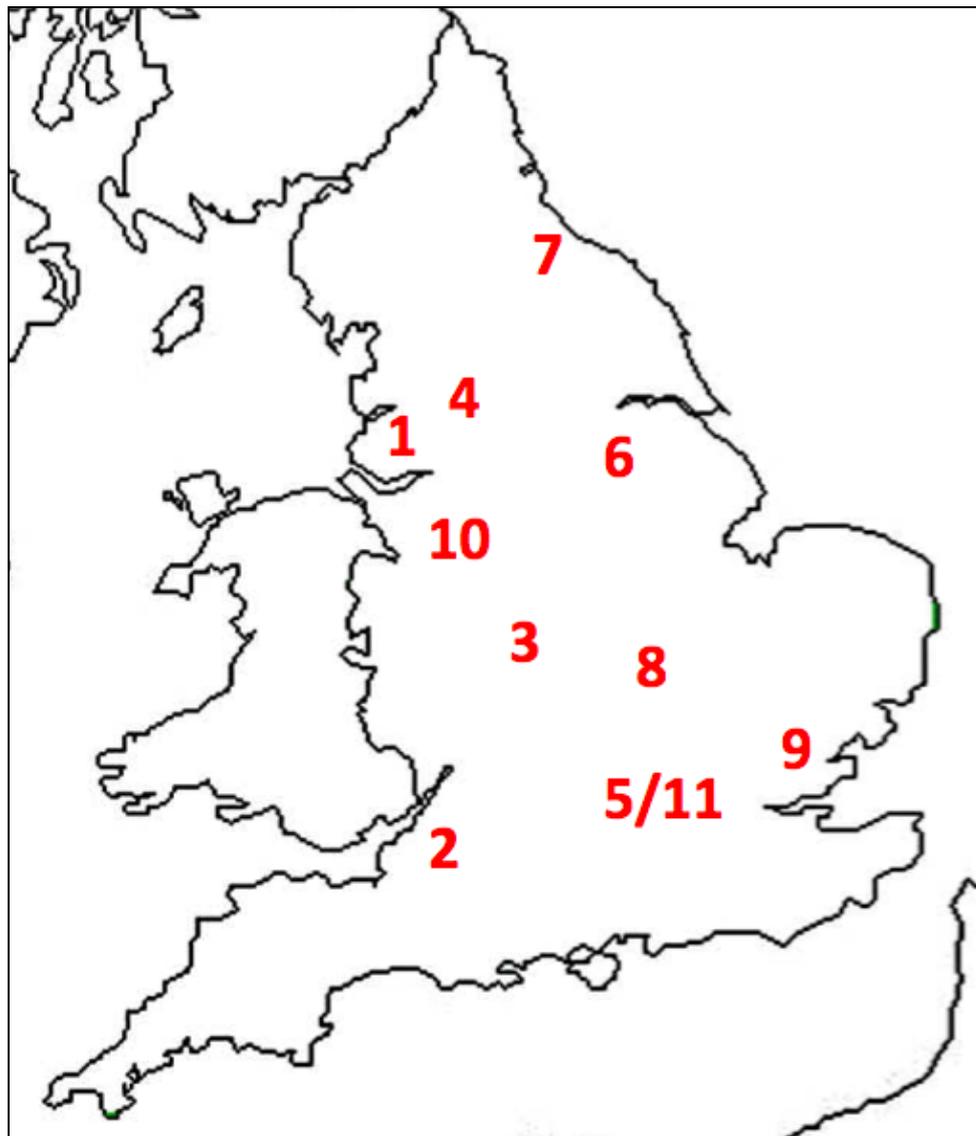


Figure 1 – MHWP site map

The following sites were selected as pilot sites for the MHWP:

1. Ashton, Leigh and Wigan Community Health Care (ALWCH) Bridgewater Community Healthcare NHS Trust, ALW Division
2. Avon IM&T Consortium (AIMTC): Bristol Community Health, South Gloucestershire Community Services and North Somerset Community Partnership
3. John Taylor Hospice CIC (NHS BEN)
4. NHS Calderdale (Calderdale and Huddersfield Foundation Trust)
5. City and Hackney Teaching Primary Care Trust
6. Doncaster Community Healthcare (NHS Doncaster)
7. North Tees and Hartlepool NHS Foundation Trust
8. NHS Northamptonshire Provider Services
9. South West Essex Primary Care Trust (part of North East London Foundation Trust)
10. NHS Stoke on Trent
11. NHS Tower Hamlets

The organisations included in the project have undergone changes as part of the TCS programme and may now have become part of another organisation, joined with other organisations or (in the case of the NHS BEN site) have achieved Social Enterprise status.

For this reason the sites will be referred to by both the name of the current organisation and that of the organisation who submitted the bid.

A baseline assessment questionnaire was sent out by the Community Information Project (CIP) in the spring of 2010 to all Trusts with community services. The baseline assessment contained questions for both clinical and informatics respondents, and was designed to help CIP ascertain the existing level of mobile working capability in community services on a national level.



Figure 2 – Selection process

At the same time, an open invitation to take part in the MHW project was extended to these same organisations. Of 192 organisations who were contacted, 92 responded with a completed questionnaire. Of these 92 organisations 34 responded to the invitation to take part in the MHW Project. These responses were then examined in depth by the MHW project team and assessed for suitability.

Suitability was judged on a number of factors, designed not to single out those organisations most likely to produce a successful deployment but rather to present a diverse spread of existing mobile capability, clinical systems implementation and geographical placement. This approach, it was hoped, would offer the clearest picture of mobile deployment capability across

the whole country, illustrating the differences between organisations and helping to draw out the similarities, creating a solid base of recommendations and lessons learned to pass on to the wider NHS community.

Project Methodology

This section presents the methodology adopted by the MHWP team in order to organise and run the Mobile Health Worker Project across the eleven pilot sites.

Approach

It was important to establish a rigorous approach that would provide each site with equal opportunity to contribute quantitative and qualitative data to the overall results. In order to ensure this was achieved, the MHW Project team devised a portfolio of standard documentation to be completed and returned by each site throughout the study period. In addition, all sites were guaranteed equal levels of contact with, and project support from, the MHW Project team as well as first line technical support provided by project partners BT.

Documentation

Standard documentation requested from sites comprised the following elements:

- National baseline assessment questionnaire: Directed to both clinical and IT audiences, gathering quantitative data about the national state of mobile deployment prior to the MHW Project.
- Invitation to participate: Questions relating to the organisation's current position regarding mobile working as well as a statement of aims and objectives if selected.
- TCS mobile readiness assessment: The self-assessment framework for mobile working is a tool to help community services understand their own state of readiness for adopting mobile technology and working practices. The framework then helps organisations to assess the level of risk introduced by adopting mobile solutions, based on the level of readiness established by the self-assessment. All sites were asked to complete the assessment prior to commencement of implementation;
- Site overview: Each site was requested to provide details of their pilot project, including the number of staff taking part, the clinical services involved, the rural/urban profile of the area covered and the clinical system or systems in use.

Data and data collection

In order to collect metric data about the impact of the devices at each site, it was necessary to devise a standardised method for collection of statistical data. Understanding the effect (if any) that using the devices would have on a clinician's working day required snapshots of daily activity both before and after the deployment of devices.

Baseline and Benefits tools

Once selected for participation in the project, and before deploying the devices to clinicians, all sites were requested to collect data from participating staff using a baseline assessment tool of standard questions provided by the MHWP team.

Data was collected over a one month period before deployment (which was done in September 2010 for most sites) and the questions were designed by the MHWP team to track core areas the device would potentially impact. These included:

- Contacts: the number and duration of patient/service user contacts in each day over the assessment period.
- Journeys: the number and duration of all journeys made in each day over the assessment period.
- Referrals and admissions: the total number of referrals and admissions made (if any) during the assessment period. These varied greatly depending upon the service, as not all services will make referrals and admissions.
- No access visits: the number of times in a day that a clinician was unable to gain access to a patient for a visit.
- Clinicians were also asked to record instances where access to the mobile device had allowed them to prevent admissions, referrals and no access visits.
- There was also the option of collecting both positive and negative comments on the use of technology by either patients or clinicians on the tools.

Once baseline data had been collected, the mobile devices were distributed for use. All sites were requested to collect further data over two specified monthly periods in order to properly reflect the impact of the deployment of the devices:

Baseline	Benefits 1	Benefits 2
September 2010	22/11/2010 – 17/12/2010	17/01/2011 – 14/02/2011

Table 1 – Data collection dates

The benefits collection tools were designed to build upon the data collected for baseline, providing a comparative view of the pilot project on a per-site basis.

The intention of the MHWP team was that each site would collect baseline and benefits data over the same periods of time. Due to issues and delays at certain sites, this was not always possible.

There were some problems with the data collections tool. The tool came in the form of a spreadsheet that operated through the use of macros in order to collate data entered daily by clinicians. The macros – intended to facilitate ease of use – caused some unexpected issues, either due to incompatibility with existing devices or in some cases to a lack of understanding on the part of the user as to how the spreadsheet worked. This resulted in some sites receiving low numbers of returns, and others resorting to submitting their returns to the MHWP team either in hardcopy or as electronic versions of forms filled in by hand by clinicians unable to use the spreadsheet.

Data analysis

In total, the MHWP team collected more than 11,500 days' worth of data from 311 clinicians in 16 different clinical services.

Over 50,000 contacts and 49,000 journeys were recorded in this manner with over 800 comments from clinicians and more than 150 comments were received from patients

The spreadsheets (in their various forms) were collected from each site by the MHWP team and sent for collation, validation and independent analysis to resources at the NHS Information Centre for Health and Social Care (NHS IC). Owing to the problems with the tool and the fact

that sites had saved them in different formats (some with macros, some without, some entered by hand from paper copies after the fact) the collation took much longer than originally anticipated.

Data limitations

Due to differences in the amount of data submitted across all three data collection periods, it was necessary for the MHWP team and the NHS IC statisticians to work together to find appropriate ways to 'rebase' the data where necessary. This involved using formulae to work out average values where appropriate in order to give a fair representation of e.g. the numbers of contacts and journeys across the full pilot period.

Some data submitted was corrupt or not saved correctly and this resulted in some returns not being included in the analysis.

As an example, where the number of days in the baseline and benefits periods differs (for instance if 200 days were recorded for baseline as opposed to 400 days for benefits 2), the results have been averaged out in order to provide a comparative view of the data.

Metrics returned from NHS IC included both the raw figures and a breakdown of comparative metrics relating to the different services participating in the pilot. This allows the MHWP team to understand how the devices impacted the working processes of clinicians from different Services.

Most of the figures quoted in the site evaluations have been adjusted in this way (as opposed to being the 'raw' figures before analysis) and therefore it is important to note this when considering the metrics analysis.

Due to limitations in the design of the tool, where durations were recorded as a range rather than an absolute value, in order to work out the time spent on contacts and journeys it was necessary to work out an average duration for each duration category. This was achieved by finding the midpoint of each duration range:

Data range in the tool	Range midpoint used for calculations
0-15 mins	7.5
15-30 mins	22.5
30-45 mins	37.5
45-60 mins	52.5
60-90 mins	75.0
90+ mins	90.0

Table 2 – Range midpoints

These midpoints were then used to multiply up by the number of contacts or journeys recorded. It is acknowledged that this is far from ideal; however, by the time the requirement to calculate durations in this way was realised, the tools were already in use across all pilot sites.

Journeys recorded for the project include all journeys made, not just those related to direct clinical care, making it difficult to directly link the changes seen in activity to the changes seen in number of journeys made.

Many of the metric results are given as ‘averages per clinician per day’ - there are external factors that will have affected these results.

Leave, administration time, meetings and working reduced hours will all affect the number of hours available to a clinician to perform clinical duties – this will bring the overall average figures down, and should be taken into account when looking at the data.

Data quality and reliability will also be affected by low levels of returns - this could be due to low amounts returned by the site, or due to returns not being able to be included in the analysis. Possible reasons for low numbers of returns submitted by sites included users having difficulties completing the sheets due to lack of knowledge of Excel, poor compliance of users completing sheets due to not knowing why they were having to complete them and difficulties in local distribution of the collection tool.

Other limitations include some sites not collecting data for the full data collection period, or changing the date parameters of the data collection - these discrepancies should be taken into account when regarding the figures presented.

Data fields

The following table outlines the main data fields that comprised the data collection tool, along with any relevant comments and discussion about the expected benefits associated with them.

Field name	Comments
Contacts	The number of client contacts recorded in a given day.
Contact durations	Each client contact was recorded against a duration, giving an indication of the durations of contacts recorded in a given day (see Data limitations). An increase in contacts is equivalent to an increase in productivity, with staff able to achieve more.
Journeys	The number of journeys recorded in a given day. A reduction in the number of unnecessary journeys would save time for the clinician, allowing them to achieve more in a shorter period, increase productivity and save resources spent on petrol.
Journey durations	Each journey was recorded against a duration, giving an indication of the durations of all journeys recorded in a given day (see Data limitations).

Field name	Comments
Referrals	<p>Clinicians were asked in all three phases to record the number of referrals they made each working day. In the benefits collection periods, they were asked to make an estimate as to how many referrals they had been able to prevent through the availability of the device. For instance if the device was used to gain access to the patient's record and clinical information which prevented a referral, this would count as a 'saved' referral. Due to the use of estimates, 'referrals avoided' figures should be considered as qualitative rather than quantitative.</p> <p>Unnecessary referrals have a cost implication for both the person making the referral and the person receiving the referral, both in terms of time and money .</p>
Admissions	<p>Clinicians were asked in all three phases to record the number of admissions they made each working day. In the benefits collection periods, they were asked to make an estimate as to how many admissions they had been able to prevent through the availability of the device. For instance if the device was used to gain access to the patient's record and clinical information, and this affected a decision to request admission, this would count as a 'saved' admission. Due to the use of estimates, 'admissions avoided' figures should be considered as qualitative rather than quantitative.</p> <p>Admissions have an associated financial cost to the Healthcare Provider, the amount of which will depending on the reason for the admission – standardised costs are available in 'Unit Costs of Health and Social Care 2010' published by the Personal Social Services Research Unit, University of Kent. There are also significant costs to the patient associated with an admission to hospital.</p>
'No access' visits	<p>Clinicians were asked in all three phases to record the number of no access visits they encountered during a working day.</p> <p>In the benefits collection phases, clinicians were asked to record instances where the device had helped them to avoid a no access visit.</p> <p>A no access visit can be defined as a visit where the clinician cannot gain access to the patient. This may be for a variety of reasons, for example the door may be secured by a key safe or an entry code that is unknown to them, patient may be immobile and cannot answer the door, or the patient may not be at home.</p> <p>Having access to patient data may give the clinician contact phone numbers and secure entry codes and can avoid a no access visit . No access visits result in wasted time for the clinician, unnecessary journeys and usually a significant amount of time is taken rescheduling a visit or locating the patient.</p>

Field name	Comments
Duplication of data	Clinicians were asked in all three phases to record instances where they had recorded the same item or items of data in more than one place, for example multiple paper records, or electronic records This may be duplication of data for different organisations, or within the same organisation. A reduction in the duplication of data would save a great deal of time for clinicians and administrative staff alike
Free text comments	A space was provided for clinicians to record free text comments – for detailing their own experiences with the device and/or any comments made by clients/patients about the devices.

Table 3 – Data fields

Mileage : Pre and post deployment mileage data was collected, however this did not correspond directly with the data collection periods.

It proved to be quite difficult for some sites to collate and submit this due to internal processes. The London sites found it extremely difficult due to the reliance on public transport. Coupled with the fact that clinicians use pre paid travel cards it is difficult to measure expense claims for travel. In further benefit phased this question will not be asked of the London teams and for similar deployments in London it would be unlikely to realise savings in travel expenses.

Data: Assumptions

There were several assumptions made at the outset of the Project, however there was previously no robust data to support these.

These included:

- Clinicians would experience an initial drop in productivity (namely client contacts) for the initial period after adopting the devices, as they became accustomed to the devices and began to integrate them into their daily working process.
- Productivity would ultimately rise and there would be greater efficiency in journey planning. Although there was certainly evidence of the former, the latter was harder to show due to the construction of the data collection tool (see **Data limitations**). Anecdotal evidence – presented in this report under each individual site – strongly suggests that clinicians felt unnecessary journeys were reduced, with many able to start and end their days at home. That this is not reflected in the data is a matter for further investigation in future reports.
- Services that would be able to achieve certain types of benefit and those who may not achieve benefits.

Site Visits

Each site was visited several times to gather information, discuss the project and note any associated process change. At each visit, a standard set of questions designed to build up a detailed picture of the project approach at the different sites were asked. Questions were focused around the establishment and support of the project both from an organisational sponsorship and an IT perspective, and around the approach to business change taken by the sites. At the visits, face-to-face contact with the clinicians using the devices was requested, in

order to gather subjective data, to ascertain the usefulness of the device, and to elicit questions and suggestions from the users.

Business change

Guidance was provided to the individual sites to focus on business process change where possible (for example suggesting the documentation of as-is and to-be working processes, and the full involvement of clinicians in making the transition to mobile working) but these suggestions were not always enforced. The MHWP team hoped that thorough documentation of the eleven widely differing project approaches would help to inform future best practice guidance for future mobile implementation projects.

Equality Impact Assessment (EQIA)

At each site, MHWP team members discussed how project teams were addressing any impact that the use of mobile devices might be having on clinicians. In all cases, sites reported that the devices were being considered under their existing IM&T and general human resources usage guidance, with provisions already being made for users with disabilities (e.g. visual or physical) wherever they were indicated.

Project Technology

This section gives an overview of the different technologies used during the pilot projects across the eleven sites.

It is important to note that this report is **not** intended as an evaluation or recommendation of any particular technological approach to mobile working (either hardware or software). Although the technology is discussed, what is under scrutiny in this report is the project methodology and the changes resulting from the adoption of the concept of clinical mobile working.

For a complete glossary of terms and definitions of any abbreviations used in this report, please refer to the glossary appendix at the end of this document.

The devices

The devices selected for use at all pilot sites were Panasonic Toughbooks; semi-ruggedized laptops designed to withstand the heavy wear and tear that occurs when a device is used every day in many different locations and in all weather.

Laptops will not be the most appropriate and cost effective solution for all community services clinicians. There is no 'one device fits all' approach for the diverse set of disciplines that constitute community services, and the importance of properly evaluating working practices and selecting the best device for the services involved cannot be underestimated.

The use of Toughbooks for the Mobile Health Worker Project was based upon the proven success of previous mobile deployments. The devices were provided with a managed service contract from BT Health.

The objective of the project was to evaluate the benefits using both quantitative and qualitative measures across a wide variety of services and clinical applications. By using a standard device and method of connectivity that had proven successful and demonstrated benefits in previous deployments, any variance in the individual project sites successes could be considered to be independent of these common factors.

The Gold Build

Participating sites were offered a standard suite of software known as a 'gold build' which was pre-installed on the devices before distribution to the sites. The gold build was customisable to the requirements of the organisation, with the capability to add, remove or alter the component elements as demanded by the circumstances.

Gold Build Standard Components

Below is a summary of the standard gold build components, and a brief description of their purpose:

Adobe components: Including Adobe Reader (for viewing PDF documents) and Adobe Flash and Shockwave players (for viewing web content).

Citrix components: Allowing users to connect remotely to applications within their own organisation, either by hosting and providing access to them centrally, or by delivering the applications to user devices to be run locally.

BigFix: Gives administrators a centralised view of roaming resources such as mobile devices and permits remote delivery of software and security patches.

Cisco VPN client: Provides remote users with encrypted virtual private network (VPN) tunnels allowing them to connect securely to their base network and applications.

Java components: The Java runtime environment and Java 6 allow users to access web content and run certain pieces of software.

Microsoft components: Including Internet Explorer 7, Microsoft Office (Word, Excel etc), Silverlight (alternative to Adobe Flash player).

MobileXpress components: Provides access, authentication and security for mobile working through SSL VPNs and One Time Password (OTP) strong authentication.

MyID client: MyID is a credential management system and forms part of the capability for users to authenticate themselves on the device using their NHS Smartcards.

NHS Identity Agent: Each device is fitted with a Smartcard reader, and the NHS Identity Agent forms part of the capability for users to authenticate themselves on the device using their NHS Smartcards.

Smartcard drivers: Software which drives the Smartcard reader hardware that is installed on all devices.

Qualcomm Gobi 2000: Allows the device to operate using integrated mobile reception diversity, intended to promote more robust and faster network connections.

QuickTime: Software for the display of certain types of video file on the device – for viewing certain web content as well as for general presentation purposes.

Sophos components: Sophos software protects devices and users against deliberate and accidental threats to patient-identifiable records.

Gold Build Extra Components

In addition to the standard gold build components, some sites opted for extra items specific to the security or administrative needs of the site, or for specific services within that site. Below is a summary of these extra components and a brief description of their purpose (see individual site chapters for details of which sites opted for which extras):

AcceleNet: Software that boosts wireless performance by creating an ‘acceleration lane’ between the mobile device and data centre application servers. Also reduces bandwidth consumption by up to 75%.

2e2 SafeBoot installer: 2e2 is a managed encryption service for the NHS.

Check Point VPN client: Provides remote users with encrypted virtual private network (VPN) tunnels allowing them to connect securely to their base network and applications.

Communicate: In Print: A desktop publishing programme based on the use of symbols used as a resource by Speech and Language Therapists.

Desktop configurations: Certain sites requested specific adjustments to their desktop settings, such as fixed wallpaper displaying helpdesk details, password protecting screensavers, and desktop shortcuts to commonly used applications.

EMIS Web: Clinical system used on the devices by Tower Hamlets.

Gemplus/Gemplus Authentication Client (GAC) registry settings: Gemplus facilitates the authentication of smartcard holders.

Pointsec Mobile Encryption: Encrypts data on mobile devices to prevent unauthorised access in the event of loss or theft.

RiO, including shortcuts and registry settings: These shortcuts and settings allow users to quickly fire up the clinical application for use in the field.

Safeboot encryption: Encrypts data on mobile devices to prevent unauthorised access in the event of loss or theft.

TPP SystemOne: Clinical system used by several sites participating in the MHWP pilot.

Zenworks: A suite of components that give organisations a centralised, unified method of control over all deployed mobile devices (known as 'endpoints'). Allows easier user support, remote management of software updates and of security.

Overall Project Findings

This section aims to illustrate the key findings of the MHWP project overall.

The findings in this section are at a higher-level perspective than those which can be found in the individual site chapters elsewhere in this document.

Sites

Metric results by site varied greatly depending on the number of clinicians returning data for each collection phase.

Contacts

South West Essex recorded the greatest increase in contacts per clinician per day, going from an average of 4.7 contacts to 8.3 contacts, though local activity collection showed a more conservative figure.

The increases and decreases demonstrated in these figures will be discussed in detail in the site chapters.

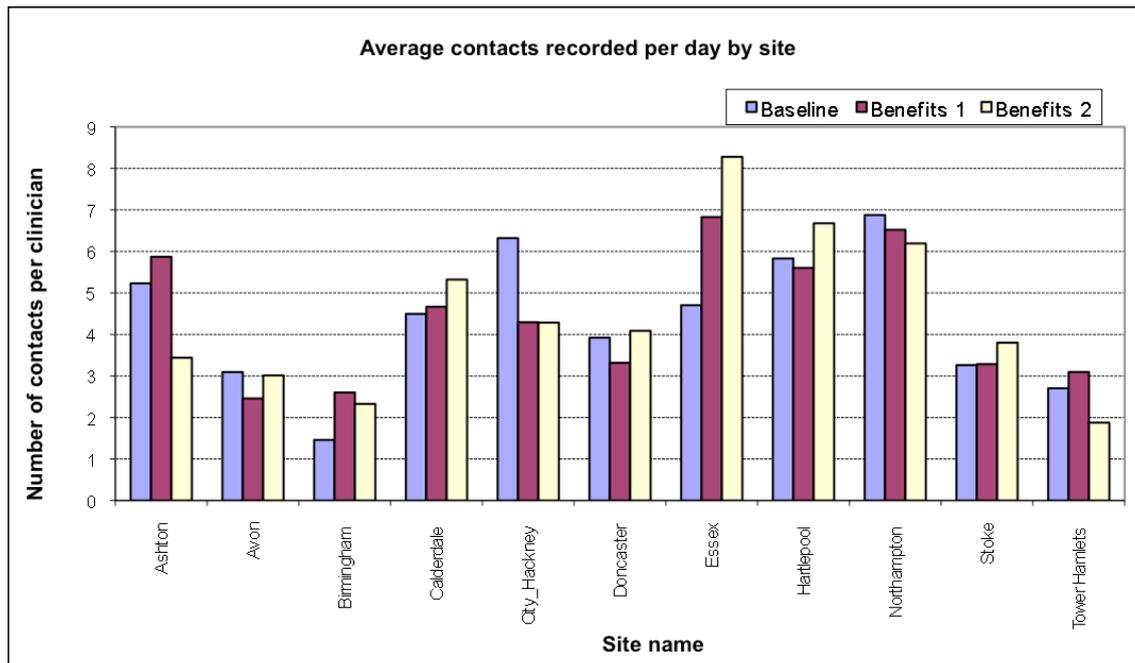


Figure 3 – Overall contacts per clinician per day

Measurements were also taken around the duration of contacts, split into six time categories:

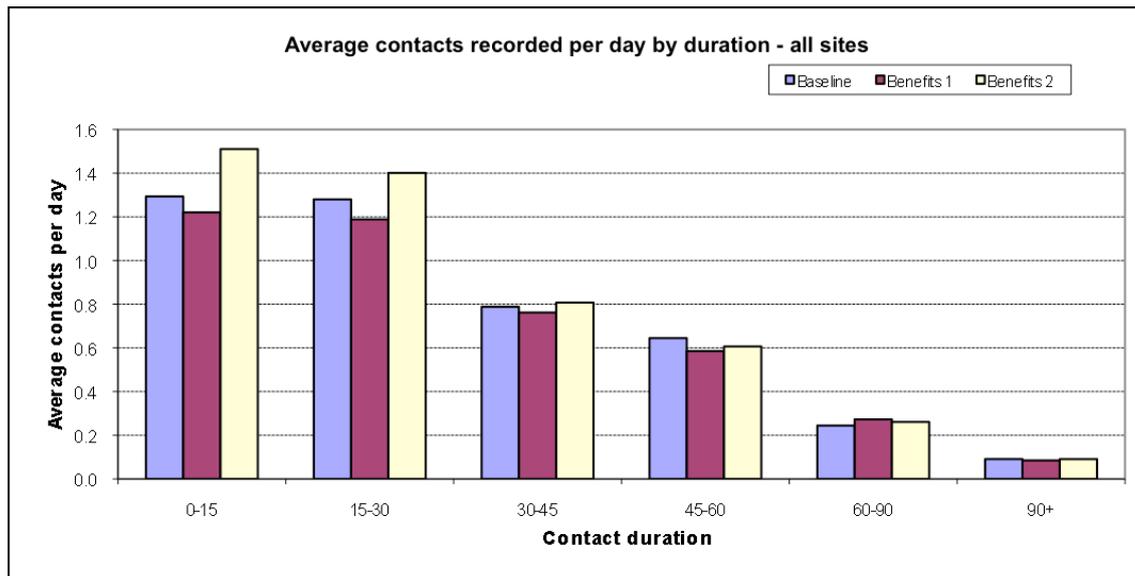


Figure 4 – Overall average contact durations per day

The figures indicate that overall, clinicians increased the number of shorter duration contacts, with those of a longer duration undergoing less of a change.

Journeys

As predicted and as is logical, where contacts were increased journeys were also increased. Only one site – Doncaster– managed to reduce their journeys by 3.3 percentage points even as their contacts increased by 4.2 percentage points.

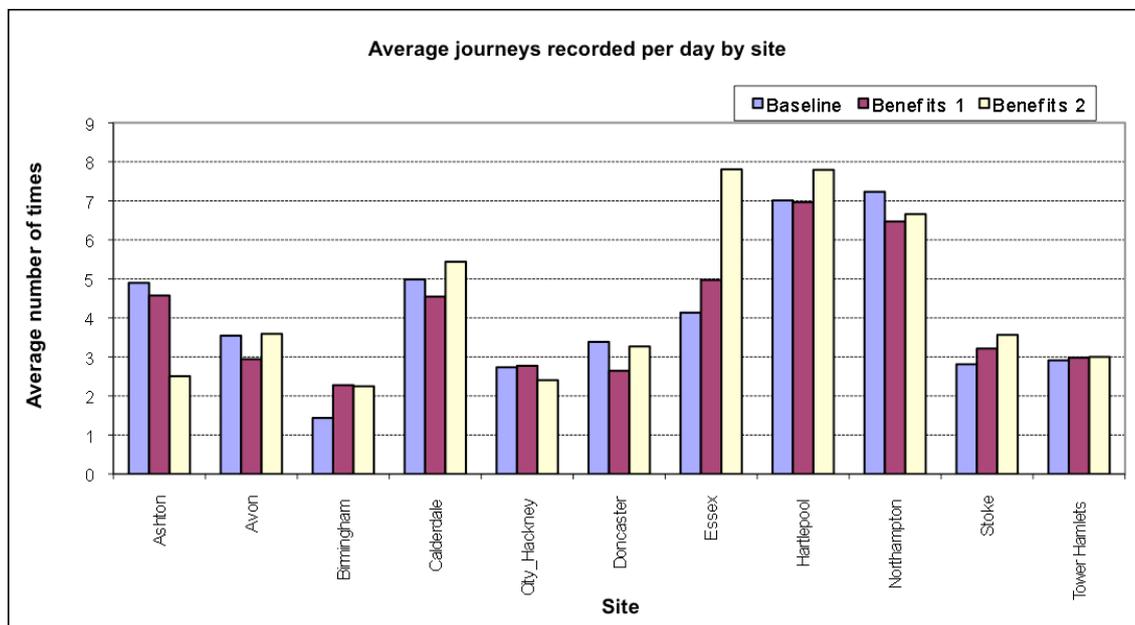


Figure 5 – Overall journeys per clinician per day

Measurements were also taken around the duration of journeys, split into six time categories:

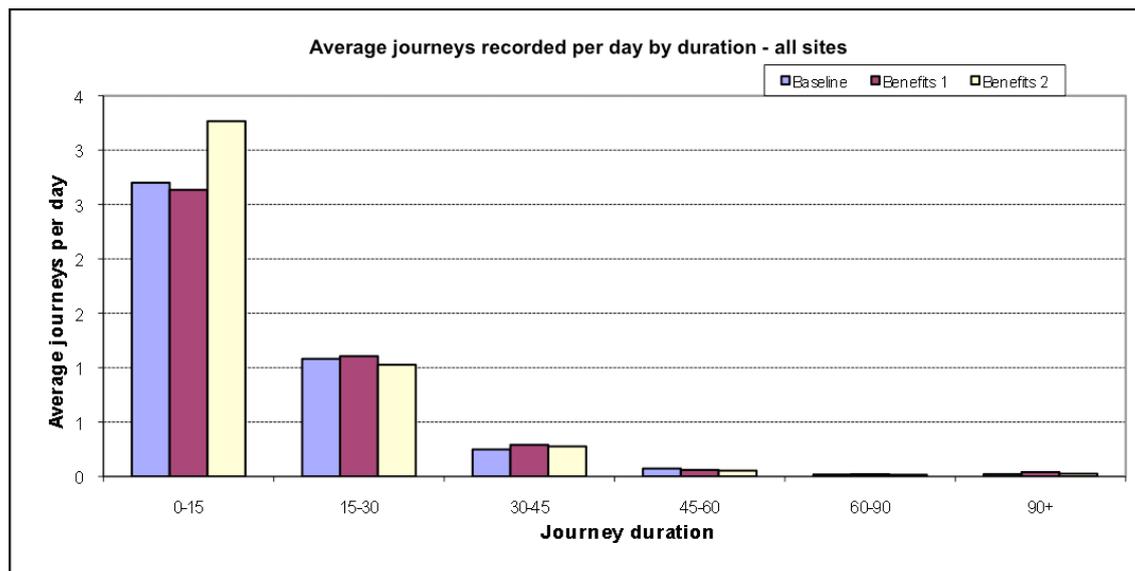


Figure 6 – Overall average journeys per day

The data collection showed that the majority of journeys in the community are in the shorter duration categories. This data confirms a long standing assumption of Community workers in the NHS that the majority of journeys are short ones.

Referrals

Significant potential for avoiding referrals was identified across all sites, with Tower Hamlets clinicians estimating that the devices had helped them avoid more referrals during the benefit collection periods than they actually made. Understanding the care provision already in place can avoid time and resource, as well as the administrative burden of making referrals.

Site name	Total referrals made (1 st and 2 nd benefits combined)	Total referrals saved (1 st and 2 nd benefits combined)	% of referrals saved (1 st and 2 nd benefits combined)
Ashton	467	19	3.9
Avon	801	42	5.0
Birmingham	433	13	2.9
Calderdale	296	27	8.4
City and Hackney	70	23	24.7
Doncaster	60	15	20.0
Essex	421	14	3.2
Hartlepool	630	33	5.0
Northampton	528	66	11.1
Stoke	1569	226	12.6
Tower Hamlets	11	29	72.5
Totals	5286	507	8.8

Table 4 – Referrals saved by site

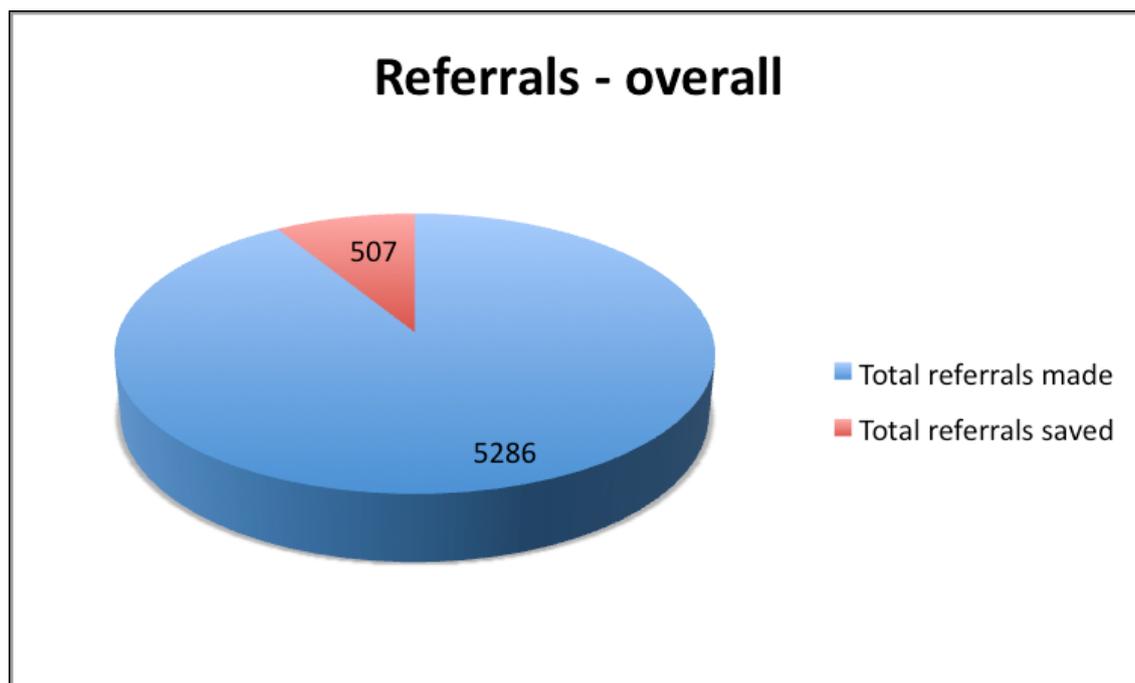


Figure 7 – Overall referrals made and saved

Admissions

Clinicians at several sites identified occasions where they felt having access to the device had allowed them to avoid making a costly hospital admission, for example due to the availability of information directly from the patient record or managements plans. Tower Hamlets recorded that the device may have helped them eliminate 100 percent of admissions for users in one service over the data collection period.

Site name	Total admissions made (1 st and 2 nd benefits combined)	Total admissions saved (1 st and 2 nd benefits combined)	% of admissions saved (1 st and 2 nd benefits combined)
Ashton	13	1	7.1
Avon	6	0	0.0
Birmingham	41	0	0.0
Calderdale	30	8	21.1
City and Hackney	18	0	0.0
Doncaster	0	1	100.0
Essex	6	0	0.0
Hartlepool	19	10	34.5
Northampton	34	10	22.7
Stoke	15	12	44.4
Tower Hamlets	0	7	100.0
Totals	182	49	21.2

Table 5 – Admissions saved by site

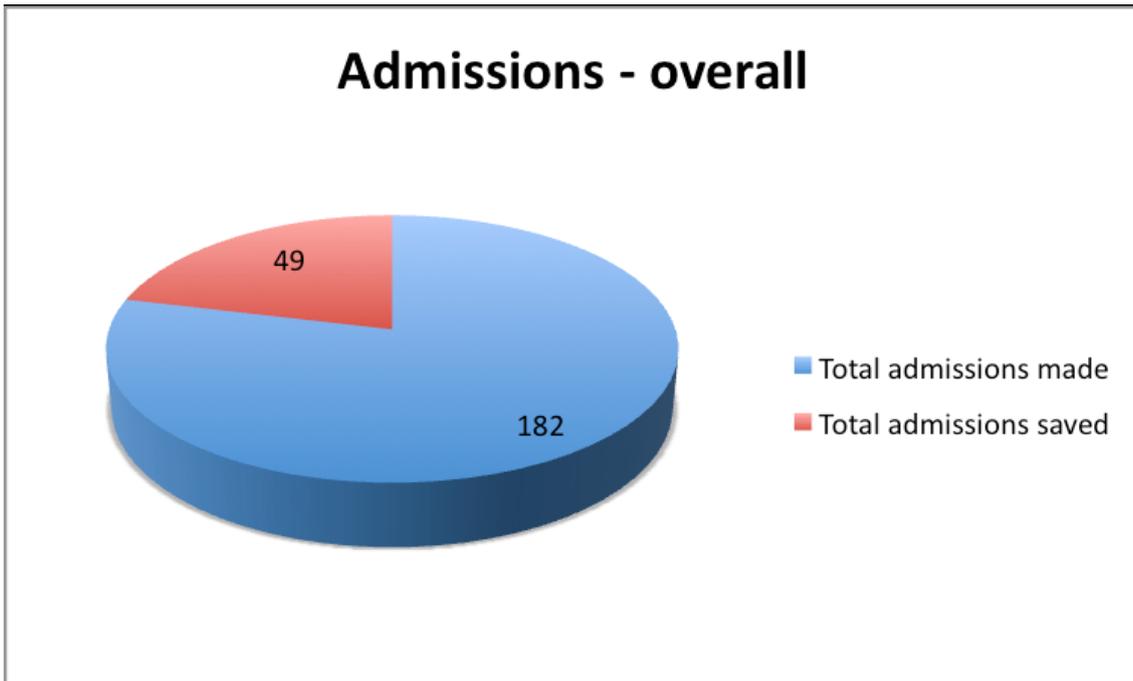


Figure 8 – Overall admissions made and saved

'No access' visits

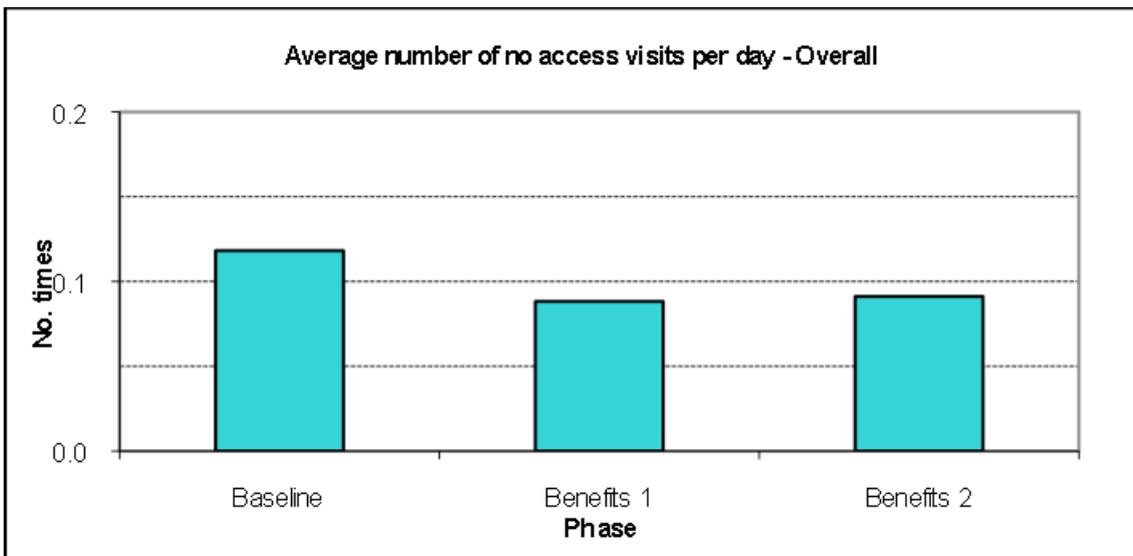


Figure 9 - Overall average 'no access' visits per day

Seven of the eleven participating sites recorded some reduction in the occurrence of 'no access' visits following the deployment of the devices.

Site name	Baseline no access visits	Benefits 2 no access visits (rebased)	Percentage reduction (%)
Ashton	12	3.5	70.8
Avon	28	17	39.3
City and Hackney	50	24.3	51.4
Doncaster	91	72.2	20.7
Essex	46	35	23.9
Northampton	58	42.6	26.6
Stoke	86	78	9.3
			Percentage increase (%)
Birmingham	10	13.1	31
Calderdale	7	8.2	17.1
Hartlepool	51	61.3	20.2
Tower Hamlets	14	14.5	3.6
Totals	453	369.7	18.4 reduction

Table 6 – Percentage of ‘No access’ visits made by site

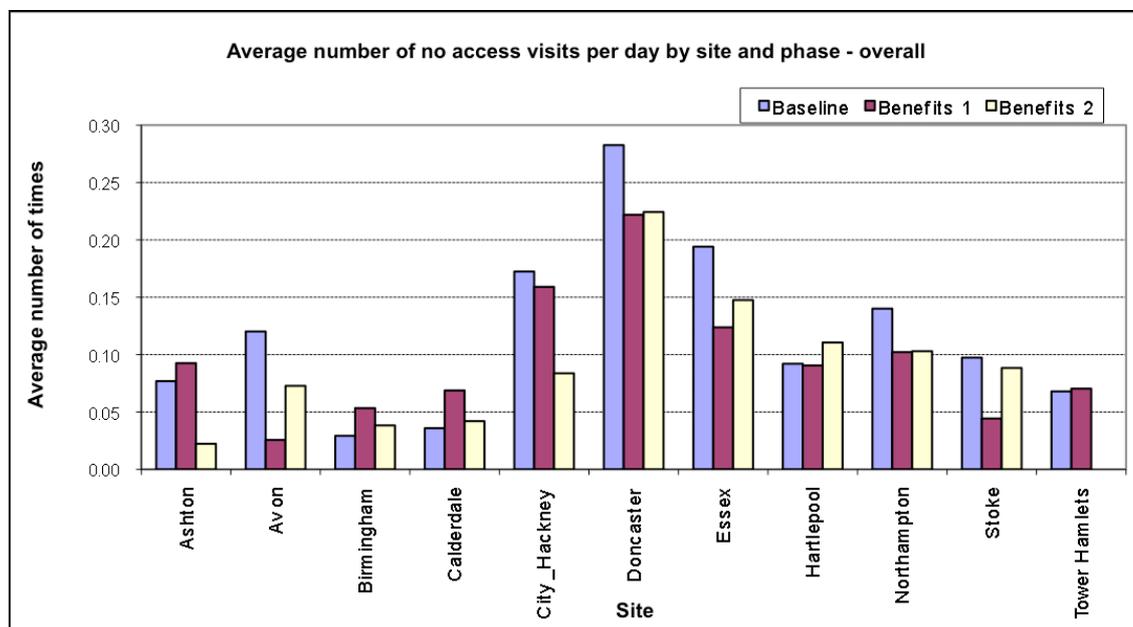


Figure 10 – Average ‘no access’ visits by site and phase

Reduced data duplication

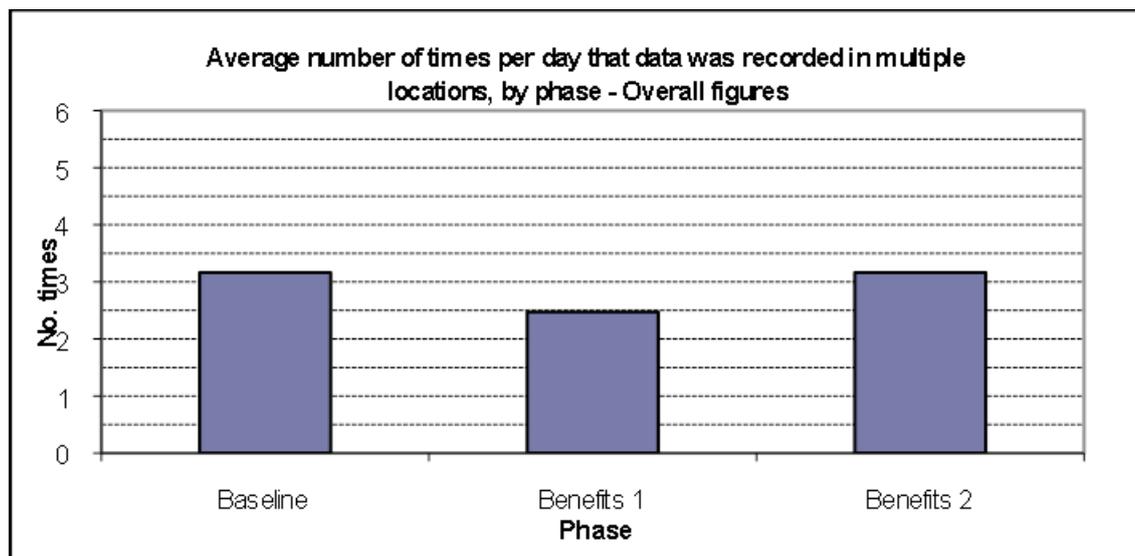


Figure 11 – Overall average data duplication

Six of the eleven participating sites recorded a reduction in clinicians’ duplication of data each day. Ashton Leigh and Wigan in particular seemed to benefit from this aspect of using the device:

Service name	% reduction in data duplication per clinician per day from baseline to 2 nd benefits
Ashton	59.0
Avon	4.0
City and Hackney	8.2
Doncaster	48.8
Hartlepool	8.4
Tower Hamlets	15.5

Table 7 – Reduction in data duplication by site

Some sites, however, reported the opposite effect, with South West Essex in particular reporting a large increase in the amount of data they duplicating each day. Though the staff were undergoing transformational change and exploiting functionality offered in the clinical application, yet had not at this point rationalised the recording on paper records. Similarly in Birmingham the MDT team have to duplicate clinical data in the inpatient unit records for their clients.

Service name	% increase in data duplication per clinician per day from baseline to 2 nd benefits
Birmingham	82.0
Calderdale	20.3
Essex	121.1
Northampton	3.7

Stoke	32.8
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Table 8 - Increase in data duplication by site

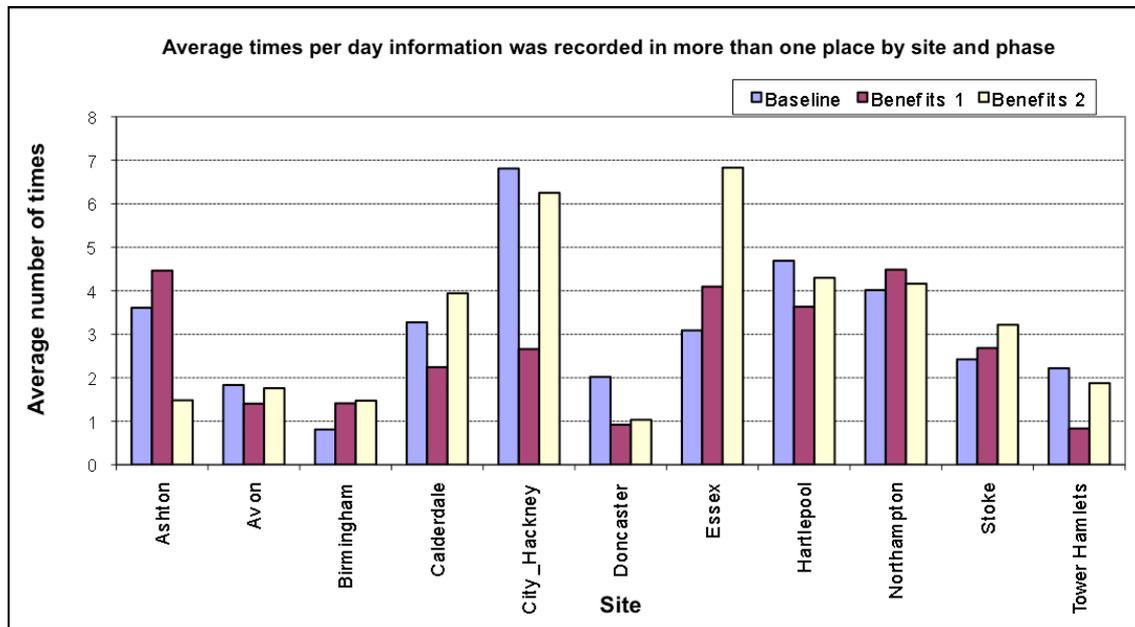


Figure 12 – Average data duplication by site and phase

Services

In order to provide some findings that would be useful across the Country, the findings have also been broken down to Service level, and the data collection process was designed to allow this (see the **Data Analysis** section of this report for more detail on the collection and analysis of data for the pilot).

The Services participating in the MHWP pilot study were categorised into the 16 Services listed below:

Service Name
CASH (Contraception and Sexual Health)
Children's & Family Services
Community Development Workers
Counselling
District Nursing
ECG technician
Intermediate Care
MDTs (Multi Disciplinary Teams)
Occupational Therapy
Palliative Services
Physiotherapy
Podiatry
Rapid Response
Respiratory services
Specialist Nursing
Speech & Language Therapy

Table 9 – Service types

The metrics showed the devices seem to offer different benefits to different services, and some services benefit more than others as illustrated below.

Note: Please see the **Data Analysis** section for more detail on the headings below.

Contacts:

Across the whole project, Respiratory Services showed the greatest increase in contacts between baseline and the second benefits period, with a 47.7 percentage point increase in contacts per clinician per day.

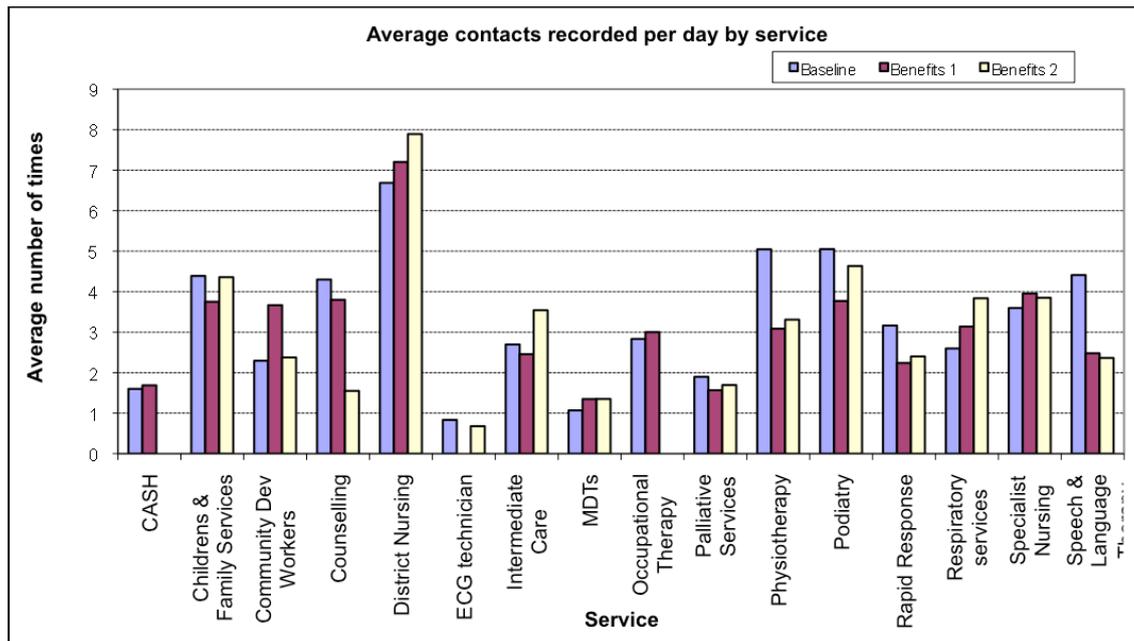


Figure 13 – Per service breakdown of contacts

Intermediate care and MDTs (Multi Disciplinary Teams) also showed strong increases in contacts, with 31 percent and 26 percent increases respectively. It is felt that these services benefitted in particular from increased contact activity due to the ability of these teams to quickly change working processes and to undertake more complete assessments and provision of care and equipment with the patients, reducing time previously spent in the base.

Journeys:

As predicted and as is logical, where contacts were increased journeys were also increased. Only one service – specialist nursing – managed to reduce their journeys by 5 percentage points even as their contacts increased by 7 percentage points.

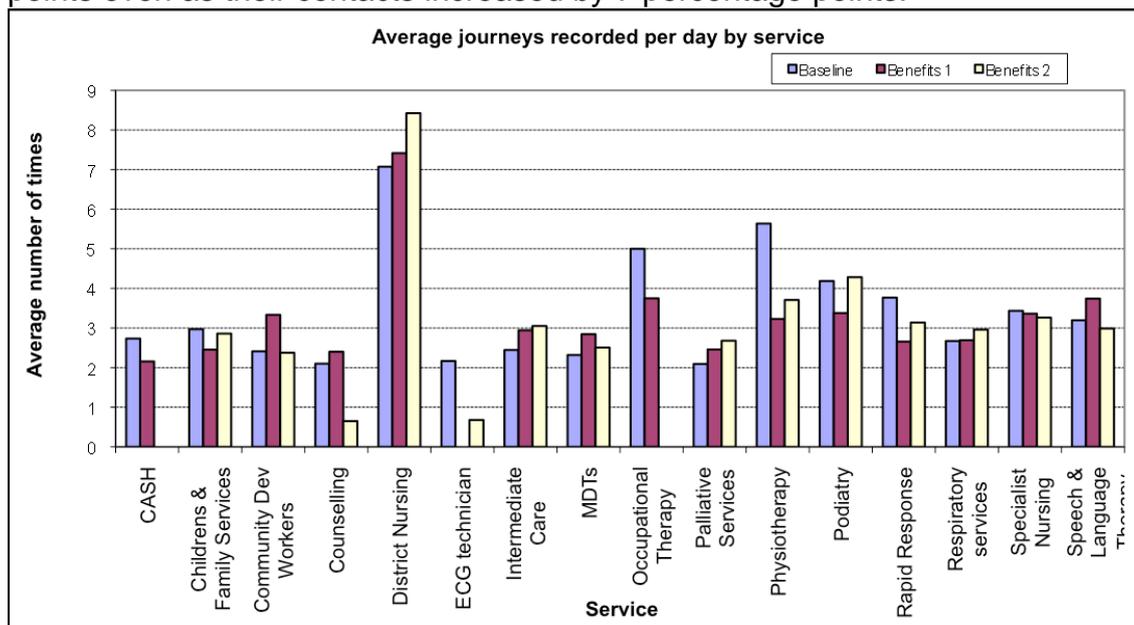


Figure 14 – Per service breakdown of journeys

Referrals:

For services that returned data on referrals prevented through availability of device, the CASH service presents the highest percentage of referrals saved (but the lowest total of referrals made). Specialist nursing reported 229 referrals saved, which amounts to a significant benefit for the sites involved in avoidance of wasted effort and person-hours invested in unnecessary referrals.

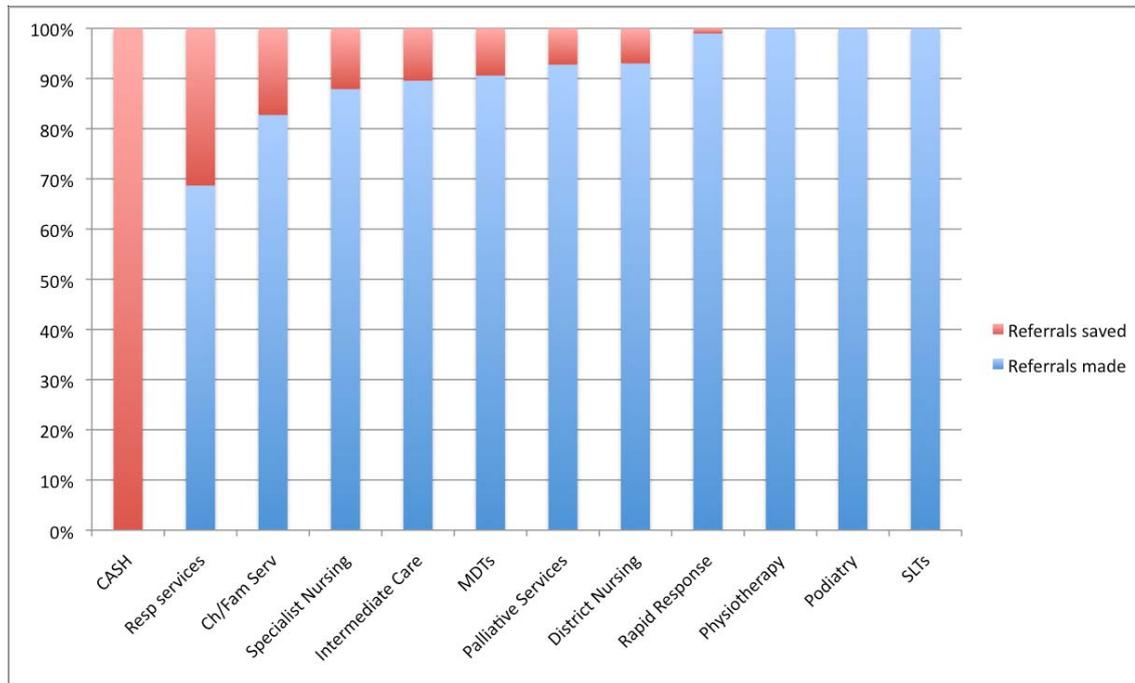


Figure 15 - Referrals saved by service type

The services not appearing in this list have been excluded either because the participating clinicians did not return any data or because they did not make or save any referrals during the pilot period, which is not unusual for certain service types (such as counselling or ECG technicians in this case).

Admissions:

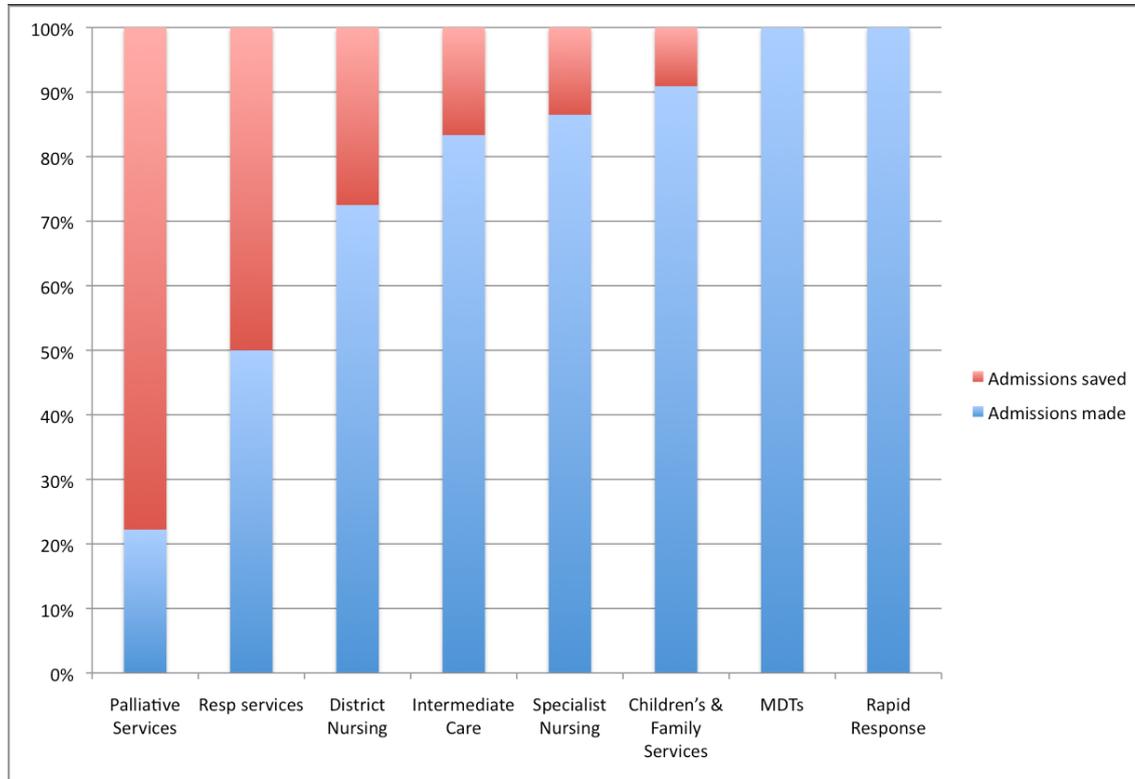


Figure 16 – Admissions saved by service type

The services not appearing in this list have been excluded either because the participating clinicians did not return any data or because they did not make or save any admissions during the pilot period, which is not unusual for certain service types (such as podiatry or physiotherapy in this case). By the nature of intermediate care services it would be unlikely to readmit patients, and neither is this usual activity for children’s services.

‘No access’ visits:

Nine of the sixteen participating service types estimated that use of the device had helped them to avoid wasting time and resources on ‘no access’ visits in the first or second benefits collection period (or both).

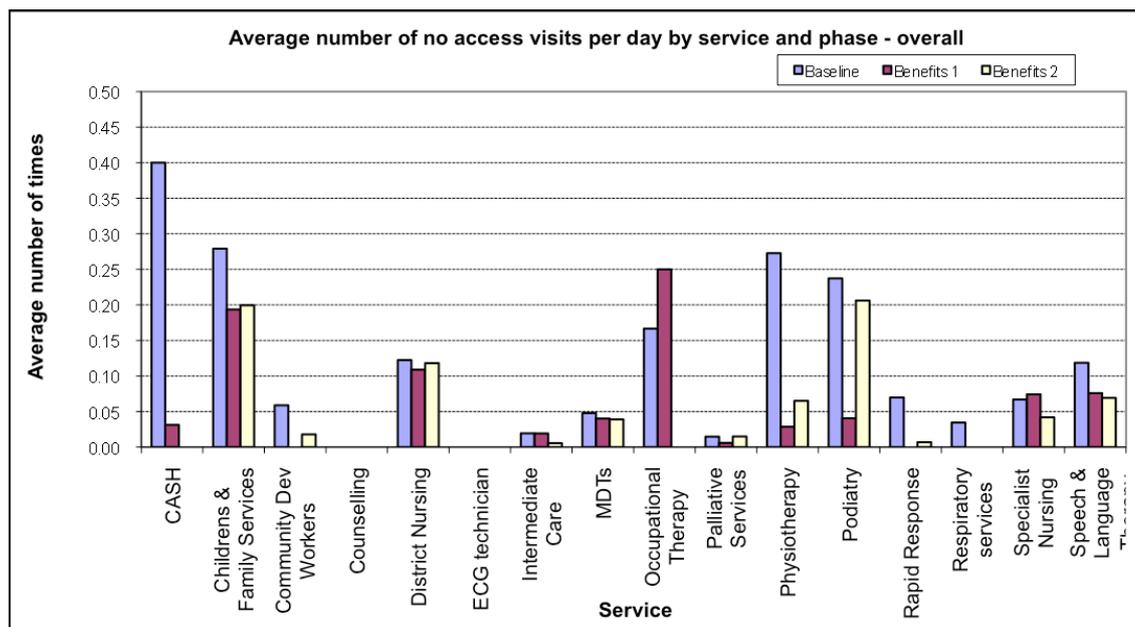


Figure 17 – ‘No access’ visits per day by service

The metrics break down as follows:

Service name	Baseline no access visits	Benefits 2 no access visits (rebased)	Percentage reduction (%)
Children’s & Family Services	156	111.5	28.5
Community Dev Workers	1	0.3	70
District Nursing	132	127.4	3.5
Intermediate Care	3	0.87	71
MDTs	14	11.4	18.6
Physiotherapy	6	1.4	76.7
Podiatry	14	12.2	12.9
Rapid Response	3	0.3	90
Respiratory services	6	0	100
Specialist Nursing	43	26.9	37.4
Speech & Language Therapy	65	37.9	41.6
Counselling	0	0	No change
ECG technician	0	0	No change
Palliative Services	3	3	No change
CASH	6	no data	Not available
Occupational Therapy	1	no data	Not available
Totals	453	333.17	26.4

Table 10 – No access visits made by service (2nd benefits period)

Some of the services in the project were clinic based and would not anticipate any reduction in no access visits. There are substantial time and travel savings associated with the saving of no

access to clients. Where often no access introduces additional visits to base, revisiting later in the day when access details can be obtained or rescheduling of visits for another time or date

Reduced data duplication:

Ten of the sixteen participating service types recorded a reduction in clinicians' duplication of data each day.

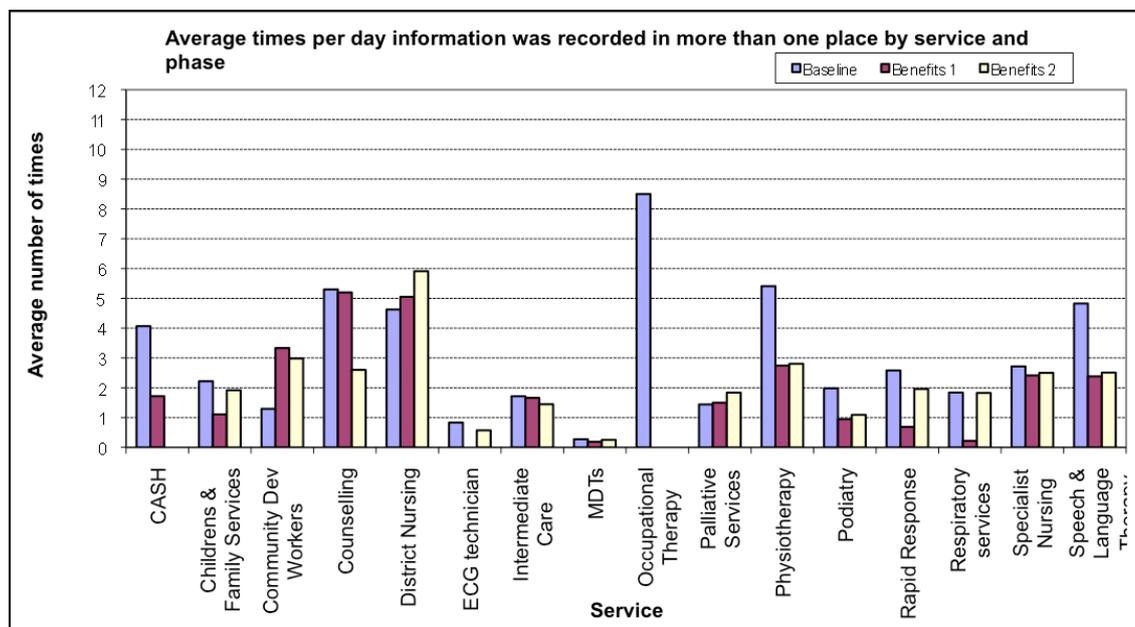


Figure 18 – Data duplication per day by service

Counselling services in particular seemed to benefit from this aspect of using the device:

Service name	% reduction in data duplication per clinician per day from baseline to 2 nd benefits
Counselling	50.9
Physiotherapy	48.2
Speech & Language Therapy	48.0
Podiatry	45.0
Rapid Response	24.1
Intermediate Care	15.7
Childrens & Family Services	13.5
Specialist Nursing	8.0
MDTs	7.4
Respiratory services	0.7

Table 11 – Reduction in duplication of data by service

Some services, however, reported the opposite effect, with community development workers in particular experiencing a large increase in the amount of data they were duplicating each day.

Service name	% increase in data duplication per clinician per day from baseline to 2 nd benefits
Community Dev Workers	130.4
District Nursing	27.8
Palliative Services	27.4

Table 12 – Increase in duplication of data by service

For some clinicians the data capture tool itself was seen as duplication, while for other services the ability to increase the use of a clinical application was seen as duplication while paper records were retained. Where part-service deployments took place that process would have to remain for service continuity.

Site Evaluations

This section contains a Site evaluation for each of the eleven sites participating in the Mobile Health Worker Project pilot.

Each case study contains:

- an overview of each site;
- details of the site's approach to the pilot;
- a breakdown of the clinical services participating in the pilot;
- technical details of the implementation;
- analysis of the metrics for the site;
- subjective findings
- Service changes seen
- conclusions and lessons learned.

Each evaluation also contains a graph generated from usage data gathered by project partner BT. The graphs show the average kilobytes usage trend of users at a given site, which is derived by dividing the extrapolated¹ total KB traffic during the period in question divided by the total number of live SIMs. SIMs that have registered no usage since initial connection are not included. Note: The BT graphs only present data around the use of the SIMs to connect to the internet. They do not account for WiFi (WLAN) usage.

Each site's project team was given sight of the metrics analysis prior to the publication of this report, to allow them the opportunity to compare the findings with their experience of the pilot and add any commentary of their own. Where provided, these comments have been included in the discussion of each of the metric findings.

¹Average trend data is extrapolated to permit comparison of previous and future periods. This is necessary to account for shift patterns, annual leave, training days, etc.

Ashton, Leigh and Wigan Community Healthcare

(ALWCH)

(Bridgewater Community Healthcare NHS Trust, ALW Division)



Introduction

Ashton, Leigh and Wigan Community Healthcare (ALWCH) is the major provider of NHS community healthcare and therapy services in the Ashton, Leigh and Wigan areas. Established as an NHS Trust on November 1st 2010, ALWCH employs a team of around 1400 staff, approximately 80 per-cent of whom are practicing health professionals.

Initial Objectives

The following are the key objectives for the project as outlined by the organisation in the response to the MHWP invitation:

- Home Base location
- Locality working
- Reduction in Paper records
- Access to clinical guidance policies and procedures
- Access to pathology results
- Faster response to referrals
- Hospital admission avoidance
- Single point of access
- More flexible working patterns
- Increased patient contact through reduction of non core activities
- Higher utilisation of estates
- Reduced travel costs

ALWCH had been in line to implement LORENZO Regional Care across its services in November 2010, and had hoped to deploy the mobile devices in conjunction with this new functionality in order to maximise benefits. Delays with the LORENZO implementation fundamentally changed the intended use of mobile devices during the pilot, placing limitations on the achievement of some of the original objectives. Despite these challenges, clinicians adopted the devices and made use of other features to assist them in their daily work, and the resulting business change is discussed below.

About the Project

Project Team

The local project team consisted of:

- Project lead;
- Technical lead;
- Business change lead and clinical lead support provided by one resource within an existing role as required.

At a Glance

Ashton Leigh and Wigan	
Number of devices	50
Geography	70% Urban, 30% Rural
Clinical systems used	iPM
Non-EPR requirements	Email OCS Intranet Care FX Community Portal Local drives MIS eCAF
SIM provider	BT Mobile
Pilot go-live date	November 29 th 2010

Table 13 – At a Glance: ALWCH

Service	Number of Users	Percentage of Service
Advanced Nurse Practitioners for Nursing Homes	6	87.5%
Community Matrons	6	28.6%
Intermediate Care Coordinators	2	33.3%
Community Development Workers	2	40%
Echo cardiology Technician	1	100%
Community Matron (Neurology)	1	100%
Counselling Service	3	38.9%
Neurological Occupational Therapy	2	13.3%
Speech and Language Therapy	1	33.3%
Cardio Respiratory Team	8	42.9%
District Nursing OOH	8	28.6%
Health Visitors	9	3.3%
Total	49	

Table 14 – At a Glance: Services involved

Project Methodology

The ALWCH implementation followed on from a previous mobile deployment to community clinicians, and was run as an informal project under the governance of the Information Management and Technology (IM&T) directorate, with clear sponsorship from the managing director of the organisation.

Given the tight timescales demanded of the site, ALWCH limited their implementation approach to the distribution of the technology that would enable access to the appropriate applications and network drives for the clinical staff to achieve benefits.

As stated in their original invitation response, some clinical staff had already received mobile devices in a previous deployment and were using them in their working processes, and the MHW Pilot was used to build on this previous deployment and assess which services would be able to derive benefits from the solution.

Two items of informal project documentation from ALWCH were seen by the MHWP team: a benefits dependency matrix detailing the objectives, benefits and outcomes of this and future

mobile projects, and the output from a Sharepoint collaborative site on which clinicians were encouraged to share their positive and negative feedback about the devices and the project as a whole.

Change Management, Skills Analysis and Support

There was no business process mapping undertaken prior to rollout at ALWCH as a decision was taken to deploy the device to a wide variety of services with disparate working practices, making process mapping very time consuming and unlikely to be completed within the timescales required for the MHWP.

Despite this, a clinical lead was nominated to undertake some process redesign. It is assumed that this will be undertaken in the future with the volunteered assistance of the SHA Benefit Lead.

No IT skills analysis of the staff included in the project was undertaken prior to going live, and so it was not known at the outset whether there would be any skills gap and training required prior to project start. Staff were requested to contact the training team on an ad hoc basis with any training issues arising following deployment of the mobile kit.

First line IT support was provided locally for ALWCH users, and the project were happy with the service provided. The local support desk was tasked with triage of support calls from clinicians. Problems that could not be solved locally were referred on to the BT helpdesk.

Implementation Technical Detail

Information for this section has been collated from the technical information provided by BT during the implementation phase, as well as from direct discussions with the site project team. Please refer to the glossary of terms for clarification on the meaning of any of the technical items below.

Gold Build – At a Glance

Rather than accepting the standard TCS Gold Build, ALWCH elected to provide their own Gold Build.

In addition to this bespoke build, ALW devices were installed with the following:

- MX Health
- Safeboot encryption
- Smartcard authentication capability
- Sophos and Zenworks

Clinical System

For the duration of the pilot, the main clinical system in use at Ashton Leigh and Wigan was iPM. At the start of the pilot, the site project team were hoping to go live with the clinical solution, LORENZO in time for the mobile working pilot; however at the time of writing this report, the LORENZO implementation is no longer a consideration.

The Ashton site did not therefore have the ability to achieve the benefits from mobile working that they had anticipated at the start of the project.

At the second pilot site visit, the site project team expressed their belief that the lack of an Electronic Patient Record (EPR) was the 'biggest hindrance' to the project achieving its full potential. The use of an EPR was the 'missing link'; without it, there was no way to realise the full agenda and benefits of mobile working in community services. The pilot site team were convinced that with the availability of an EPR and with proper organisational support, clinicians would be able to put their full trust in the devices and working processes could finally begin to change fully.

Other applications/functionality

Due to the lack of availability of a clinical record, there was a greater focus upon the other applications and functionality offered by the devices deployed at Ashton.

Staff used instant messaging whilst mobile, and the devices were configured to allow authorised users access to shared network drives at their base organisation. Staff also had access to the organisation's Management Information System (MIS) dashboard.

Technical Issues

Pre-deployment

The pilot go-live was delayed by several issues arising at the ALWCH site. Information required for the ALWCH-specific Gold Build was not made available in a timely fashion and

with key personnel unable to respond due to time constraints there was little that could be done to mitigate the delays. This caused the cancellation of scheduled user training.

The bespoke gold build also caused some compatibility issues, particularly relating to Smartcard access, which could not be supported by the initial build. Alternative access methods were considered, causing further delay to the deployment go-live date.

The Ashton, Leigh and Wigan pilot site went live on November 29th 2010.

Post-deployment

The ALWCH project team reported that users had some difficulty using the MHWP data collection spreadsheets, as they caused runtime and Visual Basic errors. The problems were associated with the macros used to construct the spreadsheets, and the technical lead found that the best solution was to construct a bespoke spreadsheet for ALWCH users that captured the same data but without the use of macros.

The BT helpdesk logged no issues from ALWCH, making it the only pilot site to have zero issues with the BT helpdesk service post go live.

General issues

Asset management: Asset management proved to be an issue in the initial delivery of the devices, as one unit recorded as delivered by BT was not received for use by ALWCH. This eventually resulted in the drawdown of a reserve unit to replace the missing equipment.

Connectivity: The most commonly recorded issue for ALWCH users was the problem of poor or variable connectivity. Users expressed a strong desire to be able to take advantage of WiFi available on site, however there were some technical issues preventing this from being resolved quickly. The ability to connect via WiFi was resolved by BT with changes to the MobileXpress version on the device and this was handed to ALW to make the changes locally to the devices once fully tested and functional.

System dependencies: The delay to the implementation of LORENZO meant that clinicians did not get to experience the benefits of using the device in conjunction with a full clinical system, and not all users had access to the organisation's web-based patient administration system (PAS).

Battery life: Some users reported that the battery life was not always sufficient to last for a full shift with heavy use. Port replicators or chargers were recommended to be available at base locations and (where applicable) at staff were advised to charge devices at home between shifts.

Study Findings

Metrics

The following section provides a summary of the metric analysis, collated from the spreadsheets returned to the MHWP team.

The table below gives an indication of the level of returns submitted by the 50 staff taking part at the ALWCH pilot.

Returns: overview

Returns	Percentage of users returning data
Mileage month 1	73%
Mileage month 2	69%
Baseline data	51%
Benefits month 1	35%
Benefits month 2	43%
Average return rate	54%

Table 15 – Rate of returns: ALWCH

Metrics: overview

Clinicians	No. in project	Baseline Returns	Benefits 1 returns	Benefits 2 returns
Health Visitors	6	4	3	3
Community Development workers	2	2	1	2
Counselling	7	2	2	1
District Nursing OOH	8	5	1	3
ECG Technician	1	1	0	1
Intermediate Care	2	1	0	2
Occupational therapy	2	1	1	0
Respiratory Services	6	0	0	3
Specialist Nursing*	13	10	7	6
Speech & Language Therapy	1	0	1	1
Total	48	26	16	22

* Includes Advanced Nurse Practitioners for Nursing Homes and Community Matrons

Table 16 – Overview of Returns used in analysis

National Mobile Health Worker Project: Progress Report

Days data	Baseline	Benefits 1	Benefits 2	Total
Health Visitors	32	12	84	128
Community Development workers	17	3	56	76
Counselling	10	5	20	35
District Nursing OOH	31	5	54	90
ECG Technician	6	0	28	34
Intermediate Care	7	0	34	41
Occupational therapy	6	4	0	10
Respiratory Services	0	0	67	67
Specialist Nursing*	47	21	167	235
Speech & Language Therapy	0	4	28	32
Total	156	54	538	748

* Includes Advanced Nurse Practitioners for Nursing Homes and Community Matrons

Table 17 – Overview of Number of Days of data returned

Data Usage

The image below, generated from data usage statistics collected by BT, shows a general trend of a gradual increase of data usage at the ALWCH site as clinicians train and learn how to use the devices. All staff were live by November 29th with a general trend in increased use.

ALWCH also used wi fi access for the devices and this was not represented on these graphs.

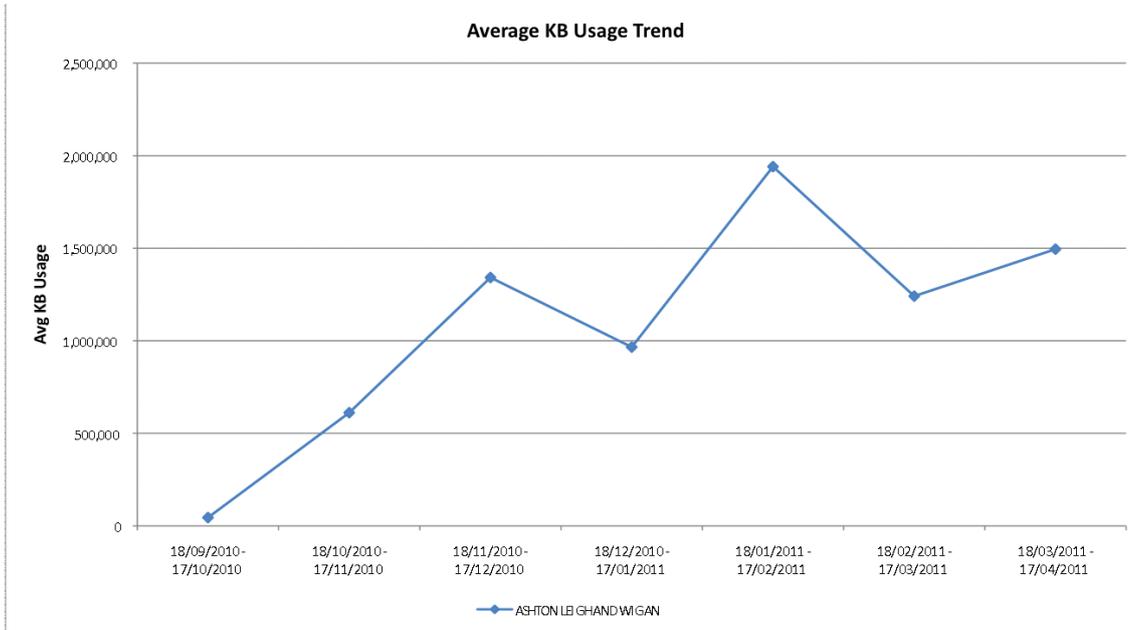


Figure 19 – Data usage trend

Contacts:

During the entire data recording phase, staff at the ALWCH site recorded a total of **2268** contacts.

The average number of contacts per day for each clinician fell by **34.6** percentage points from baseline to Benefits 2.

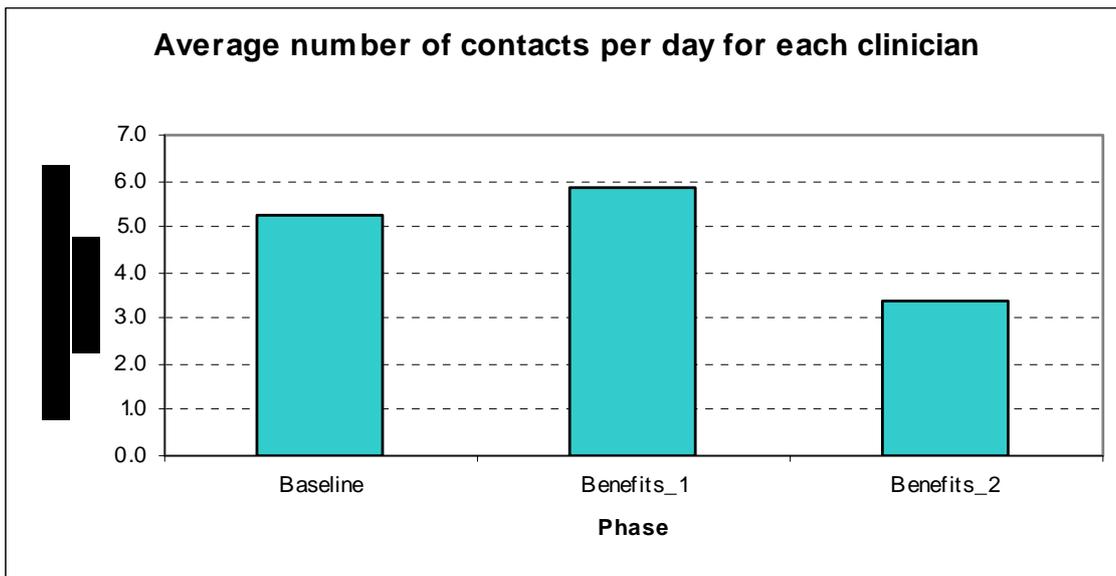


Figure 20 – Average contacts per clinician, per day

The figures may not be as representative as some of the other sites, due to the go-live for Ashton being late in relation to the data collection period. Ashton did not go live until 29th November 2010 – this was one week after the first benefits data collection started. The figures for returns for Benefits 1 are low due to this and are not truly representative of a benefits collection period, due to the lack of time for the clinicians to become familiar with the devices. The lateness of the go-live effectively makes the Benefits 2 data for Ashton equivalent to many of the Benefits 1 data collections for other sites eg the contacts drop as users take time to learn to use the device effectively – if a further benefits collection period had taken place a month later, it is expected the Ashton data would follow the trends of other sites and the contacts would begin to increase.

Contacts were broken down by duration, and the results across each duration can be seen on the following chart:

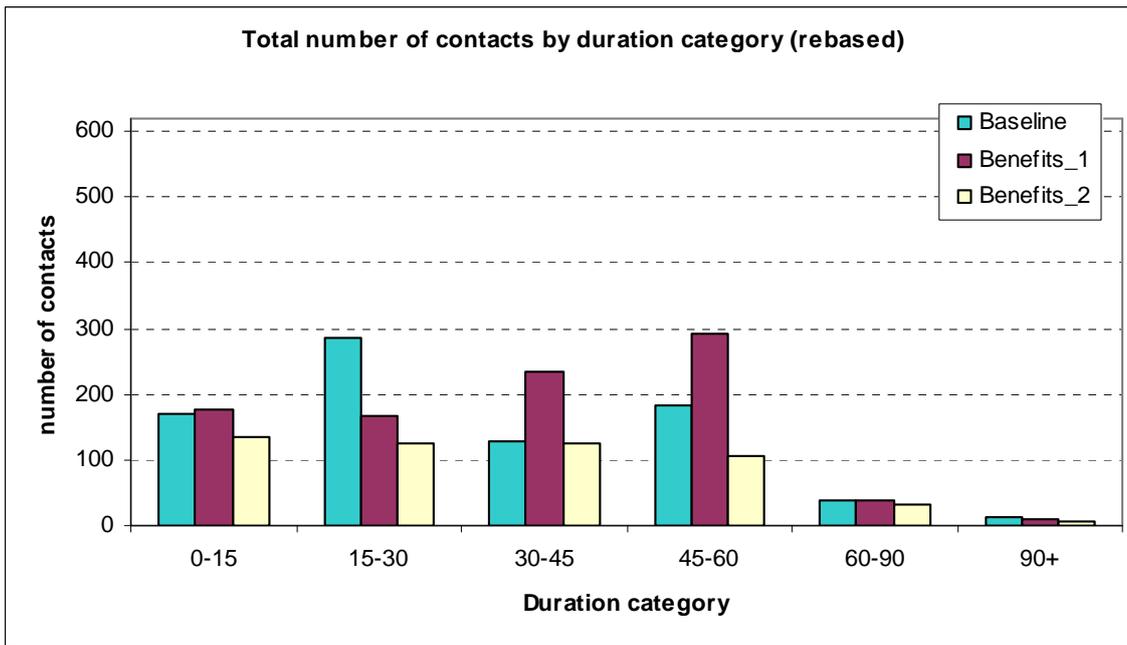


Figure 21 – Total contacts by duration

The graph shows a drop in activity across all durations, which would support the idea that the clinicians had not sufficiently learned how to use and utilise the device by the time the Benefits 2 data collection period occurred.

Duration of face to face contact with patients

The site showed a significant change in contact durations, with an **34.3** percentage point decrease in the number of minutes spent with patients:

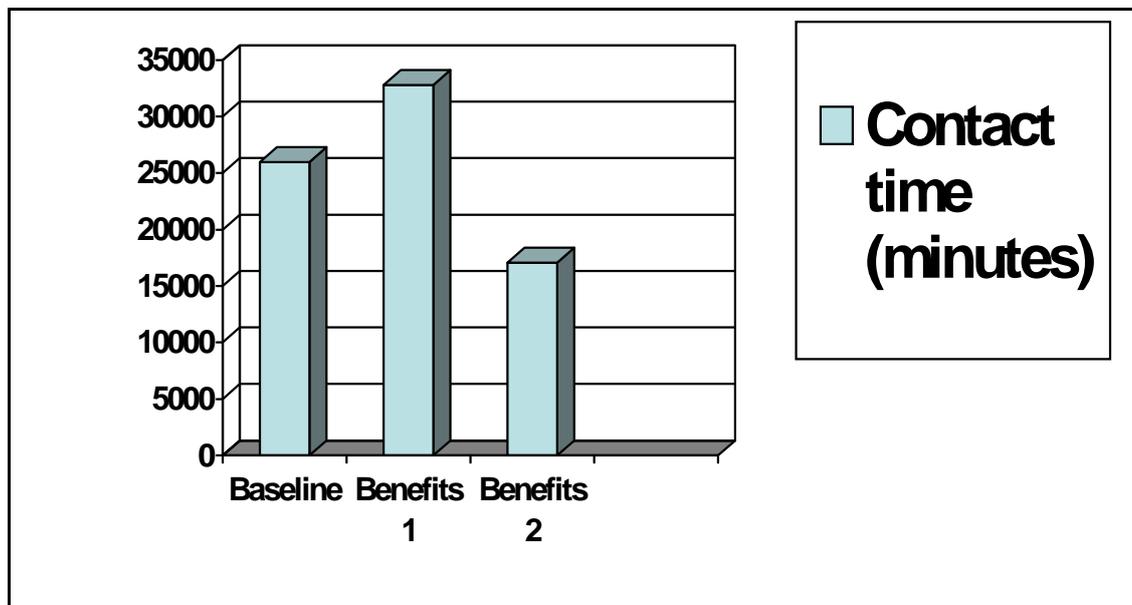


Figure 22 – Total Contact time with patients (in minutes)

The drop in duration spent with patients is equivalent to the drop in number of contacts.

When broken down into the individual services, the metrics for contacts indicate that two of the services with usable data actually recorded increased contacts from Baseline to Benefits 2:

Average contacts per day	Baseline	Benefits 1	Benefits 2	Change
Health Visitors	2.8	3.8	3.8	+ 35.7%
Community Dev workers	2.3	3.7	2.4	+ 4.3%
Counselling	4.3	3.8	1.6	- 62.8%
District Nursing OOH	7.4	6.0	5.0	- 32.4%
ECG Technician	0.8	-	0.7	- 12.5%
Intermediate Care	8.1	-	7.7	- 4.9%
Specialist Nursing	7.2	8.8	3.2	- 55.6%

Table 18 – Contacts by service

It was not possible to compare Occupational Therapy, Respiratory Services and Speech & Language Therapy due to lack of data returns in either the Baseline or Benefits 2 data collection period – this applies to all areas of the metrics.

Journeys:

During the entire data recording phase, staff at the ALWCH site recorded a total of 1868 journeys.

The number of journeys per day for each clinician fell by **49.0** percentage points over the course of the pilot.

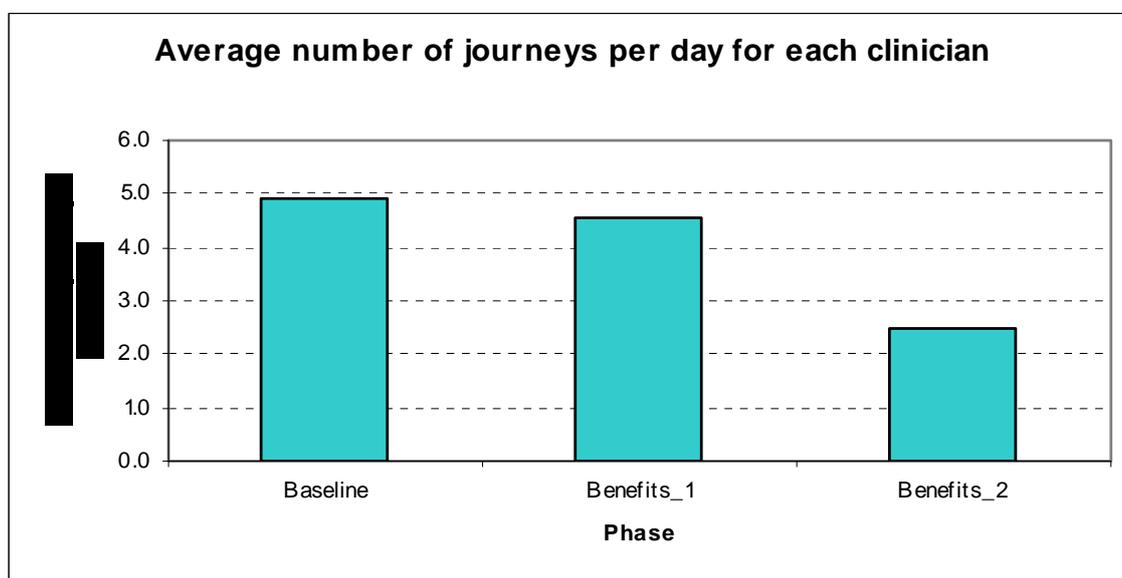


Figure 23 – Total journeys

This represents a bigger drop than number of contacts (nearly 15 percentage points), which would indicate although the clinicians may not have been using the devices to their full potential to improve activity at the point of the Benefits 2 data collection, they were able to improve efficiency in travel, possibly by planning journeys / routes more effectively.

Journeys were also broken down into durations, and the results are shown in the following chart:

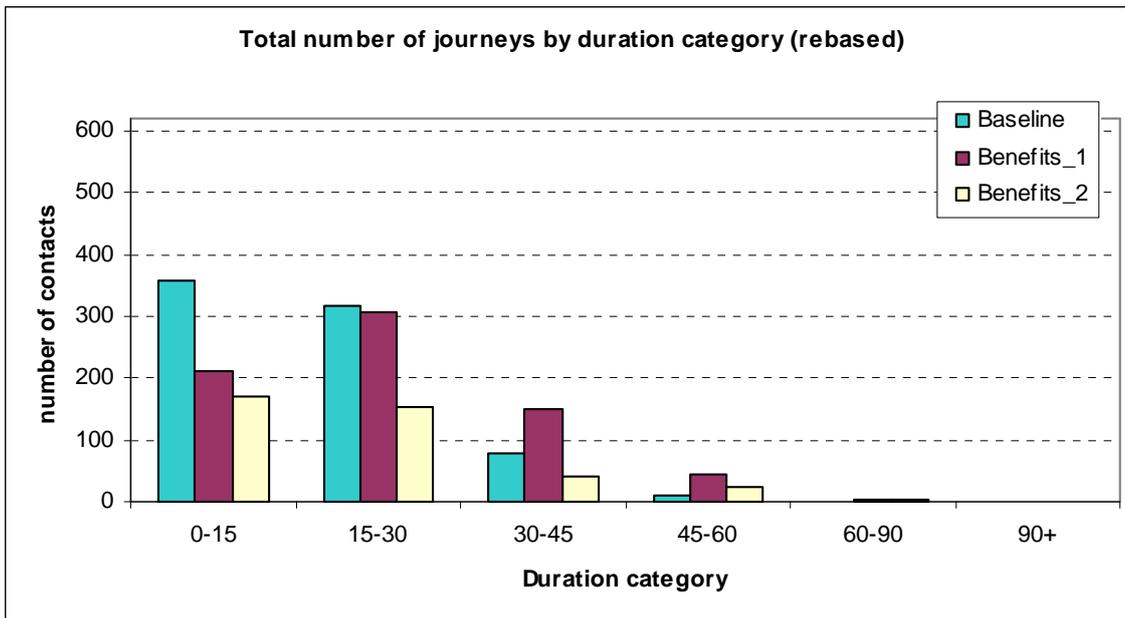


Figure 24 – Total journeys by duration

The graph shows that journeys across all durations have fallen, with the exception of the 45-60min duration band, which has increased slightly.

The site showed a significant change in journey durations, with a **42.2** percentage point decrease in the number of minutes spent travelling each day:

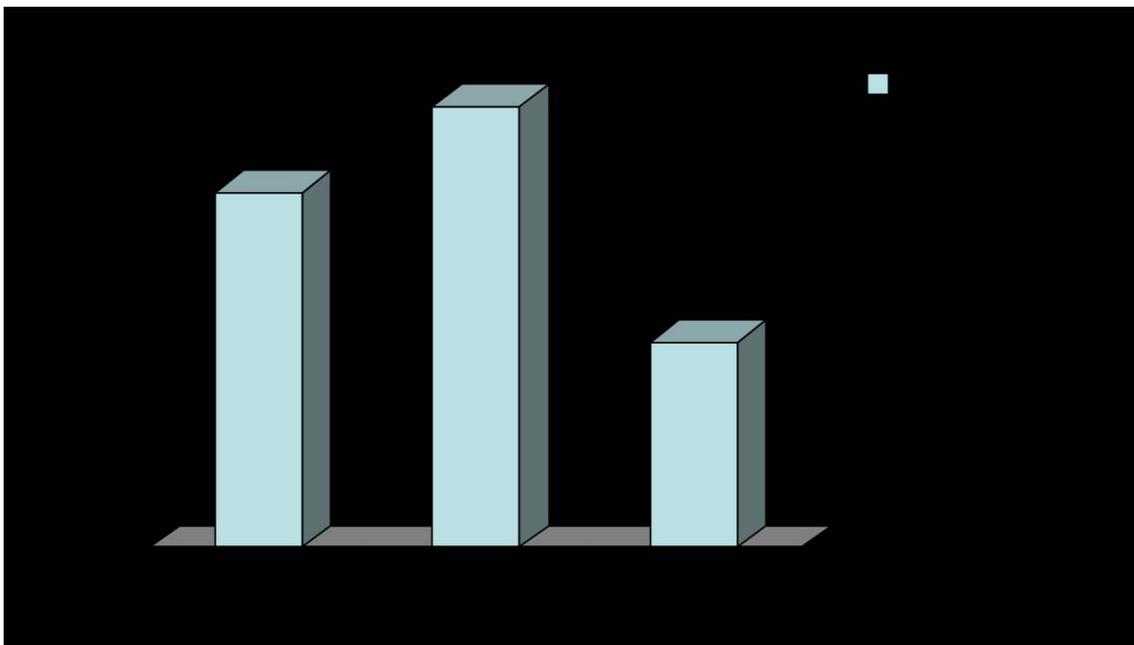


Figure 25 – Journey time (in minutes)

The total time spent in journeys has fallen slightly less than the number of journeys, which would be expected when the duration graph is taken into account, and the small increase in the longer journeys is accounted for.

When broken down into the individual services, the metrics for journeys indicate that five services with useable data recorded decreased numbers of journeys per day over the pilot duration, with one service (community development workers) recording no change in their daily number of journeys:

Average journeys per day	Baseline	Benefits 1	Benefits 2	Change
Health Visitors	3.0	2.5	2.3	- 23.3%
Community Dev workers	2.4	3.3	2.4	0%
Counselling	2.1	2.4	0.7	- 66.7%
District Nursing OOH	8.1	7.4	5.4	- 33.3%
ECG Technician	2.2	-	0.7	- 68.2%
Intermediate Care	0.7	-	1.1	+ 57.1%
Specialist Nursing	6.5	6.1	2.8	- 56.9%

Table 19 – Journeys by service

The data shows that whilst some services have reduced their number of journeys, this is just in line with the reduction in contacts, however others show greater reductions, indicating more efficient use of time and reduced travel is possible even in the very early stages of the project.

Mileage:

Mileage	#1	#2	Change
All staff (12 returns)	2818	3018	+ 7.1%

The mileage claimed for the site during the project indicated that mileage had increased by 7.1 percent, however this is based on a very small number of returns, with only 12 returning data for both periods of data collection, therefore it is questionable if the data is representative.

Referrals:

In total, **467** referrals were made over the Benefits periods. Clinicians at ALWCH estimated that due to having access to the devices, they saved **19** potential referrals. This equates to a **3.9% saving** of referrals.

Admissions:

In total, **13** admissions were made over the Benefits periods. Clinicians at ALWCH estimated that due to having access to the devices, they saved **1** potential admission. This equates to a **7.1% saving** of admissions.

No access visits:

No access visits decreased by 71 percentage points from the baseline measurement to the second benefits measurement period.

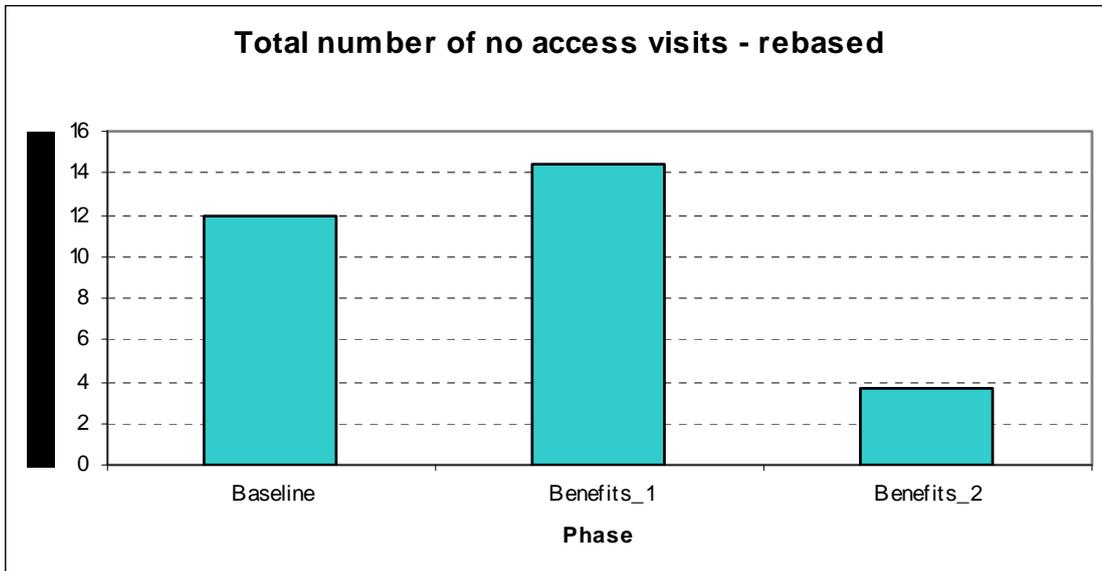


Figure 26 – No access visits

The reduction in No access visits reflects the improved access to information provided by having the mobile device.

Duplication of data:

The metrics show a reduction of 58.3 percentage points from the baseline measurement to Benefits 2:

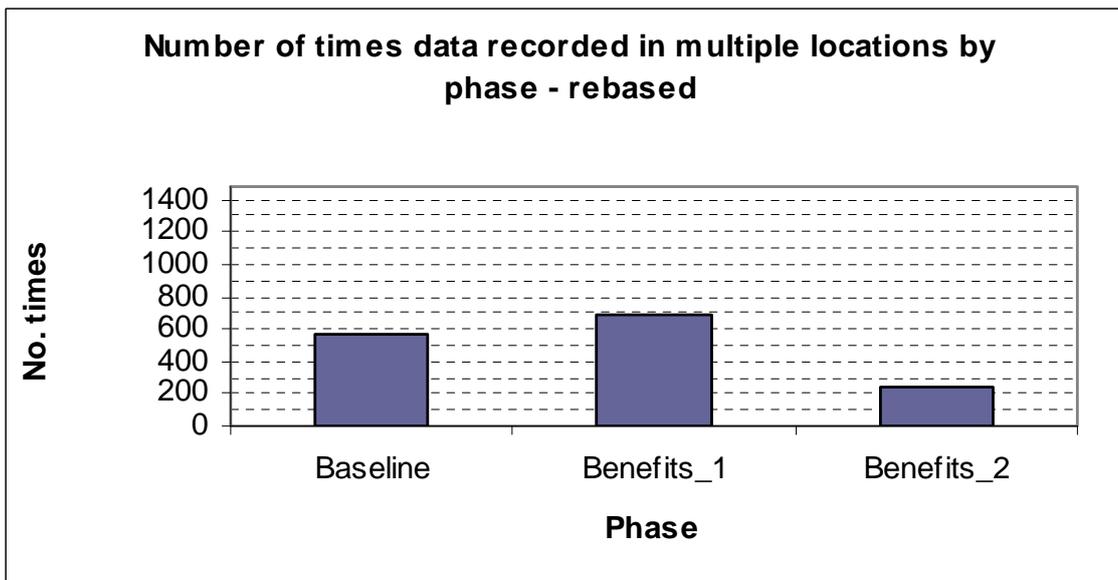


Figure 27 – Duplication of data

When broken down into the individual services, the metrics show data duplication dropped in all but one service. This appears to be an anomaly and the ALWCH project team will be

investigating if this one service works differently to the others, or if there was possibly a mis-interpretation of the question:

Duplication of data	Baseline	Benefits 1	Benefits 2	Change
Health Visitors	5.8	6.7	3.9	- 32.8%
Community Dev workers	1.3	3.3	3.0	+ 130.8%
Counselling	5.3	5.2	2.6	- 50.9%
District Nursing OOH	0.7	3.4	0.3	- 57.1%
ECG Technician	0.8	-	0.6	- 25.0%
Intermediate Care	8.0	-	1.1	- 86.3%
Specialist Nursing	3.6	5.1	1.1	- 69.4%

Table 20 – Data duplication by service

Summary of Metric findings

- The low data returns and the lateness of the go-live make the data analysis for ALWCH difficult to interpret with any degree of confidence.
- There is large variation across the large number of Services included in the project, which is compounded by the low numbers included within each area.
- The Health Visitors data show that, even in the very early stages of the project, it is possible to improve productivity whilst reducing travel and use time more efficiently.
- Savings are possible in both Referrals and Admissions.
- Significant reductions in no access visits and duplication of data have been shown.

Subjective findings

The items discussed in this section are those findings which were made based upon the subjective comments noted at the pilot site by the MHWP team, or reported in the free text comments on the data returns sheets

Internal communications: Through the use of email and instant messaging, staff at the ALWCH site were able to communicate with colleagues more effectively whilst out in the field. They found that they were able to send each other messages instantly, unobtrusively and securely. This helped to join up the workflows of the numerous clinical teams participating in the MHWP study.

Contemporaneous data entry: Clinicians found that recording clinical data at the point of care reduced the burden of retrospective data entry, helping to avoid the need to block out long periods of time to catch up on data entry.

Email anywhere: With the increase in corporate communication being conducted by email, clinicians at ALWCH appreciated the removal of the necessity to travel back to base locations in order to retrieve and read emails throughout the day.

The devices provided the ability to download emails securely wherever a 3G connection could be made, including at the clinician's home. Tasks assigned by email could be actioned immediately, increasing clinical efficiency and patient safety.

Management Information Service (MIS): Mobile access to the corporate Management Information System allowed clinicians to enter data and view their own activity at any point without the need to return to base to enter activity data.

Independence: A dedicated piece of mobile kit for each clinician participating in the study meant that it was no longer necessary for those staff to have to wait and take turns in sharing the desktop devices at base locations as they often did previously. In addition, staff based in non-NHS buildings could link back easily to their base organisation and access emails or documentation securely.

Peace of mind: The devices allowed clinicians to directly access results and relate them directly to patients at the point of contact, helping to reduce anxieties or stress.

Reduction in CO2 emissions: Staff at ALWCH perceived that there should be a decrease in the carbon footprint of their services due to the reduction in unnecessary journeys. The metric data recorded for the organisation indicated that journeys had indeed decreased over the pilot period, by almost fifty percent.

In their own words

The following are examples of direct quotes from clinicians and patients throughout the project with 3 patient comments recorded and 20 clinician comments.

Clinician comments

Pre-deployment

- “Unable to gain access to Lorenzo database yesterday, impacted on workload today. Also prevented/delayed adding referrals to service waiting list. Further 20 minutes lost in afternoon due to slow network/problems with computer in room (no alternative available).”
- “Electronic entry of data again deferred due to lack of access to computer; also lack of computer with the appropriate software.”
- “No access to a computer in the morning - an additional journey required to record contact data.”

Post-deployment

- “The Toughbook has been fantastic enabling me to input client data directly onto the system, without having to carry around coded data and travel around looking for a computer.”
- “Huge saving on time and resources.”
- “Majority of the form is not applicable to the role; Toughbook is excellent for making the most of time between visits. However can be difficult to access a connection at times which means extra miles to move to location with connection.”
- “Excellent device very disappointed that we now been told not to use at home was making my working much more efficient.”
- “Having access to network/data collection when I need it has made a great difference to time management. Prevents backlog from building.”
- “Problems getting onto Toughbook due to update and safe boot being installed.”

Service user comments

Pre-deployment

- “1 mum said 'wouldn't it be easier to put everything on computer' as I spent a lot of visit writing.”

Post-deployment

- “One positive comment about electronic booking in system.”
- “Client liked the idea that I could print off info straight away.”

Service Changes Seen

- Improved workflows
- Increased home based working

Conclusions

Impressions and achievements

The MHW Project has enabled better communication routes for staff. For some, the project has provided them with an electronic link to the organisation which previously they did not have as they were based in buildings with no access to the organisations infrastructure

The project's successes have increased the desire amongst non-participating staff for the wider deployment of mobile working in the organisation, with the MHW Project

This project allowed lessons learnt from the previous mobile 'Hospital @ Home' deployment to be factored in for participating staff. ALWCH must now deal with increased expectations from staff around the provision of mobile working going forward.

The ALWCH project team felt that the timescales for the MHWP were too tight, and that this restricted the amount of detailed work they could do particularly around understanding clinical working processes prior to the implementation and designing new ones that would incorporate the benefits of the devices.

The ALWCH project team are aware that far greater benefits could be realised with the availability of an electronic patient record. The provision of this remains a priority for the organisation; meanwhile, even without an EPR clinicians participating in the MHW pilots have already seen peripheral benefits to their working processes and continue to identify further changes that would be of benefit to their services.

Participation in the MHWP has also increased the IT literacy of clinical staff. This increased understanding is not limited to use of the mobile device but also extends beyond it to concepts such as remote access to network drives.

Lessons learned – what would we do differently?

The timescales of the project were very challenging for the delivery and rollout of device, limiting the amount of detailed preparatory work that the ALWCH project team felt capable to engage in.

In particular the challenging timescales hindered ALWCH from undertaking planned business change management or the higher level of clinical engagement, that would normally be recommended in the introduction of complex technological equipment to clinical working practice.

It is recognised by the clinical staff that a project of this scale should be directly linked to the Productive Community work stream to assist with benefit realisation for the service

Clinical staff at ALWCH also struggled to understand the data collection tool used to harvest the metrics for this report. Closer communication between the project team, the MHWP liaisons and the clinicians could have helped to avoid the misunderstandings about the operation of the tool and the resulting low numbers of returns from clinical users.

The analysis of activity took place during a period of significant organizational change and in some cases periods of service redesign.

Whilst significant benefits can be seen in many areas of the presented information e.g. number of journeys and travel time, items such as average contacts per day have slightly decreased

To try and provide further analysis of the data a local evaluation based on the sample of 8 staff who completed all 3 stages of data collection has been carried out by ALW.

This is based on data available from the ALW Division PAS.

The system indicates a trend of increased number of patients seen and increased contact time with patients between baseline and both benefits 1 and 2

Some services found access to mobile working much more beneficial than other services and it was staff who felt confident with IT equipment who gained the most benefit.

ALW division anticipate that significant benefits from the deployment of Mobile Working will be realized through further focused service redesign and the planned integrated PAS/EPR deployment

A Questionnaire was also undertaken which has given valuable information to the Project team and has led to the redeployment of some of the devices. and given a valuable insight in to user experience

Future plans for mobile working

- The SHA Benefits Lead will work with three clinical services to produce process maps and identify possible process changes for the next stage of mobile deployment.
- Access to Summary Care Records is planned for clinical staff.
- Access to mobile printers is planned for the future. There were three mobile printers in the trusts estate which had never been used so they were added to the project, though are only fit for use in clinical locations as they are old mobile printers and quite large.
- Introduction of Patient Surveys using touch screen on the device.
- Progress toward the introduction of a full EPR with mobile access for users of the device.

Avon IM&T Consortium (AIMTC)

Bristol Community Health, South Gloucestershire Community Services, North Somerset Community Partnership



Introduction

The application to take part in the Mobile Health Worker Project (MHWP) was made jointly on behalf of NHS Bristol, NHS South Gloucestershire, NHS North Somerset and their associated provider services with the full and active support of the Avon IM&T Consortium (AIMTC) – a shared NHS service supporting the three Primary Care Trusts. The sites are collectively termed as Avon in all MHWP documentation, for ease of reference.

Initial Objectives

The following key objectives were outlined by the organisation in their response to the MHWP invitation:

- Increase productivity by reducing travel time
- Increase time spent in direct patient contact
- Enable real-time access to the RiO record
- Significantly reduce the need for duplicate recording of information
- Reduce clerical staff costs
- Provide on-line access to sources of clinical information and knowledge
- Maintain effective co-ordination and management of community teams
- Reduce reliance of community staff on physical office space, reducing utilisation of estates
- Enable 24/7 working
- Reduce mileage and carbon footprint

As the three Trusts had successfully implemented the clinical solution RiO, they identified the need for mobile solutions to maximise the utilisation of the clinical application, and a key aim for them was to establish best practice guidance for the use of mobile solutions.

About the Project

Project Team

The local Project team consisted of:

- Project Lead
- IMT Lead
- Clinical Leads from each service (as part of their Head of Service role – no time was ring-fenced for the Project)
- Project Support (administrative resource)
- Business Change was provided by the Transformation teams as required (~0.4wte)

At a Glance

Avon	
Number of devices	48
Geography	50% urban, 50% rural
Clinical system used	RiO
Non clinical system requirements	Equipment ordering facility Email Intranet Internet BNF Map of Medicine (knowledge tool) Patient education material Microsoft Office applications
SIM provider	BT Mobile, Vodafone, Orange
Pilot go-live date	14 th October 2010

Table 21 – At a Glance: Avon

Service	Number of Users	Percentage of Service
NHS Bristol, Bristol Community Health		
Podiatry	7	18%
Disabled Adult Resource Team (DART)	4	25%
Physiotherapy	7	64%
Intermediate Care	7	3%
NHS South Gloucestershire		
Podiatry	5	31%
Disabled Adult Resource Team (DART)	5	71%
Physiotherapy	2	9%
NHS North Somerset		
Rapid Response Team	11	16%
Total	48	

Table 22 – At a Glance: Services involved

Project Methodology

The Avon pilot was run as an informal² sub-project of the existing RiO implementation project, across the three trusts, who had already successfully implemented RiO. The success of implementing RiO was a motivating factor for taking part in the MHWP.

There was clear project sponsorship from across the health community, and a holistic approach was adopted. The existing RiO Project Board provided the governance framework for the MHWP.

The documentation created to support the Project included a High-level Plan, Mobile Working Board Update Report, trainer's notes, localised mobile device User Guide and Service process maps.

² In this context, 'informal' denotes a project that did not produce formal project documentation (e.g. Project Initiation Document, Project Plan, Highlight Reports, etc)

Change Management, Skills Analysis and Support

There was no ring-fenced business change lead for the Avon implementation, but input was available from the AIMTC Transformation team as required.

Service process maps had been documented prior for the RiO deployment and these maps were reused for the MHWP in order to save time and avoid repetition of effort. The maps were revisited where necessary for the MHWP. Clinical staff were supported to appropriately modernise and develop their working practices to maximise the benefits to be derived from utilising mobile devices.

Due to the tight timescales, the main emphasis initially was to roll out the devices and start data gathering. The Project team were aware that staff were making changes to their working processes, but these were not formally captured in the early stages. The Project team acknowledged that formal capture was needed so that changes could be relayed to relevant business areas (for example Human Resources, where policies might need updating). It was felt that work in that area was ongoing and would continue as part of the RiO deployment. Clinical staff reported that they were making significant changes to their working processes very soon after go-live for example, to maximise the benefits of having the devices. They did however feel 'uncertain' as to whether senior management supported or understood these changes at that point in the project. Staff were encouraged to document the changes they made and feed this back to the Project Team

An IT skills analysis was undertaken as part of the RiO deployment and it was assumed that no additional IT training was required prior to the deployment of mobile devices – this was in part due to all staff having volunteered to take part in the MHWP.

Clinical IT support for the mobile implementation was undertaken by the existing local helpdesk (AIMTC). The Project team were happy with the responsiveness of this service to the Project. User issues were triaged and either dealt with locally or passed on to the BT helpdesk, as appropriate.

Implementation Technical Detail

Information for this section has been collated from the technical information provided by BT during the implementation phase, as well as from direct discussions with the site project team. Please refer to the glossary of terms for clarification on the meaning of any of the technical items below.

Gold Build – At a Glance

Avon opted to accept the standard TCS configurable Gold Build, plus the following items:

- RiO shortcuts and registry settings;
- Gemplus/Gemplus Authentication Client (GAC) registry settings;
- Sophos licence username and password;
- 2e2 SafeBoot installer.

Following the initial deployment of 48 devices, some additional requirements were identified locally, and subsequent changes to the Gold Build were requested. These included changes to allow printing, and direct access to letters in RiO.

Clinical System

RiO had been deployed to all services participating in the pilot, however the level of use of the functionality was varied. Some services were using the full extent of the functionality available in the system, and working in a very paper light manner, others were only utilising the diary functionality and maintaining full paper clinical records.

The extent of use of the clinical system was found to have an effect on the benefits experienced at this pilot site.

Other applications/functionality

Users utilised the devices for more than just accessing the clinical record.

Other uses included using the device in meetings to directly record minutes, accessing information in meetings, reducing the need to print large volumes of papers, improved communication between team members and using instant messaging/diary notes.

In one Service, a library of equipment was also added in which images of equipment were available, allowing mobile clinicians to show these to patients in their homes. This helped to allay patient anxieties about what items would look like, and enabled clinicians to explain more easily the benefits and uses of the different pieces of equipment.

Technical Issues

Pre-deployment

The go-live date was delayed by 1 week due to an issue with the Safeboot encryption service being discovered to be incompatible with the devices issued.

The site went live on the 14th October 2010.

Post-deployment

The project team reported that the clinical staff had difficulty understanding and using the MHWP data collection spreadsheet.

During the project period, a total of 62 issues were raised to the BT helpdesk by the three Avon IM&T Trusts. Please refer to the glossary of terms for clarification on the purpose of any of the technical items below:

- 50 issues related to the devices:
 - o 19 MobileXpress issues;
 - o 12 VPN issues;
 - o 12 Safeboot issues;
 - o 4 settings/configuration issues;
 - o 2 communications failure issues;
 - o 1 damaged device.
- 2 issues related to device peripherals:
 - o 1 smartcard faulty/lost;
 - o 1 N3 token lost.
- 10 issues related to the Windows Operating System:
 - o 4 application not responding;
 - o 5 information required;
 - o 1 Microsoft key issue.

General issues

Connectivity: This was the most commonly reported issue for users at the Avon sites. The Project Team felt that the network coverage maps were not very reliable and to build up an accurate picture of what SIM works best in each area, they had to test it for themselves.

Battery life: The clinicians found that the device needed to be charged regularly. If they were using it regularly it was not a problem, but if it was left for a few days for example when the staff member was off, it needed to be recharged fully before use, otherwise the battery went flat very quickly.

Ergonomics and handling: Concerns were raised about the ergonomics of the equipment and that the device is an additional piece of equipment for the staff to carry. It was recognised that the organisations needed to ensure that staff are advised appropriately on the use and handling of the devices and this advice is included into the appropriate HR policies. Individual risk assessments should be undertaken locally if necessary.

Display settings: One staff member reported that the screen was difficult to see in bright conditions, for example in bright sunshine. Users were advised to alter screen brightness settings or alternatively to find shaded areas in which to use the device.

Study Findings

Metrics

The following section provides a summary of the metric analysis, collated from the spreadsheets returned to the MHWP team.

The table below gives an indication of the level of returns submitted by the 48 staff taking part at the AIMTC pilot site. As discussed earlier in the report, not all returns could be used in the analysis.

Returns: overview

Returns	Percentage of users returning data
Mileage month 1	85%
Mileage month 2	96%
Baseline data	77%
Benefits month 1	79%
Benefits month 2	100%
Average return rate	88%

Table 23 – Rate of returns: Avon

Metrics: overview

Clinicians	Number in project	Baseline returns	Benefits 1 returns	Benefits 2 returns
Intermediate Care	7	7	5	8
Disabled Adult Resource Teams	9	7	8	8
Physiotherapy	9	7	6	8
Podiatry	12	9	8	12
Rapid Response	11	6	6	11
Total	48	36	33	47

Table 24 – Overview of Returns used in analysis

Days data	Baseline	Benefits 1	Benefits 2	Totals
Intermediate Care	34	74	93	201
Disabled Adult Resource Teams	75	66	85	226
Physiotherapy	22	70	123	215
Podiatry	59	74	131	264
Rapid Response	43	67	145	255
Total	233	351	577	1161

Table 25 – Overview of Number of Days of data returned

Data Usage

The image below, generated from data usage statistics collected by BT, gives a visual indication of the data usage at the AIMTC site as clinicians take up and learn how to use the devices. It is not known why there was a dip mid Jan to mid Feb, but the overall trend shows a gradual increase in use over time.

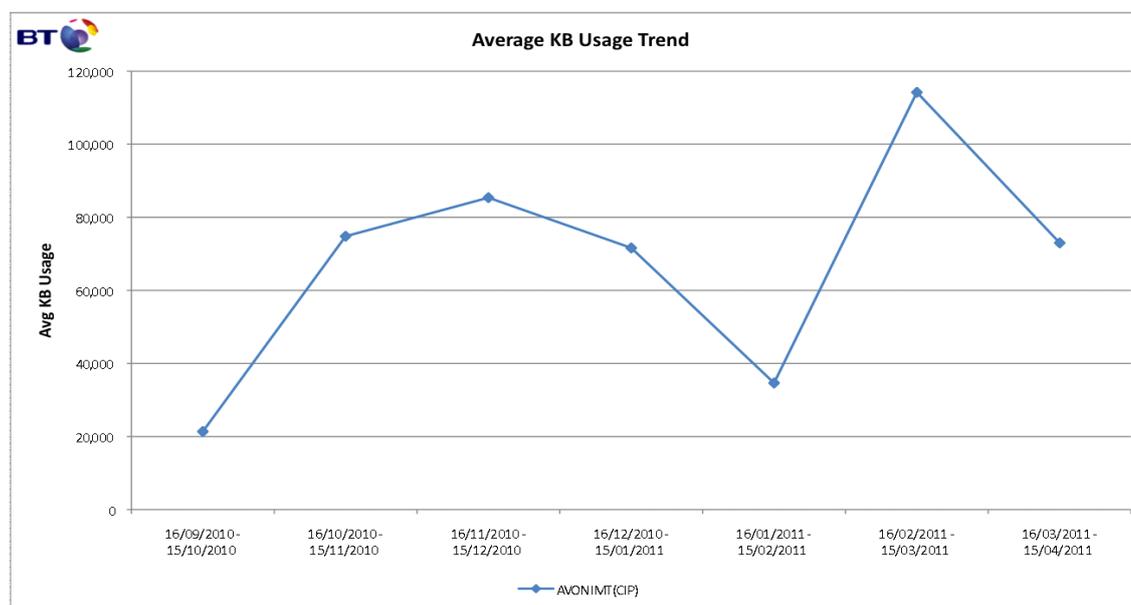


Figure 28 – Data usage trend

Contacts:

During the entire data recording phase, staff at the Avon site recorded a total of **1996** contacts. The average number of contacts per day for each clinician fell very slightly by **3.2** percentage points from Baseline to Benefits 2.

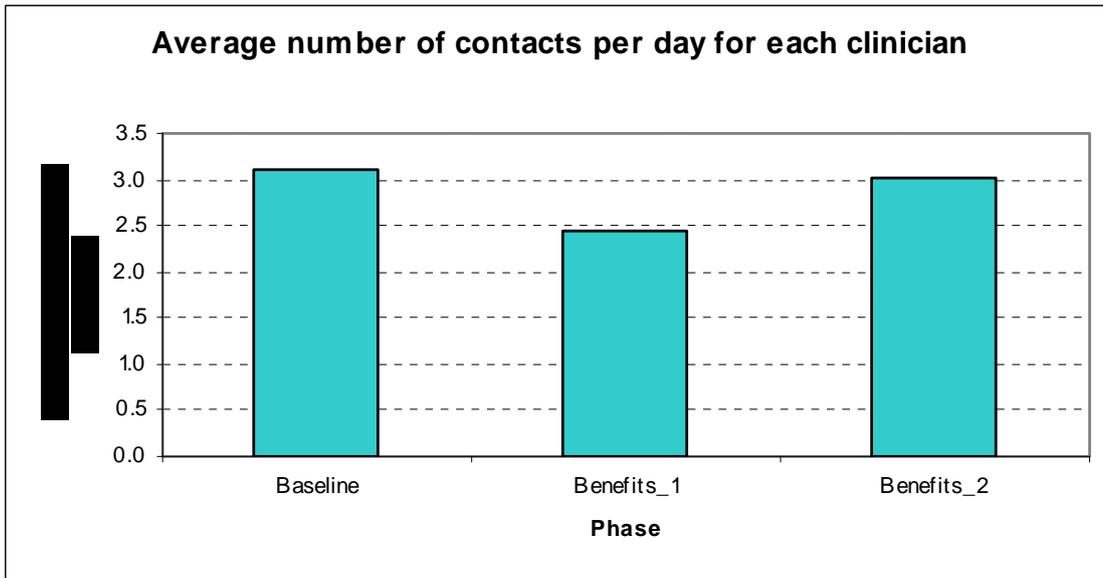


Figure 29 – Average contacts per clinician, per day

The AIMTC conducted their own independent analysis alongside the MHWP analysis, which generally supports these findings.

The local project team reported users did struggle with completion of the data collection spreadsheets and very often had to fill them in retrospectively, which may have affected the accuracy of the data.

The average contacts vary significantly across the Services involved, shown below in figure 5, which accounts for the overall slight fall, however there are encouraging increases within these.

Contacts were broken down by duration, and the results across each duration can be seen on the following chart:

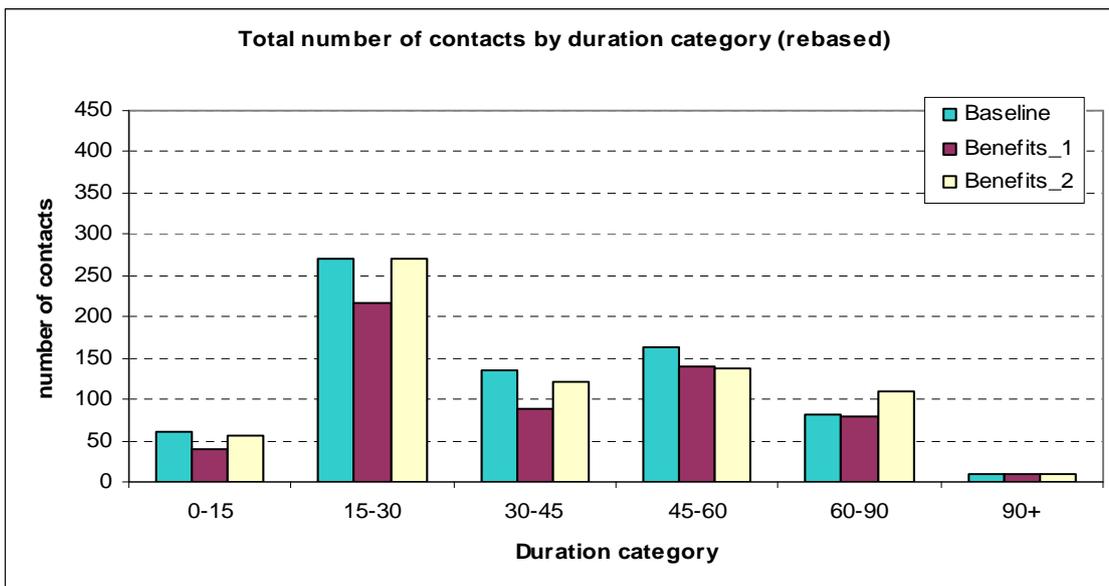


Figure 30 – Total contacts by duration

The graph shows contacts across most durations were static or slightly lower in Benefits 2, with the exception of the period 60-90 minutes, which is noticeably higher in Benefits 2. As this is a longer duration banding it is unlikely that this increase is due to the device causing a clinician to take longer to record the same level of information – it is more likely to be due to clinicians being able to capture and record more information directly into the patient record at a visit, potentially reducing the need for a further visit, and providing more comprehensive care at a single visit.

Duration of face to face contact with patients

The site showed only a very small change in contact durations, with only a **0.4** percentage point increase in the number of minutes spent with patients.

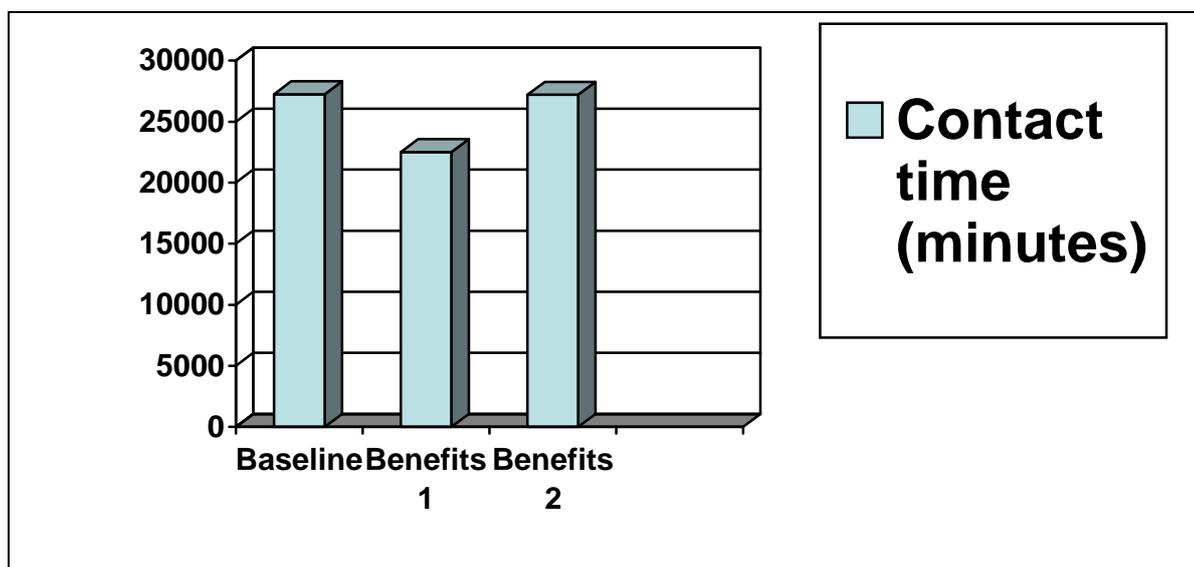


Figure 31 – Total Contact time with patients (in minutes)

This very slight increase in contact time, compared with the small drop in number of contacts takes account of the higher number of longer duration contacts discussed above.

When broken down into the individual services, the metrics for contacts indicate that one of the services recorded increased contacts from Baseline to Benefits 2, and significant variation across Services is shown:

Average contacts per day	Baseline	Benefits 1	Benefits 2	Change
Intermediate Care	2.5	1.7	2.4	- 4%
Disabled Adult Resource Teams	1.2	1.3	1.8	+ 50.0%
Physiotherapy	5.0	3.1	3.3	- 34.0%
Podiatry	5.1	3.8	4.6	- 9.8%
Rapid Response	3.2	2.2	2.4	- 25%

Table 26 – Contacts by service

The AIMTC project was unique in that it spanned 3 separate organisations. This means that several of the Service types listed (Physiotherapy, Podiatry, and Disabled Adult Resource Team) actually represent more than one Service, across different organisations. Each of these Services may work very differently and therefore have experienced different benefits across the project, however we have not been able to make this distinction in the metric analysis.

As part of the RIO project AIMTC gave the services a maturity rating on how much they use the functionality in RiO. It is noted that the service with the highest maturity score (DART) is the service that has shown an increase in contacts. Physiotherapy who do not do currently use the clinical functionality in RiO have a lower maturity score and have seen a decrease in contacts (which may not be due to having a mobile solution).

Journeys:

During the entire data recording phase, staff at the Avon site recorded a total of **2348** journeys. The number of journeys per day for each clinician fell by **2.9** percentage points over the course of the pilot.

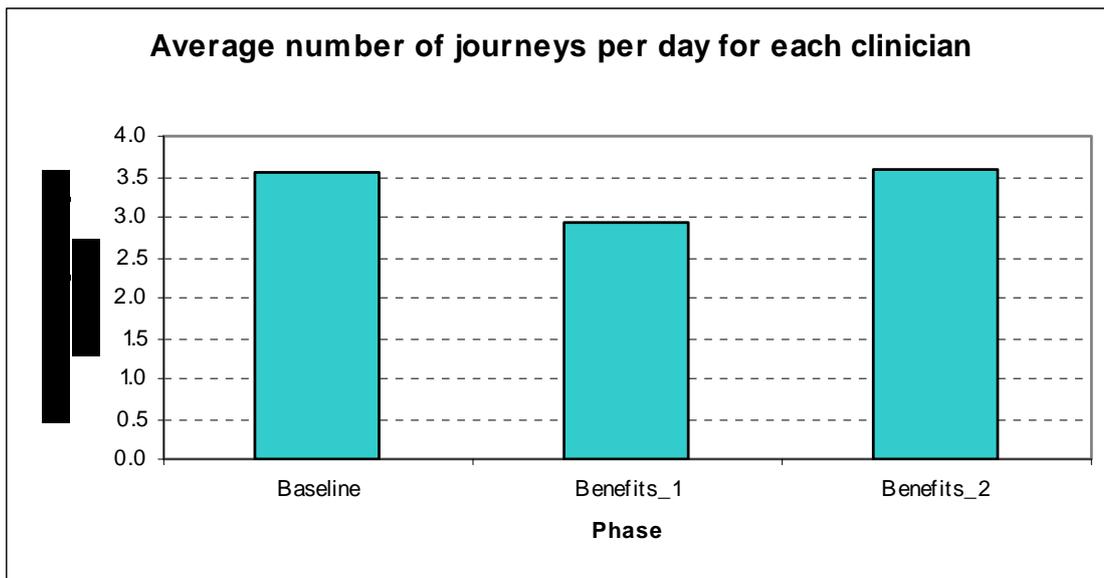


Figure 32 – Average journeys per clinician, per day

This fall is in line with the fall in contacts seen above.

Journeys were also broken down into durations, and the results are shown in the following chart:

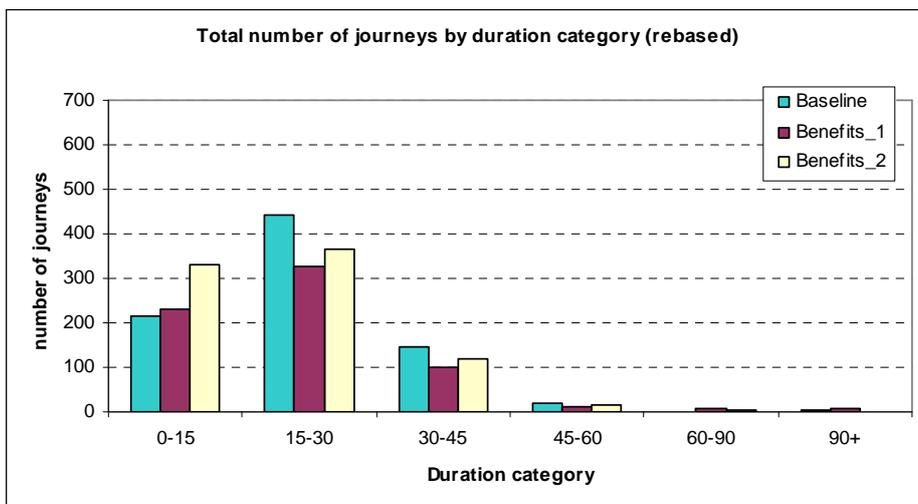


Figure 33 – Total journeys by duration

The graph shows an increase in shorter journeys (0-15mins), then either a general fall or static number across all other categories. This indicates either an increase in closer, opportunistic visits or improved planning of schedule/route.

Journey durations decreased from Baseline to Benefits 2 collection, with clinicians recording the minutes they spent travelling decreased by **10.8** percentage points.

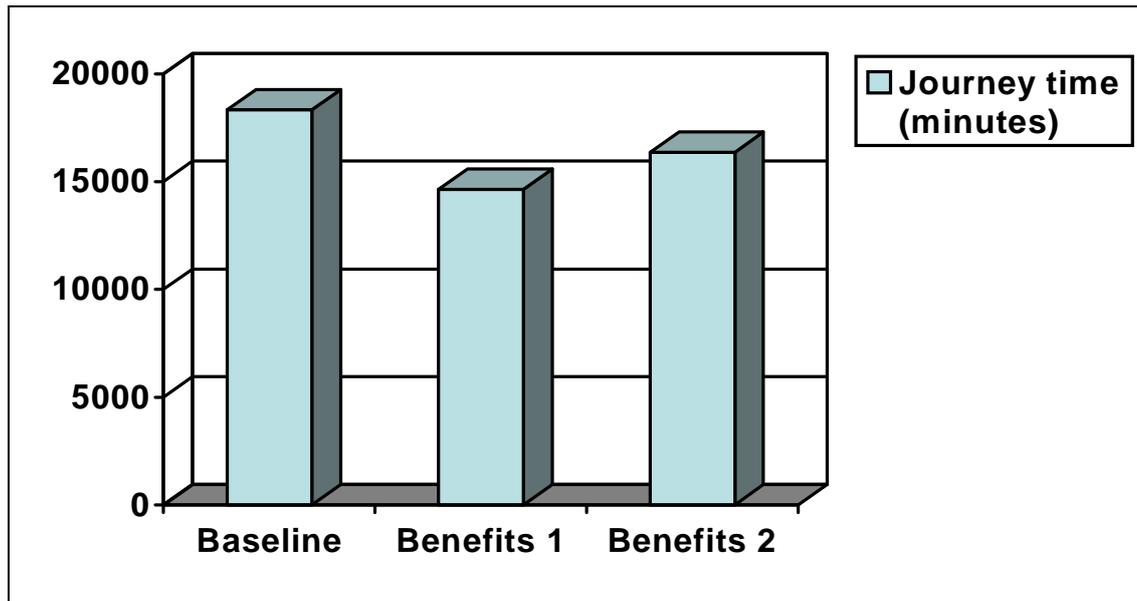


Figure 34 – Journey time (in minutes)

The fall in travel time supports the assumption that clinicians are able to plan their schedule better, and reflects the increased number of shorter journeys, whilst reducing the need for longer journeys.

When broken down into the individual services, the metrics for journeys indicate that two services decreased numbers of journeys per day over the pilot duration:

Average journeys per day	Baseline	Benefits 1	Benefits 2	Change
Intermediate Care	2.9	2.7	3.7	+ 27.6%
Disabled Adult Resource Teams (DART)	2.6	2.7	3.0	+15.4%
Physiotherapy	5.6	3.2	3.7	- 31.2%
Podiatry	4.2	3.4	4.3	+ 2.4%
Rapid Response	3.8	2.7	3.1	- 18.4%

Table 27 – Journeys by Service

The journey data reveals some unusual results, which could be linked to the different services across different organisations being included in the same analysis, for example Intermediate Care have increased their number of journeys despite activity reducing – this is also the same for Podiatry, although to a lesser degree. The AIMTC project team were not aware of any underlying factors that may have affected these results, such as change in base for any of the Services, increase in travel associated with non-clinical activity etc.

Physiotherapy and Rapid Response have reduced journeys approximately in line with their reduction in activity, and DART have increased their journeys significantly less than they increased activity, indicating increased productivity with efficiency savings in travel.

Mileage:

Mileage	#1	#2	Change
All staff (35 returns)	7460.5	7818.5	+ 4.8%

Table 28 – Mileage

Mileage claimed for the site over the same period (taken from a sample of 35 clinicians who returned mileage data) indicated that mileage had increased by **4.8%**.

The AIMTC Project team felt the mileage data could be a little misleading - the mileage did not reflect the data collection periods, and mileage is collected for part of one month and part of another.

Some of the users do a lot of non clinical work which can vary from month to month – for example attending meetings at other trusts which can lead to larger mileage amounts.

It was felt that if purely ‘clinical’ mileage had been reported, it would have resulted in a reduction, that would support the reduction in the number of journeys.

Referrals:

In total, **801** referrals were made over the Benefits periods. Clinicians at Avon estimated that due to having access to the devices, they saved **42** potential referrals. This equates to a **5% saving** of referrals.

Admissions:

In total, **6** admissions were made over the Benefits periods. Clinicians at Avon did not record any instances where they felt the device helped them to save an admission.

No access visits:

No access visits decreased by **39.3** percentage points from the baseline measurement to the second benefits measurement period.

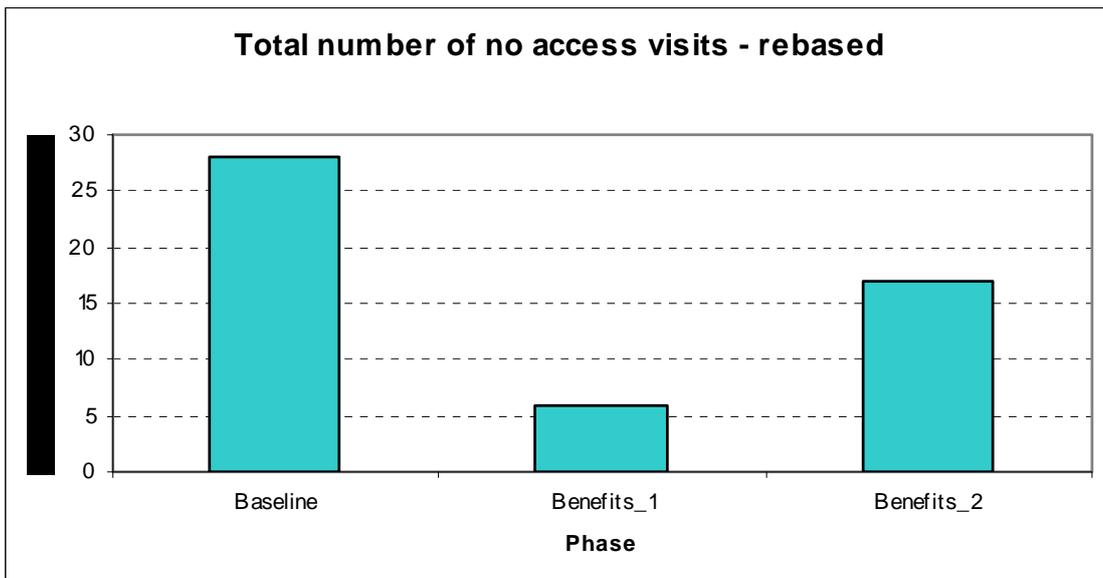


Figure 35 – No access visits

The reduction in No access visits reflects the improved access to information provided by having the mobile device.

Duplication of data:

The metrics show no change from the baseline measurement to Benefits 2:

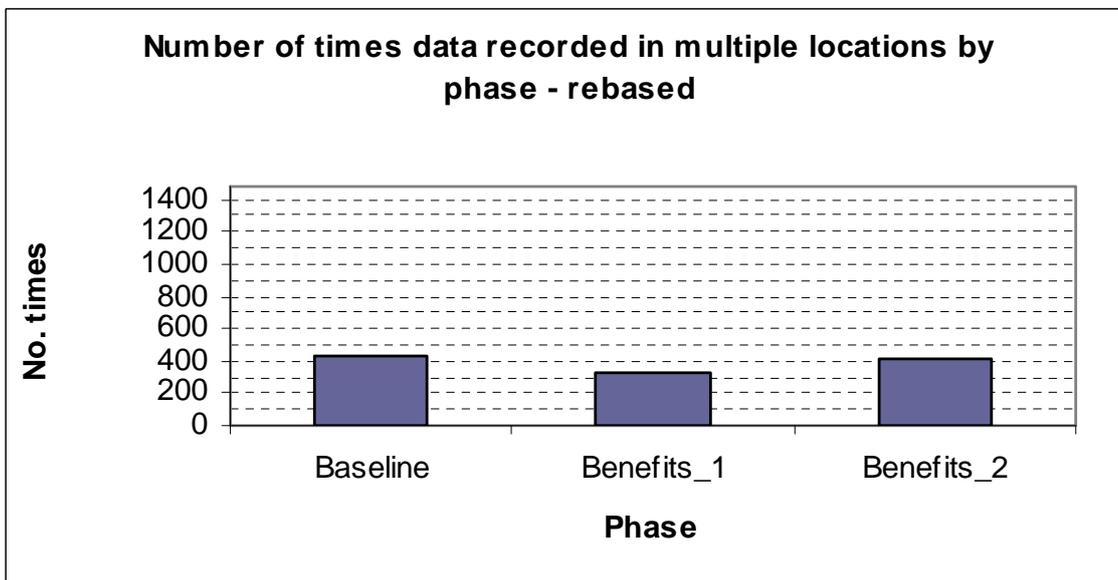


Figure 36 – Duplication of data

This is likely to be due to the fact that devices were deployed to limited numbers in each Service, which limited the amount of business change that could be implemented. Existing processes needed to be continued to maintain the Service level. This has been recognised by the AIMTC project team, and is covered in the future plans section in the conclusion.

Duplication of data	Baseline	Benefits 1	Benefits 2	Change
Intermediate Care	1.6	2.2	2.2	+ 37.5%
Disabled Adult Resource Teams	0.4	0.3	0.4	0%
Physiotherapy	5.4	2.7	2.8	- 48.1%
Podiatry	2.0	0.9	1.1	- 45.0%
Rapid Response	2.6	0.7	2.0	- 23.1%

Table 29 – Data duplication by service

The variation seen above reflects the number of users in a service with a device, and also the extent of use of the electronic clinical record.

The physiotherapy result appears to be an anomaly, as they are not using a full electronic clinical record and the AIMTC project team are not aware of any reason why they should have reduced duplication of data by such a large amount.

Whilst it appears the DART teams have been unable to reduce duplication, this could be because they had already rationalised their records and reduced duplication prior to the implementation of mobile devices. This is a trend seen across several sites, where advance business planning has occurred.

Summary of Metric findings

- The project spans 3 separate organisations, with different ways of working
- The Services vary on the extent of use of the electronic clinical record which will affect the benefits that are seen – locally a maturity rating has been attributed to Services to account for this
- The DART data show that, it is possible to significantly improve productivity, whilst achieving comparative efficiencies in travel.
- Significant reductions in no access visits have been shown, and significant reductions in duplication can be achieved, where this has not already been addressed.

Subjective findings

The items discussed in this section are those findings which were made based upon the subjective comments noted at the pilot site by the MHWP team, or reported in the free text comments on the data returns spreadsheets.

Flexible working: The device allowed staff to adopt more flexible ways of working including commencing and concluding their working days from home, assisting those with young families and helping others to avoid rush-hour traffic. Staff perceived that ‘unnecessary’ travel was significantly reduced, therefore saving money and releasing time for other activities. Work-life balance was reported to be improved by having the device.

Travel savings: One staff member felt she was ‘saving’ two hours a day by being able to avoid travelling at peak times – this time was used for more productive tasks such as additional patient contacts or the completion of administrative tasks. Having the device also meant that all time during the day could be used effectively, for example short gaps between visits or meetings could be used to check emails, find information etc. Staff felt they were far more efficient with the device.

Availability of equipment: Access to hardware has historically been ‘difficult’ with staff sharing desktop computers. This meant that staff often only had time to perform the bare essentials on the computer, such as updating their clinical notes. The mobile devices were allocated to a single person, so users can fully utilise the technology available – for many this meant being able to be up to date with on line training, access much more on line information and be able to provide much more useful and tailored information to patients.

Job satisfaction: Mobile working improved work patterns and had a direct effect on staff satisfaction with their jobs; the main reason was they felt less stressed as the ‘additional’ time allowed them to keep on top of the workload, and not constantly feel that they were playing catch-up. This also has led to improvements in service waiting times, which were noted to have reduced.

Increased hours of working: Some staff expressed concerns that the devices might encourage clinicians to work longer hours and that this may lead service managers to expect this of their staff, therefore it is important to consider the culture of the organisations and working hours monitored in the annual staff surveys. However most clinicians were pleased to benefits from the increased autonomy offered by mobile working.

Connectivity issues: It was reported that several users failed to get connectivity when they needed it, and others reported it could take up to twenty minutes to connect. Some users found that connectivity sometimes dropped in the middle of a session causing RiO to lose data. Other users were unable to get any connection at home and they reported that this was a lost opportunity.

Increased productivity: Where use of an electronic clinical application was limited, most users felt with better connectivity and network coverage, it would be worth their while investing the time to learn how to use it. Users of a full electronic clinical record were unanimous in their

view that the device improved productivity and would help them meet cost –savings, as well as significantly improving satisfaction in their work-life experience.

Security: Some users expressed concerns regarding the use of the devices when in public view (i.e. in the car) due to safety/security issues and feeling vulnerable. Additionally using the device in the car could be ergonomically very difficult and impractical, as well as being uncomfortable. Many users however reported they were pleased with the improved security of clinical information. Not having to carry paper patient information around with them and relying and faxes being received was a big benefit.

Extra burden: On the whole, the device was considered to be portable and a significant improvement on previous hardware, with staff reporting the device was fit for purpose and user friendly. However, it was noted that those with no access to the clinical application were limited in the benefits gained, and it was seen by some as an additional heavy and awkward burden to carry on top of equipment already required.

Greener working: As well as making cost savings by reducing unnecessary travel, users felt that they were making cost savings through a vast reduction in printing, saving costs of both paper and ink. This has helped the services become more environmentally friendly.

Improved communications: An unexpected finding was the improved communication between staff when out of the office. Whilst most staff are accessible via mobile phone, staff are often reluctant to disturb colleagues when they are out of the office, except in emergencies. Having access via the mobile device allows staff to message each other (a variety of means have been used, including email and via the clinical system diary) throughout the day, allowing none urgent issues to be dealt with in a much more timely and efficient manner. For community staff, who can spend a large amount of time attempting to liaise with unavailable colleagues, this finding has been a significant benefit.

Patient acceptance: Patients were accepting of the use of technology and it did not cause a barrier between the clinician and patient, although many clinicians did not use the device in front of all patients, but used their judgement of whether it was appropriate in advance. Patients could generally see how it was beneficial to clinicians and many saw first hand how the devices could directly be of benefit to themselves.

Improved processes: Patients were impressed with the noticeably improved processes, especially ability to show and order equipment at their homes, leading to increased confidence levels

Improved access to information at the point of care: This includes both clinical and supporting information. Users had increased confidence in the care they were providing knowing they had access to up to date information, and were able to show patients resources from a variety of sources at the point of care. This often negated the need for follow up actions such as printing leaflets and posting them out.

In their own words

The following are examples of direct quotes from clinicians and patients throughout the project taken from the 25 patients comments and over 200 clinician comments that were received.

Clinician comments

Pre-deployment

- “Trade Union meeting in London - Toughbook would have been useful as I could have triaged referrals remotely prior to meeting and during lunch time.”
- “One of today's patients had been transferred from clinic to domiciliary visits, as a result his clinic treatments that had been entered on RiO were not available to me on a visit - mobile working would have given me access to that information.”
- “Multiple meetings in different locations, remote access again would have been useful to access emails and Rio etc.”
- “I could have completed RIO at the end of my day if had 'away from office' access as too far away to come back therefore had to do it next day.”

Post-deployment

- “The main issue and advantage of instant access to RiO is to avoid the duplication of podiatry notes, and to avoid the need to either have to collect notes or send through the internal post.”
- “Non-clinical day - all day meeting in London - Toughbook used instead of printing out masses of papers - also used to remote access emails.”
- “Still struggling to save time on recording due to length of time to log on. Not enjoying using the device in the car, cramped, awkward.”
- “Able to order equipment quickly without coming into hospital.”
- “The Toughbook has been really beneficial in supporting the new way we are working - reducing the number of visits to the office and allowing me to go straight to patients, do data entry at home etc. I am still having to go to the office to print out letters etc and pick up messages etc. The way we are working would have changed anyway but this has just made it easier.”
- “Toughbook used to access patient information prior to visit from home avoiding need to visit base, saving time and reducing mileage.”
- “Additional visit scheduled due to time saved not having to return to base to access RIO system. Toughbook used in car between visits, during patient visit and to hot-desk (informally) at Clifton office. My office base is Barton Hill therefore substantial time saved on travel which facilitated increased clinical face to face time with patient.”
- “Not used with patient as my physio work is physical with patients whilst there- notes written up afterwards.”
- “Following non access visit was able to do some note writing and contact my next client to arrange earlier visit.”
- “Toughbook enabled me to work from home today and catch up on yesterdays remaining paperwork without having to make the 78 mile round trip into work.”

- “Signal lost a few times during input, losing all unsaved work. Frustrating and time consuming.”
- “Makes e-mail much more accessible as a means of communication
- “Was able to use the internet to search for a useful number in a clients home.”
- “Toughbook enabled me to take action point minutes in a meeting, and email them immediately to the chair.”
- “Used Toughbook to show client information about equipment on internet to enable improved choice.”
- “Patients have been very accepting of the computer.”

Service user comments

Pre-deployment

- “Negative comments made by one patient re: volume of paperwork because information is not shared between disciplines.”
- “Patients regularly comment on the amount of paperwork we have to fill in. Much of this is info held by the GP or Social Services which we cannot access by computer in or out of the office.”

Post-deployment

- “That's a lot to carry around.”
- “Was able to send the client a test email from the Toughbook - client said 'it's good that you've got that'.”
- “impressed by the level of security required to access patient information on the Toughbooks.”
- “That seems very efficient.”
- “During my visit, the client has arranged to work from home and has her own laptop. We discussed efficiency of this for her.”
- “That is handy (Toughbook).”
- “I was able to access a web site for instructions for craftwork.”
- “I was able to show them what a piece of equipment would look like which they thought was helpful.”
- “Patient commented on time saving [of the device].”
- “Patient's relative thought it seemed very exciting to have access to electronic patients notes.”
- Client commented: "We have to move with the times."
- “Patient thought the computer was good because all staff would be able to read it as no hand writing and the District Nurses who were also treating the same patient would be able to see what I had done instantly.”
- Client commented: "You've got it all there".
- Client said: "It's so instant".

Service Changes seen

- Changes to working patterns.
- Improved choice offered to patients through use of online resources (e.g. equipment ordering).
- Improvement in recording of clinical and activity data.
- Reduction in printing.

Conclusions

Local Impressions and achievements

The initial phase of the project was a steep learning curve for everyone. Once initial deployment lessons had been learned, subsequent phases were much easier. The initial deployment also coincided with a deployment of the clinical system, meaning that resources were stretched and there was a lot of change happening at once and that clinicians need to be supported.

The Project team perceive the main benefits locally to be changes to working practices, allowing more flexible working. There has been an increase in home working, with associated reduction in 'needless' travel to base. Managerial responsibilities have changed as a result of the changes in working practice – these need to be acknowledged and addressed formally. Staff ultimately have more freedom to perform their jobs in the most effective way.

The clearly defined timescales for data collection were helpful, as they gave a focus and momentum to the project.

The Project Team identified that the project has highlighted to the wider corporate audience that deploying technology is not as simple as just issuing mobile devices and expecting results. The MHWP pilot has emphasised the need for effective business change management to guide users toward using the technology to deliver benefits.

Overall, those involved with the Project at Avon felt the project went very well.

Lessons learned – what would we do differently?

As a result of the MHWP, there has been a lot of local learning for the Project team.

An important learning point for the services was that benefits can be realised more easily across all users if their processes had been mapped and possible changes to working practice identified in advance of the deployment of the devices. This allows everyone to work towards the same goals and outcomes, and mappings can be re-visited as required, to make further suggestions or amendments. Linked to this is the recognition that unless all members of a service are using mobile devices the changes that can be implemented will be limited, so a degree of duplication is inevitable.

Mapping service processes prior to deployment of equipment also allows easy identification of which services are 'technologically' ready for mobile devices, and which have further work to do, before maximum benefits can be achieved.

Future projects would focus their efforts and target service managers initially to gather the required data within stated timescales.

Business change management needs to take much greater priority from the outset, with more detailed investigation into which users and services would benefit most from the devices.

For future studies it is important to ensure that training in the use of the data collection tool be incorporated into the scheduled training sessions for the devices, avoiding some of the difficulties encountered with the use of the MHWP spreadsheets by clinicians.

The project team aim to increase communication with clinical staff regarding the project background, including the project history, aims, and details of how it will progress. This will help avoid the situation of users operating within a 'vacuum' without a full understanding of the context and purpose of the work.

Future plans for mobile working

- AIMTC recognise the need for whole service transformation to realise the maximum benefits from mobile technology, and applied to the MHWP for additional equipment to expand the pilot to selected whole services. AIMTC was successful in this application and is currently participating in this extended project.
- The results from this project have been used to inform a larger piece of work looking at mobile working across the area.
- A business case is being created locally to take mobile working forward.
- The business case will be based on all previous findings and will make recommendations for each service on what will be the best option for them.
- AIMTC strongly feel that 'store and forward' functionality is needed in their clinical system to allow maximum benefits of providing mobile technology to clinicians, and will be pursuing this with Connecting for Health.

John Taylor Hospice CIC

(Community Interest Company)

Birmingham East and North (BEN)



Introduction

The John Taylor Hospice serves a population of over 400,000 in North and East Birmingham together with adjoining areas. It incorporates a day hospice, an inpatient unit and specialist community based nursing and MDT, pastoral and bereavement support teams.³

The MHWP application was made on behalf of John Taylor Hospice by Birmingham East and North (BEN), and the site is referred to in this case study as BEN for ease of reference.

As part of the Mobile Working for Clinicians project, BEN were looking to trial mobile working functionality to support the deployment of TPP's SystmOne Palliative module the hospice's range of services.

Initial Objectives

The following are the key objectives for the project as outlined by the organisation in the response to the MHWP invitation:

- To provide real time access to patients records away from the hospice
- Reduced duplication of effort
- Increased clinical safety
- Improve data quality in relation to electronic records
- Improve clinical engagement with IT technologies
- Test 3G coverage and understand business continuity risks and issues

The BEN project team envisaged the mobile devices helping to provide support for clinical acceptance and adoption of the recent deployment of the TPP SystmOne Palliative module.

About the Project

Project Team

The local project team consisted of:

- Project lead;
- Technical lead;
- Business change lead;
- Clinical lead.

All team roles were taken on by existing staff as part of their day-to-day responsibilities.

³ <http://www.johntaylorhospiceof.org.uk/>

At a Glance

BEN	
Number of devices	21
Geography	100% urban
Clinical systems used	SystemOne Palliative
Non-EPR requirements	Intranet, Internet, online booking for equipment, web mail, Microsoft Office applications
SIM provider	Orange, Vodaphone and O ₂
Pilot go-live date	October 22 nd , 2010

Table 30 – At a Glance: BEN

Service	Number of Users	Percentage of Service
Community Team	13	100%
MDT	8	100%

Table 31 – At a Glance: Services involved

Project Methodology

The BEN pilot was run as a formal project alongside the deployment of the SystemOne Palliative Module, and there was clear sponsorship and leadership for the undertaking across the organisation.

The project approach at BEN involved the core project team as well as the Data Quality Team, the Training Team and the Business Change Team.

Documentation produced and seen by the MHW Project team includes the following:

- As-is process flows
- To-be process flows
- Stakeholder engagement document
- Operational Guide
- Authority to proceed & lessons learned as part of Project Plan

Change Management, Skills Analysis and Support

One hundred per cent of the two service types operating at the John Taylor Hospice took part in the MHWP pilot work. BEN undertook process mapping specifically for the mobile project, documenting both as-is and to-be processes. From these mappings, service processes could be redesigned at the start of the project, rather than adjusted purely on an ad-hoc basis.

Additionally, clinicians were given the opportunity to contribute suggestions to working processes as the project evolved and unforeseen opportunities for improvement have emerged. These process changes have been fully supported by the management throughout the project.

First line IT support for the mobile implementation was undertaken by the existing local helpdesk within PCT IT Business Delivery. User issues were triaged and either dealt with locally or passed on to the BT helpdesk, as appropriate. The BEN project team were happy with the responsiveness and effectiveness of the service throughout the pilot phase and beyond.

Implementation Technical Detail

Information for this section has been collated from the technical information provided by BT during the implementation phase, as well as from direct discussions with the site project team. Please refer to the glossary of terms for clarification on the meaning of any of the technical items below.

Gold Build – At a Glance

BEN opted to accept the standard TCS configurable Gold Build, plus the following items:

- Sophos licence username and password.
- 2e2 SafeBoot installer.

Clinical System

The main clinical system in use at the BEN sites for the pilot was TPP's SystemOne Palliative module. This was used by clinicians in the services included in the pilot initially to allow clinicians to update demographic information at the point of care, with direct entry into the EPR expected in a further phase of work once the full clinical record and rationalised templates have been rolled out across the organisation. It is recognised that the SystemOne application is the only clinical information which traverses all of the clinical services in the organisation.

Other applications/functionality

As well as the main clinical application, devices deployed were equipped with additional applications intended to assist clinicians in their daily tasks.

Internet Explorer was provided to give clinician's access to the Internet (including the organisation's online equipment ordering service and web mail accounts).

Favourite's folders were set up on each device for the clinicians to ease access to the most useful internet sites

Shared network drives were mapped, giving clinician's real-time access to documents and resources at their base location.

The Microsoft Office suite of applications (including Word and Excel) were provided, to allow users to create, edit and share documents as required.

Technical Issues

Pre-deployment

This section documents any technical issues that arose for the pilot site during the pre-deployment phase.

At the outset of the MHWP pre-deployment, there was a very limited complement of IT staff to assist with the preparation. This resulted in some minor delays around the ordering of the N3 tokens that allow users to access their corporate network securely. Once the tokens arrived, it was discovered that there were two types of tokens and this necessitated some reordering, resulting in another short delay to the go-live date.

The BEN MHWP pilot went live on October 22nd, 2010.

Post-deployment

A total of 14 issues were raised during the project period to the BT helpdesk. Please refer to the glossary of terms for clarification on the purpose of any of the technical items below:

- 11 issues relating to the device:
 - o 6 mobile express;
 - o 4 VPN issues;
 - o 1 settings/configuration issue.
- 3 issues related to the Windows Operating System:
 - o 2 application not responding;
 - o 1 clinical system issue.

General issues

Connectivity: As with some other sites in the MHWP pilots study, top of the list of technical issues raised by BEN was the variable connectivity experienced by some users. The project team adopted a 'mix and match' approach based on user experience, exchanging seven of the device SIMs with those from another network provider which did improve connectivity.

Battery life: Some users reported that the battery life was not always sufficient to last for a full shift with heavy use. Port replicators or chargers were recommended to be available at base locations (where applicable) for charging between visits and shifts. Staff were advised to ensure that the devices were left to charge between shifts either at home or in the base location for optimum battery life.

Study Findings

Metrics

The following section provides a summary of the metric analysis, collated from the spreadsheets returned to the MHWP team.

The table below gives an indication of the level of returns submitted by the 21 staff taking part at the BEN pilot site. As discussed earlier in the report not all the returns could be used in the analysis.

Returns	Percentage of users returning data
Baseline data	90%
Mileage month 1	81%
Mileage month 2	81%
Benefits month 1	67%
Benefits month 2	100%
Average return rate	84%

Table 32 – Rate of returns: BEN

Metrics: overview

Clinicians	Number in project	Baseline returns	Benefits 1 returns	Benefits 2 returns
Community team	13	10	10	13
MDT	8	7	7	8
Total	21	17	17	21

Table 33 – Overview of Returns used in analysis

Days data	Baseline	Benefits 1	Benefits 2	Totals
Community team	202	122	304	628
MDT	140	84	192	416
Total	342	206	496	1044

Table 34 – Overview of Number of Days of data returned

Data Usage

The image below, generated from data usage statistics collected by BT, gives a visual indication of the data usage at the BEN site as clinicians take up and learn how to use the devices.

The initial spike in usage corresponds with a go live in October followed by a significant reduction in use where connectivity was an issue for the clinicians, then a marked gradual increase which is likely to coincide with the project team actively involving staff and changing of SIM Provision

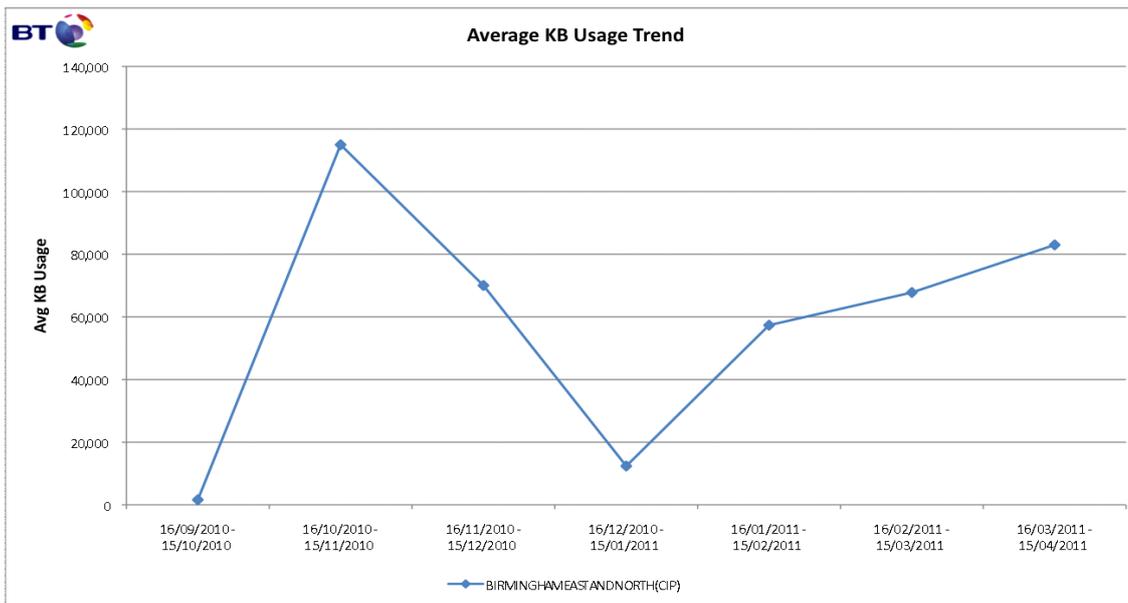


Figure 37 – Data usage trend

Contacts:

During the entire data recording phase, staff at the BEN sites recorded a total of **2185** contacts.

The number of contacts per day for each clinician rose by **53.3** percentage points from Baseline to Benefits 2 (Note: Local reporting shows a higher average number of contacts, but these local reports do still reflect the same increase in activity).

This was attributed to an increase in recording of contacts of the shorter duration.

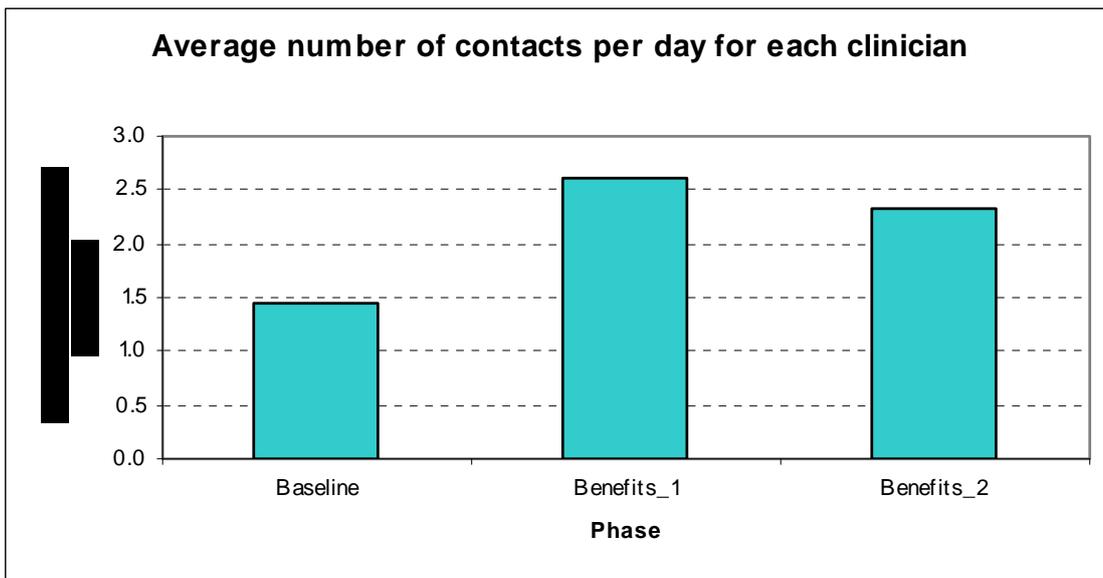


Figure 38 – Average contacts per clinician, per day

The BEN project team confirm that these figures represent the feelings of the clinicians participating in the project, who have subjectively reported an increase in productivity. Local reporting shows higher average contacts but these local reports indicate the same increase in activity

Contacts were broken down by duration, and the results across each time duration can be seen on the following chart:

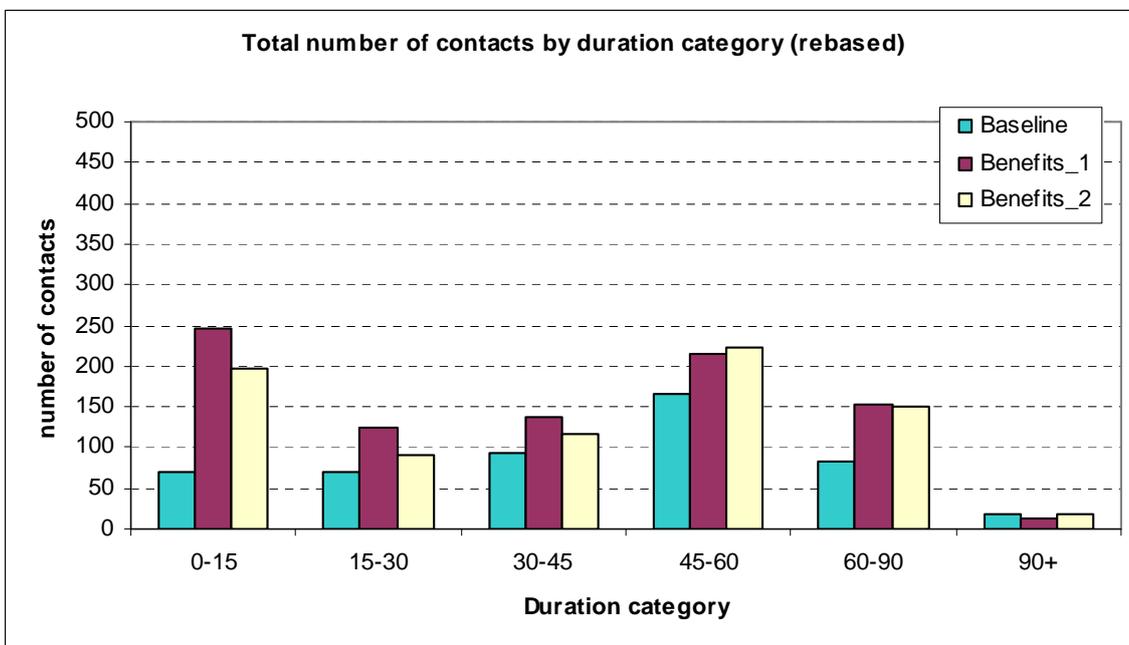


Figure 39 – Total contacts by duration

The above graph shows that contacts have increased across all duration categories.

Duration of face to face contact with patients

The site demonstrated a significant increase in contact time spent with patients, with a **47.3** percentage point increase in the number of minutes spent with patients. It itself this could indicate improve delivery of care or could be as a result of spending more time with patients as data can be recorded during the visit.

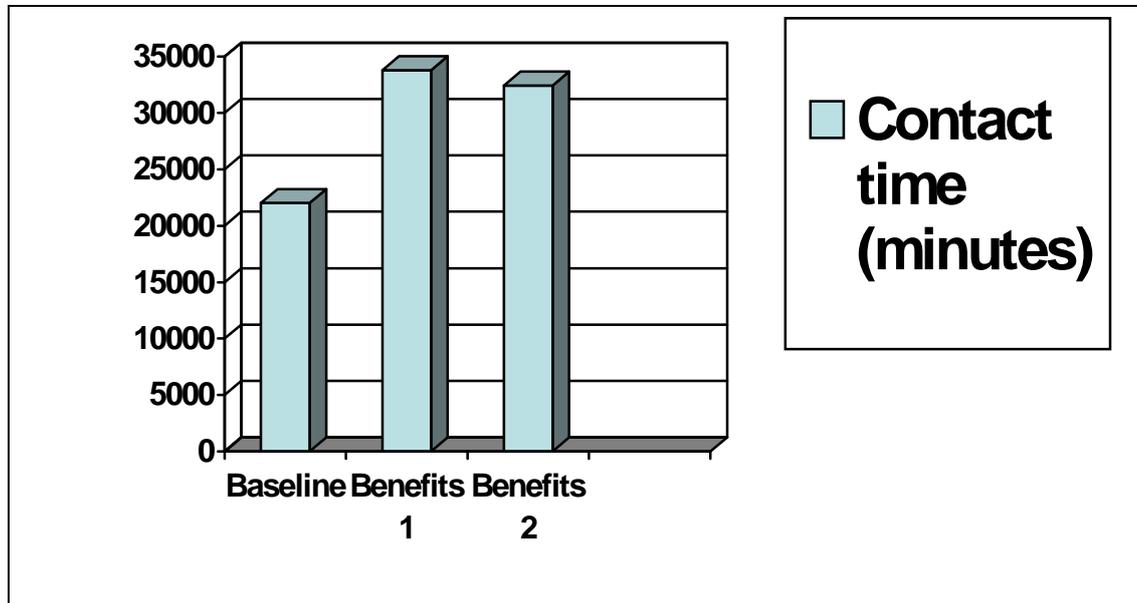


Figure 40 – Contact time (in minutes)

This is in line with the increase in number of contacts seen earlier.

When broken down into the individual services, the metrics for contacts indicate that both of the services recorded significantly increased contacts from Baseline to Benefits 2:

Average contacts per day	Baseline	Benefits 1	Benefits 2	Change
Community team	2.1	3.8	3.2	+ 52.4%
MDT	0.6	0.9	1.0	+ 66.7%

Table 35 – Contacts by service

Journeys:

During the entire data recording phase, staff at the BEN site recorded a total of **2038** journeys.

The average number of journeys per day for each clinician rose by **57.1** percentage points from Baseline to Benefits 2.

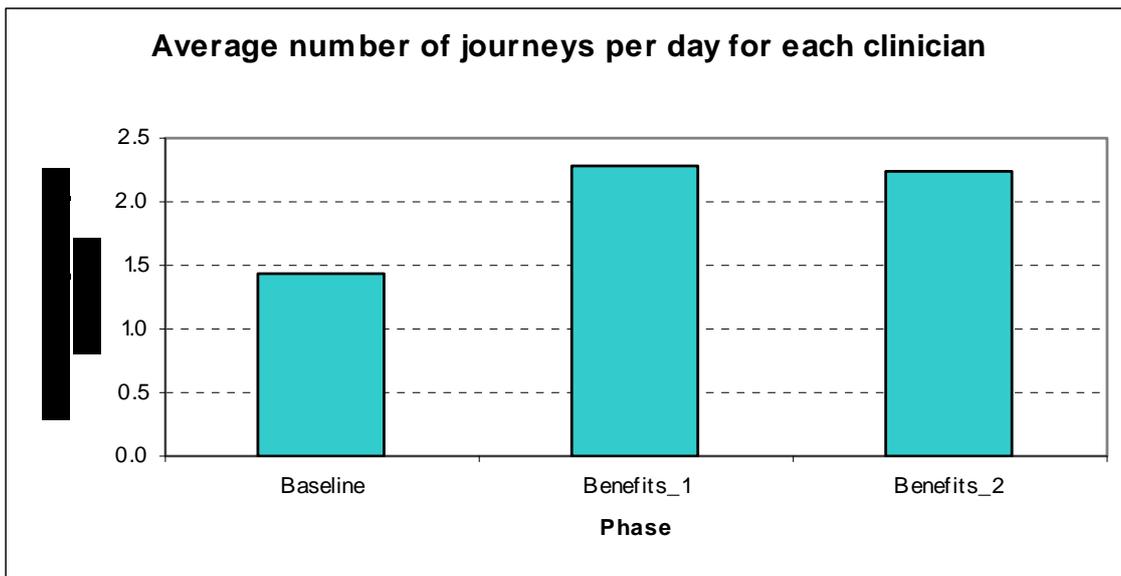


Figure 41 – Average journeys per clinician, per day

Number of journeys has increased slightly more than contacts; however the BEN project team felt this was possibly due to the nature of the Services involved – they are highly specialised and cover a large area, with a significant number of journeys being unavoidable.

Journeys were also broken down into durations, and the results are shown in the following chart:

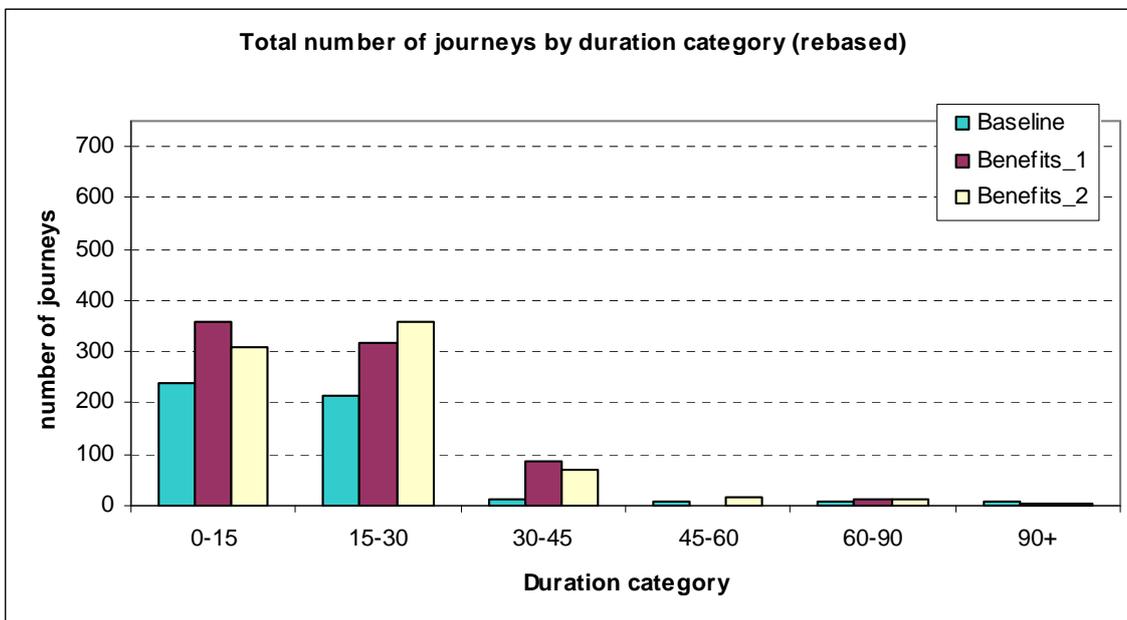


Figure 42 – Total journeys by duration

As with contacts, there is an increase across the duration categories.

Journey durations increased significantly from Baseline to the Benefits 2 collection, with clinicians recording the minutes they spent travelling increased by **69.7** percentage points.

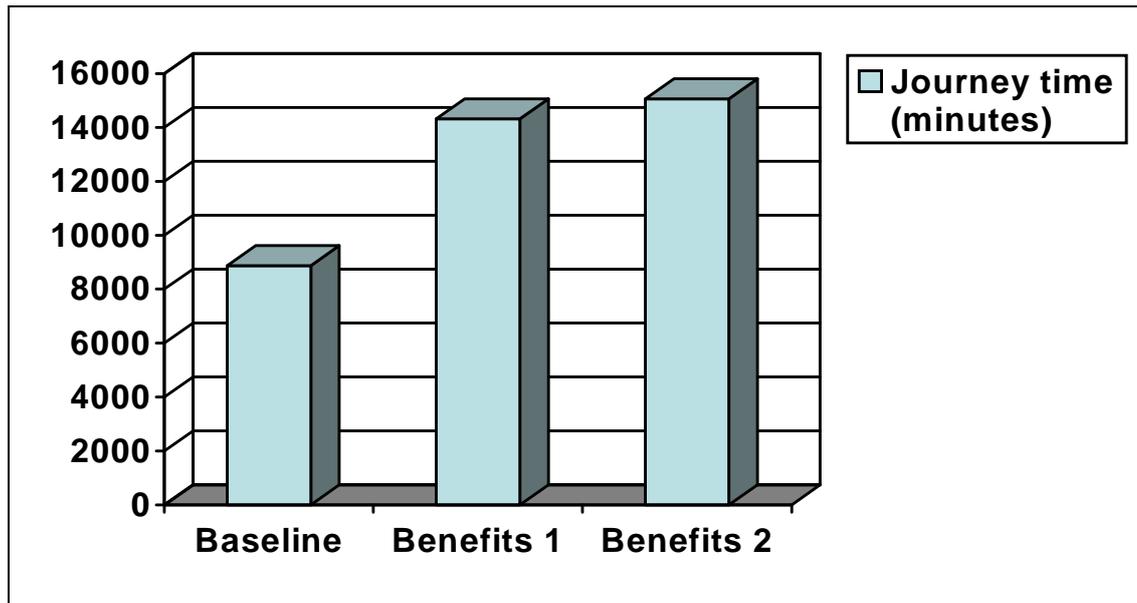


Figure 43 – Journey time (in minutes)

As previously mentioned, the services in the BEN project are highly specialised, in End of Life Care, and cover a large geographical area. Due to the significant increase in activity the project team felt it was inevitable that travel times would also increase significantly. There is very limited scope for improved scheduling/planning due to the sensitive nature of the visits.

When broken down into the individual services, the metrics for journeys indicate that both services increased numbers of journeys per day over the pilot duration:

Average journeys per day	Baseline	Benefits 1	Benefits 2	Change
Community team	1.9	3.0	2.8	+ 47.4%
MDT	0.8	1.3	1.4	+ 75.0%

Table 36 – Journeys by Service

There is a large difference between the two services, which is indicative of the nature of their work and the way in which they work. The MDT is linked much more to a fixed central base where they are reliant on attending daily.

Mileage:

Mileage	#1	#2	Change
All staff (11 returns)	2172.8	1992.1	- 8.3%

Table 37 – Mileage

Mileage claimed for the site over the same period (taken from a sample of 11 clinicians who returned mileage data) indicated that mileage had decreased by **8.3** percent.

Compared to the data collection returns, there were a low number of mileage returns, which may have affected the results. Based on the number of journeys and journey time increasing, it would be expected the mileage would also have increased though some clinicians are no longer returning to base to record clinical information.

Referrals:

In total, **433** referrals were made over the Benefits periods. Clinicians at BEN estimated that due to having access to the devices, they saved **13** potential referrals. This equates to a **2.9%** saving of referrals.

Admissions:

In total, **41** actual admissions to the hospice were made over the Benefits periods. Clinicians at BEN did not record any instances in which the device saved them from making an admission. Though the nature of the service is to maintain care at home for patients who have identified home as their preferred place of care, admissions to the hospice are facilitated where possible for patients who express a wish for hospice in-patient care.

No access visits:

No access visits increased by **31.0** percentage points from the baseline measurement to the second benefits measurement period.

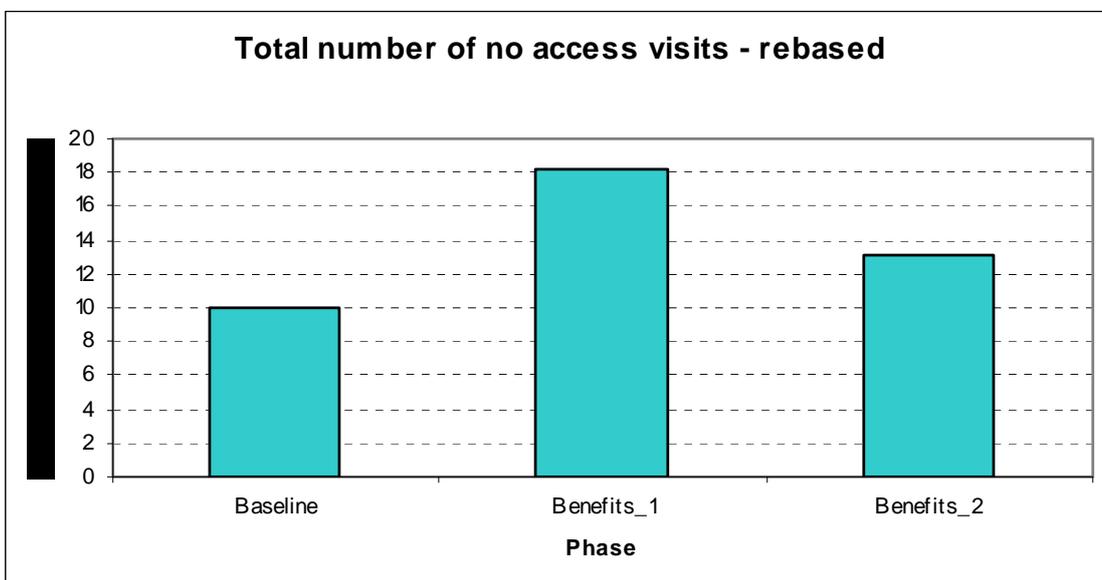


Figure 44 – No access visits

It was felt that this may be due to improved recording of No access visits rather than an actual increase. It would not have been routine for staff to collect data on no access visits prior to the pilot, and therefore the baseline data may not have been that robust. Also the actual numbers involved are very low, so the percentage increase appears, at first glance, to be worse than it actually is.

Duplication of data:

The metrics show an increase in duplication of **87.5** percentage points from the baseline measurement to Benefits 2:

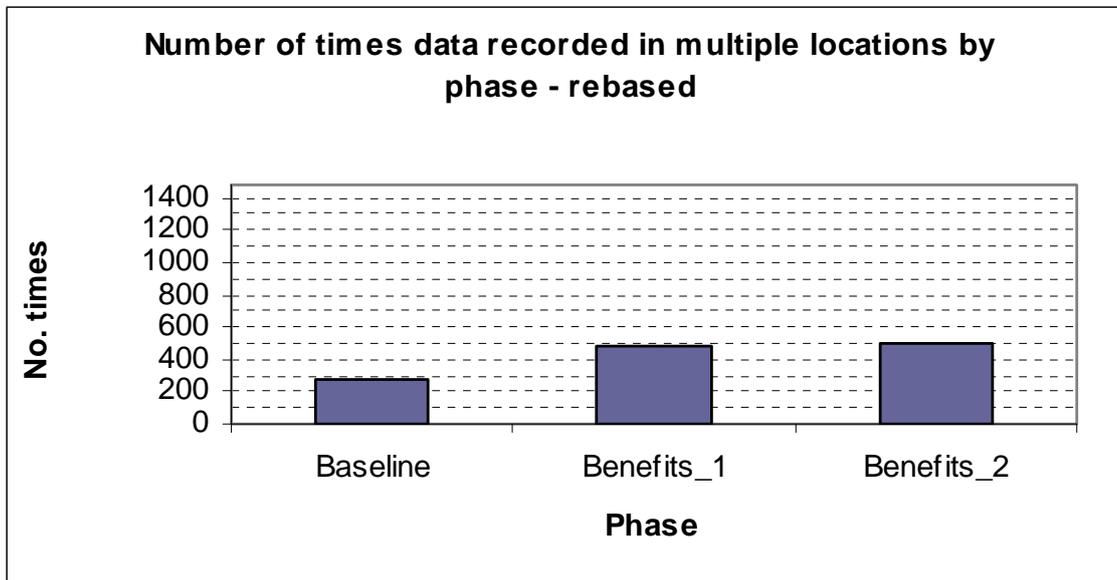


Figure 45 – Duplication of data

The increase may be due limited devices being deployed, therefore existing processes needed to be maintained. Also the deployment of devices coincided with implementation of increased use of functionality in an electronic clinical record – it is possible that with this overlap, users of the device have associated the increased duplication from entering into the electronic clinical record with use of the mobile device, and have captured this on the data recording forms.

The Project team report that this finding conflicts with what users of the devices are reporting subjectively to them – they feel that duplication is reduced by having the mobile device. The BEN project team have taken this finding away for further investigation. Though some duplication will remain as the community service do not use a common EPR.

Duplication of data	Baseline	Benefits 1	Benefits 2	Change
Community team	1.3	2.3	2.2	+ 69.2%
MDT	0.1	0.2	0.3	+ 200%

Table 38 – Data duplication by service

Although both teams have increased duplication, there is a significant difference between the two. This can be attributed to the different ways of working across the two teams. The MDT carries out a significant amount of work in the inpatient unit and day Hospice and must input into the inpatient record, as well as their own record. It is hoped that as the electronic clinical record is rolled out further, this will be used across all areas and can significantly reduce the burden of duplication.

Summary of Metric findings

- Increased contacts and contact durations are achievable, with both staff groups showing this.
- No access visits can be reduced
- Referrals can be avoided. It was unlikely that admissions would be avoided due to the nature of end of life care.

Subjective findings

The items discussed in this section are those findings which were made based upon the subjective comments noted at the pilot site by the MHWP team, or reported in the free text comments on the data returns sheets

Service improvement: Clinicians noted that they feel like this is the first time they have been given a tool which actually enables them to do their job better.

IT literacy: Staff felt that the project had raised their IT literacy skills in areas such as the use of Microsoft Excel and understanding of device connectivity and network connectivity

Flexible working: Using the device can offer great flexibility and empowerment to clinicians, according to BEN staff interviewed. The device allowed them to adopt more flexible ways of working including commencing and concluding their working days from home.

Reduced office congestion: The nature of the service provision meant that daily meetings at the base would be retained for clinical updates and peer support, but staff would spend in general less time in the hospice. In turn, this reduction in need to access the base location also had a beneficial effect on carers' ability to find parking at the hospice when it was really needed.

Improved communication: The devices have improved communications between teams, giving them access to email even when they are away from their base location. They are also more able to share information with patients more easily, for example when giving advice about benefits available and treatment types. The Hospice staff also maintain an official Facebook page, which can now be updated outside of the network in the hospice building.

Equipment ordering: Rapid web based access to loans and stock levels now allows clinical decisions on care to be made and stock to be delivered promptly; the clinician can assess the need and plan care according to the availability of the relevant equipment. Where equipment is unavailable the clinician can quickly plan to make more appropriate arrangements for the patient. Clinicians are now using Internet Explorer on the mobile devices, which allow staff to access the organisation's equipment management service. In the past clinicians had collected equipment orders throughout the day and passed them on to the equipment team at the end of their shifts or at lunchtime, increasing trips back to base. This often created a glut of requests which could result in equipment not being available and alternative arrangements being made. Since clinicians have been able to make live equipment bookings at the point of contact through a web interface, this has spread the workload of the equipment team more evenly across the day and means that the patient is more likely to receive the best equipment for the purpose. This also reduces the resources for printers and faxes as most orders no longer require this process.

Nurse prescribing: BEN staff reported that the ability to use online resources such as the website medicines.org and the Syringe Driver Survey Database (SDSD) at the point of care allowed them to make clinical decisions with increased confidence and speed.

Contemporaneous record keeping: The ability to easily maintain a record of contemporaneous contacts has been of great benefit to BEN staff. Clinicians are now able to fulfil professional guidelines for updating patient records within 24 hours of clinical activity, and this information is then available immediately to other hospice staff working remotely.

Productivity: BEN hospice staff felt that their general productivity was improved by the introduction of mobile devices. This is reflected in the metric data for the site by an increase in visits; however, not all indicators of productivity can be captured by the MHWP benefits questionnaires.

In their own words

The following are examples of direct quotes from clinicians and patients throughout the project, from 3 patients comments and over 60 clinician comments.

Clinician comments

Post-deployment

- “System has been of great benefit with regard accessing patient information. However, it is constantly unreliable with connectivity. I can be half way through something and then I lose connectivity which can be extremely frustrating!”
- “Main advantage at present is due to change of hours/ flexible working able to input data at home.”
- “No connectivity so had to use colleague’s tough book (on joint visit) to access palliative drugs database.”
- “Laptop has been extremely helpful to show patients medications [we are] discussing; however, internet connection extremely slow!”
- “Still having problems with BT connections! Disconnects itself while still working on computer which is very frustrating!!”
- “Generally much improved connectivity, quicker access to all areas.”
- “Connectivity and speed much improved since transferring from orange to BT SIM card.”
- “Inappropriate to use during one visit due to distraction from consultation due to conducting consultation with the assistance of an interpreter.”
- “Toughbook went into hibernation whilst in a patient’s home and then froze. Didn’t want to try reactivating it as it would have taken the focus away from the patient and caused a barrier.”
- “Recent access to system one been good no problems with connection. Only at present used in putting data so benefits are limited. However when able to input patient notes will be more flexibility. As I work part time I find it easier to input data at home to fit around my family/school run etc.”
- “Information giving of dietary needs, mainly communication.”

Service user comments

Post-deployment

- “Not taken into either of these homes as it was not appropriate.”
- “Changing patient to pump feeding, therefore practical communication needed.”
- “Patient discussed recent admission to hospital and the problems that arose during drug rounds when the [hospital] system crashed. She wasn’t impressed.”

Service Changes Seen

- Accessing online equipment ordering from patients homes.
- Changes to working patterns.
- Improved work-life balance for staff.

Conclusions

Impressions and achievements

When interviewed in the months following go-live, project team and staff at John Taylor Hospice all stated that they felt the project had been a success. Feedback across the board is positive, with clinicians stating that it has been a pleasure to take part and very worthwhile. The project has allowed significant changes to working practice, increasing flexibility and productivity as well as improving patient care. Clinicians felt that the greatest achievement from their perspective is the way that the devices have empowered the teams in their working practices, whilst showing trust and respect for their various disciplines. Staff stated that they felt valued, with a good degree of ownership over the project direction. The ability to take decisions over changes in working process and have those changes validated and supported by managers has been a valuable and liberating experience for BEN clinicians.

The project team built a good relationship with BT early in the project, which was beneficial to all parties throughout the pilot.

It was felt that the staff's improved IT skills and the general benefits of using the device would assist greatly in the continued roll out of the full electronic clinical record.

Lessons learned – what would we do differently?

During the initial weeks of the deployment, the project team realised that a 'mix and match' approach to distributing SIM cards would be required in order to achieve the best levels of connectivity for all clinicians. After some experimentation, it was discovered that certain network providers gave better coverage of a specific geographical area covered by one or more clinical users. For future deployments, some smaller-scale testing of the available networks in the different areas before investment would be a good idea.

The value of empowering clinicians by including them in the project process cannot be underestimated, and is one of the most powerful lessons to be learned by other organisations from the BEN project. This deployment methodology renewed appreciation for this fact within the BEN team, ensuring that it will continue to involve clinicians in future deployments.

Future plans for mobile working

- During the ongoing implementation of the full clinical record, the organisation has the ability to plan working processes that allow for mobile access at the point of contact, eventually leading to a significant reduction in paper recording.
- 24/7 technical support, whilst not deemed necessary for the pilot, is being considered by the service for rollout to support future mobile working.
- Subject to the availability of funding, the service has discussed future trialling of a connectivity accelerator (Netmotion) to address network persistence issues experienced during the pilot.

NHS Calderdale

Calderdale & Huddersfield Foundation Trust



Introduction

The application to take part in the MHWP pilot was made by NHS Calderdale on behalf of their community services.

The trust had recently implemented the TPP clinical solution SystmOne to their Adult and Children's Services. Prior to the MHWP implementation, Children's Services were already working in a paper-light way – with working processes geared towards producing as little paper overhead as possible – and Adult Services were also working towards achieving the same goal.

Initial Objectives

The following are the key objectives for the project as outlined by the organisation in the response to the MHWP invitation:

- To deliver a more informed responsive service
- To collect real time feedback from patients as part of the patient involvement strategy
- Support of a single point of access for scheduling
- Reduce the duplication of record keeping
- Maximise patient contact time
- Reduce Travel
- Increase productivity
- Respond quickly to urgent situations and reduce the need for admissions
- Estate rationalisation

About the Project

Project Team

The local project team consisted of:

- Project lead;
- Business change lead (same resource as project manager);
- Clinical lead.

At a Glance

Calderdale	
Number of devices	25
Geography	50% urban, 50% rural
Clinical systems used	SystmOne Community
Non-EPR requirements	Intranet, Internet, web mail, Microsoft Office applications, BNF Online
SIM Provider	BT Mobile & O ₂
Pilot go-live date	18 th October, 2010

Table 39 – At a Glance: Calderdale

Service	Number of Users	Percentage of Service
District Nursing Team	10	14.7%
Community Matrons	10	100%
Specialist Matrons	3	100%
Complex Discharge Matrons	2	100%

Table 40 – At a Glance: Services involved

Project Methodology

The Calderdale pilot was run as an informal project by the IM&T clinical team, with support from the organisation’s Health Informatics Service, following on from the clinical systems implementation project for SystmOne.

In accordance with local governance for the project, the Director of Operations reported progress up to board level and there was clear sponsorship and leadership from the organisation’s managing director of Provider Services.

Documentation produced and seen by the CIP liaison includes the following:

- A monthly report to the organisation’s Business and Planning Meeting.

Change Management, Skills Analysis and Support

Calderdale did not undertake any working process mapping prior to the start of the project. The Productive Community team were made aware of the project and were encouraged to provide input.

Staff were encouraged to make changes independently to their working practices to maximise the benefits from the devices. These changes were not formally documented but they have been fully supported by management.

Details of process changes are discussed in the sections that follow.

IT skills analysis for participating clinicians had recently been undertaken as part of the SystmOne Deployment, and it was not felt necessary to repeat this for the MHWP pilot.

IT support for the pilot was provided by the Health Informatics Service (HIS) via a Service Level Agreement; however, it was not felt by the project team that HIS had been actively involved in the pilot. Because the managed service agreement, users were encouraged to contact the BT Helpdesk for first line support rather than their local IT support.

Additional information

Note: The operational services have been transferred to Calderdale & Huddersfield Foundation Trust and the Calderdale Community Services SystmOne Team has been transferred to The Health Informatics Service (THIS) which is hosted by Calderdale and Huddersfield NHS Foundation Trust (CHFT).

Implementation Technical Detail

Information for this section has been collated from the technical information provided by BT during the implementation phase, as well as from direct discussions with the site project team. Please refer to the glossary of terms for clarification on the meaning of any of the technical items below.

Gold Build – At a Glance

Calderdale opted to accept the standard TCS configurable Gold Build, plus the following items:

- IE Homepage;
- Web mail desktop shortcut;
- Sophos licence username and password;
- 2e2 Safeboot installer.

Clinical System

All of Calderdale's children's and adult services migrated to TPP SystmOne just prior to the commencement of the MHWP pilot. Using the devices, the staff were able to use the SystmOne EPR to input clinical data at the point of care.

Other applications/functionality

As well as the main clinical application, devices deployed were equipped with additional applications intended to assist clinicians in their daily tasks.

Internet Explorer was provided to give the clinician's access to the Internet (including the British National Formulary (BNF) and web mail accounts).

Shared network drives were mapped, giving clinician's real-time access to documents and resources at their base location.

The Microsoft Office suite of applications (including Word and Excel) were provided, to allow users to create, edit and share documents as required.

Technical Issues

Pre-deployment

This section documents any technical issues that arose for the pilot site during the pre-deployment phase.

Calderdale had a relatively smooth pre-deployment phase, resulting in them being the third site to go live overall. Issues encountered were focused around Gold Build items and caused only minor delays to the go-live date.

The first delay was administrative rather than technical, with delivery of the licences for Sophos (anti-virus software) delayed by one week. The second delay was related to a problem with Safeboot (encryption software) that affected eight out of the eleven pilot sites at the same time. The problem was fixed within a week, and the deployment went ahead as planned.

The Calderdale MHWP pilot went live on October 18th, 2010.

Post-deployment

In the absence of a local IT support desk, first line support was provided by the BT helpdesk. A total of 61 issues were raised during the project period to the helpdesk. Please refer to the glossary of terms for clarification on the purpose of any of the technical items below:

- 44 issues related to the devices:
 - 20 MobileXpress;
 - 12 VPN issues;
 - 7 Safeboot issues;
 - 3 settings/configuration issues;
 - 1 communications failure issues;
 - 1 damaged device.
- 3 issues related to peripherals:
 - 2 smartcard faulty/lost;
 - 1 SIM swap.
- 14 issues related to Windows OS:
 - 10 application not responding;
 - 3 information required;
 - 1 clinical system.

The Calderdale site experienced some difficulties in completing and submitting the MHWP data collection spreadsheets, possibly due to the macros used within them. Those clinicians who were unable to complete the form electronically preferred to print out the form and fill it in by hand. The project lead then collected these hard copies, scanned them in and emailed them back to the MHWP project team, this method of collation of data made analysis difficult.

General issues

Variable connectivity proved to be an issue for Calderdale as for many of the other sites in the pilot study. Investigations into network provider coverage leading to the switching of SIMs may help future users maximise the coverage that they can achieve, but for the pilot, connectivity and slow connection speeds proved to be the biggest single issue affecting use of the devices.

Users at Calderdale noted that hibernation presets caused the device to shut down and log them out of secure sessions at inconveniently short intervals. This is a device setting issue that is relatively easy to fix, and this could have been dealt with much more quickly if Calderdale had benefitted from an effective local IT support helpdesk.

Some users reported that the battery life was not always sufficient to last for a full shift with heavy use. Port replicators or chargers were recommended to be available at base locations and (where applicable) at clinicians were advised to charge devices overnight between shifts.

The absence of a local IT support helpdesk for the Calderdale clinicians proved to be a real frustration in the reporting and resolution of issues. Clinical time was eaten away waiting for the resolution of problems that could have been monitored and addressed more easily by a local team.

Study Findings

Metrics

The following section provides a summary of the metric analysis, collated from the spreadsheets returned to the MHWP team.

The table below gives an indication of the level of returns submitted by the 25 staff taking part at the Calderdale pilot site. As discussed earlier in the report not all the returns could be used in the analysis.

Returns: overview

Returns	Percentage of users returning data
Baseline data	96%
Mileage month 1	88%
Mileage month 2	88%
Benefits month 1	80%
Benefits month 2	92%
Average return rate	89%

Table 41 – Rate of returns: Calderdale

Metrics: overview

Clinicians	Number in project	Baseline Returns	Benefits 1 returns	Benefits 2 returns
District Nursing	10	10	9	10
Specialist Nursing*	15	14	10	12
Total	25	24	19	22

Table 42 – Overview of Returns used in analysis

* Specialist Nursing includes Community Matrons, Specialist Matrons and Complex Discharge Matrons (applies to all metric data)

Days data	Baseline	Benefits 1	Benefits 2	Totals
District Nursing	83	82	149	314
Specialist Nursing	112	136	208	456
Total	195	218	357	770

Table 43 – Overview of Number of Days of data returned

Data Usage

The image below, generated from data usage statistics collected by BT, gives a visual indication of the data usage at the Calderdale with the initial spike site as clinicians are trained and before the devices were deployed, followed by a steady rise and levelling out as the devices are adopted and clinicians become familiar with them.

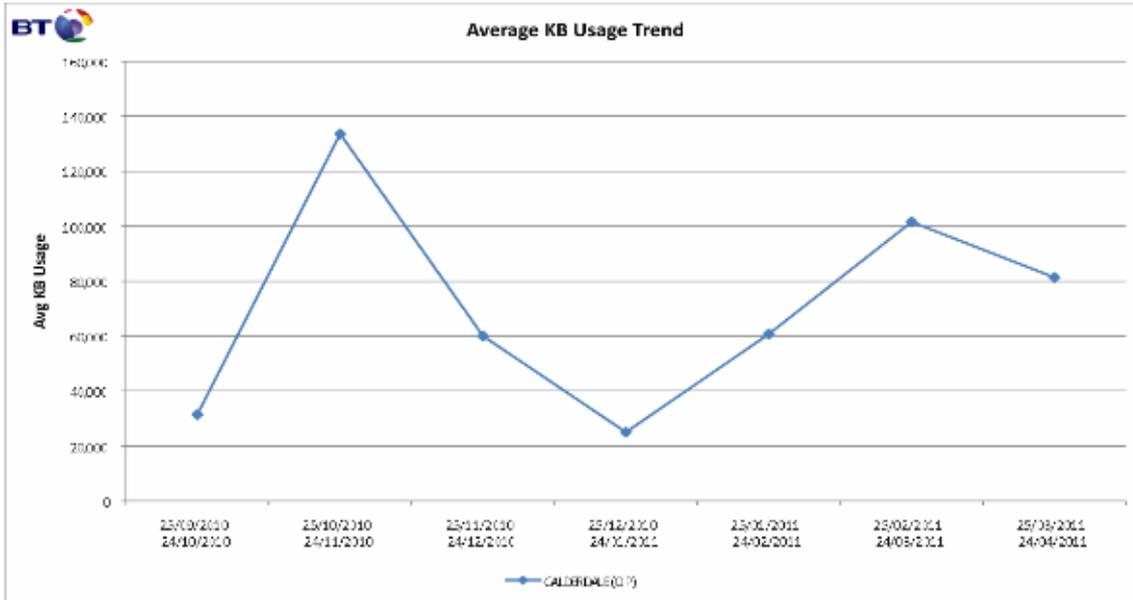


Figure 46 – Data usage trend

Contacts:

During the entire data recording phase, staff at the Calderdale site recorded a total of **2824** contacts.

The number of contacts per day for each clinician rose by **17.8** percentage points from Baseline to Benefits 2.

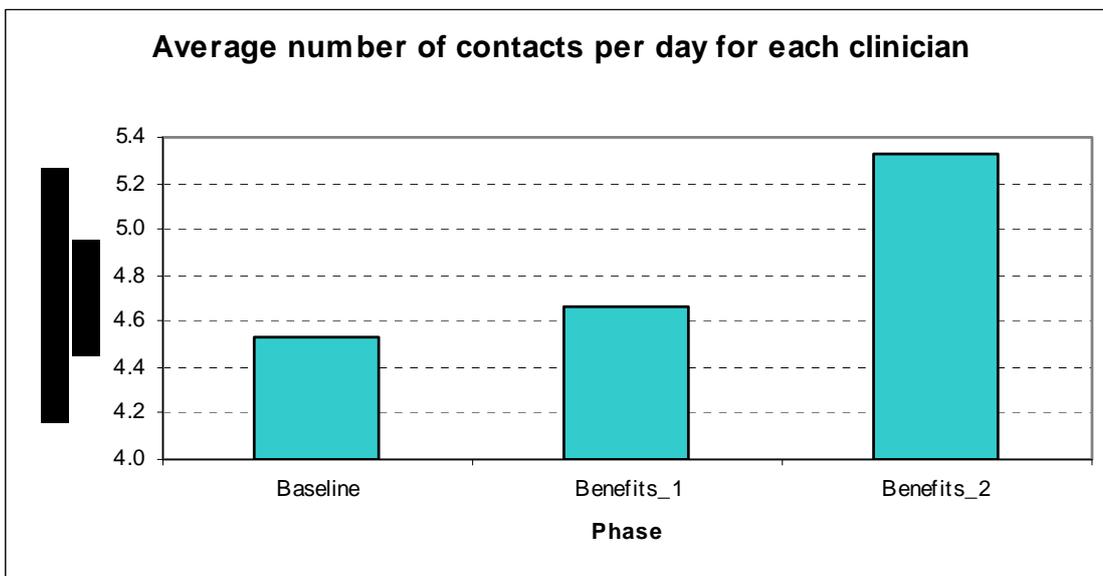


Figure 47 – Average contacts per clinician, per day

Users reported being more effective and efficient in subjective findings which support the increase in contact activity. Calderdale also performed their own analysis from their clinical system for comparative time periods, which fully support the findings regarding increased activity for users of the mobile devices.

Contacts were broken down by duration, and the results across each duration can be seen on the following chart:

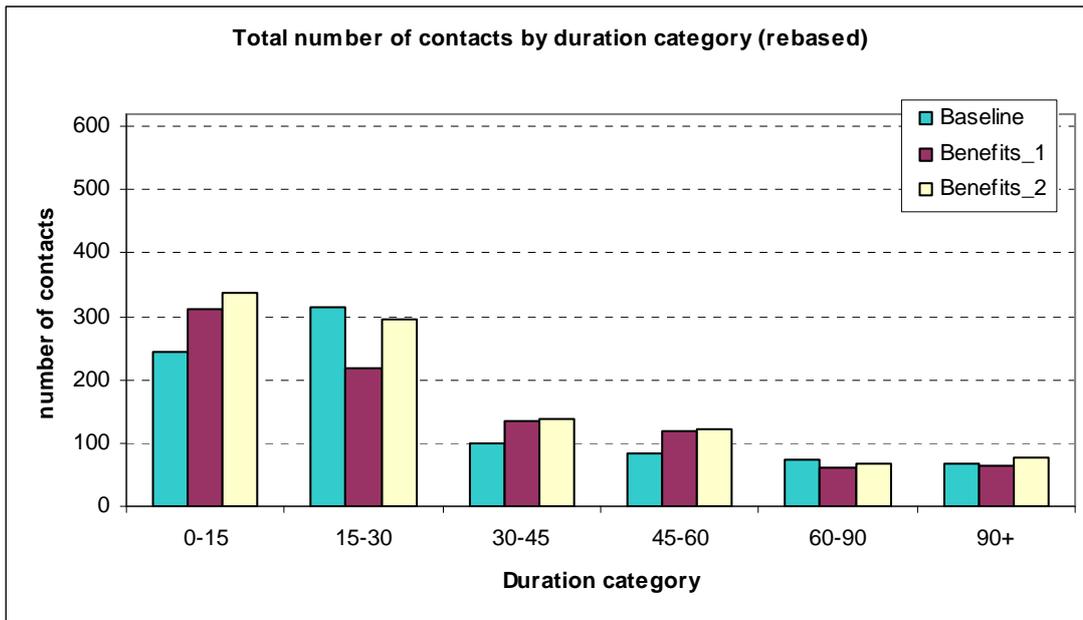


Figure 48 – Total contacts by duration

An increase in contacts is seen across all duration categories, except 60-90min, which shows a very slight drop.

Duration of face to face contact with patients

The site demonstrated a 14.5 percentage point increase in the number of minutes spent with patients:

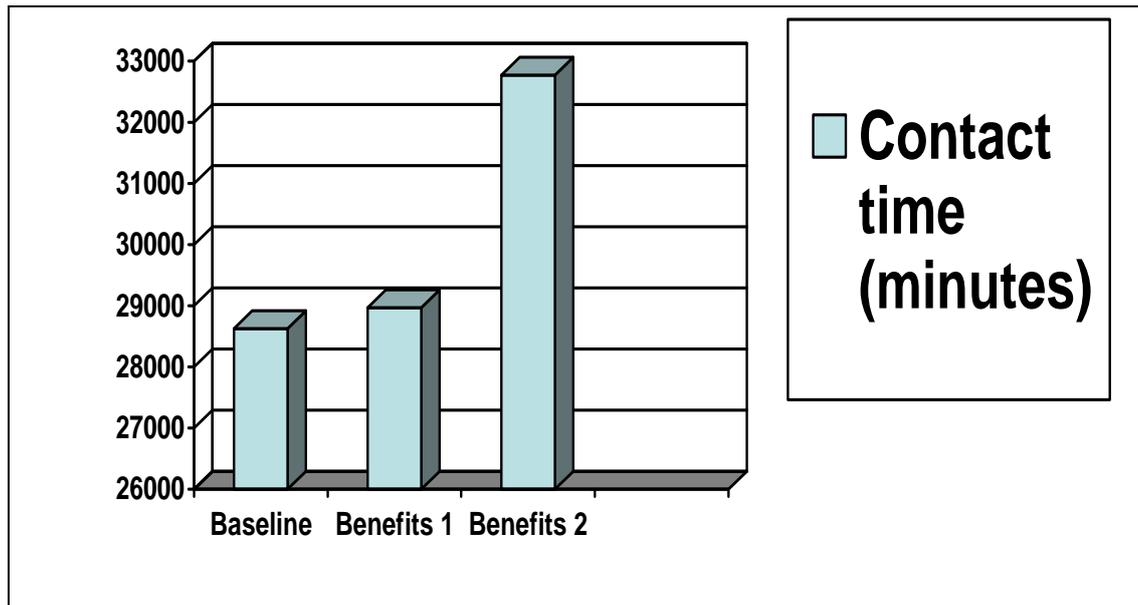


Figure 49 – Contact time (in minutes)

The increase in time spent with patients is directly attributable to the increase in number of contacts.

When broken down into the individual services, the metrics for contacts indicate that both of the services recorded increased contacts from Baseline to Benefits 2, and significant variation across Services is seen:

Average contacts per day	Baseline	Benefits 1	Benefits 2	Change
District Nursing	6.2	6.8	6.9	+ 11.3%
Specialist Nursing	3.2	3.4	4.2	+ 31.3%

Table 44 – Contacts by service

This difference could be accounted for by the number of users in each service that had access to devices – in the Specialist Nursing teams, all members had access to a device, whereas less than 15% of the District nurses had devices, limiting their ability to make transformational change in the Service.

Journeys:

During the entire data recording phase, staff at the Calderdale site recorded a total of **2920** journeys.

The number of journeys per day for each clinician rose by **8.0** percentage points over the course of the pilot.

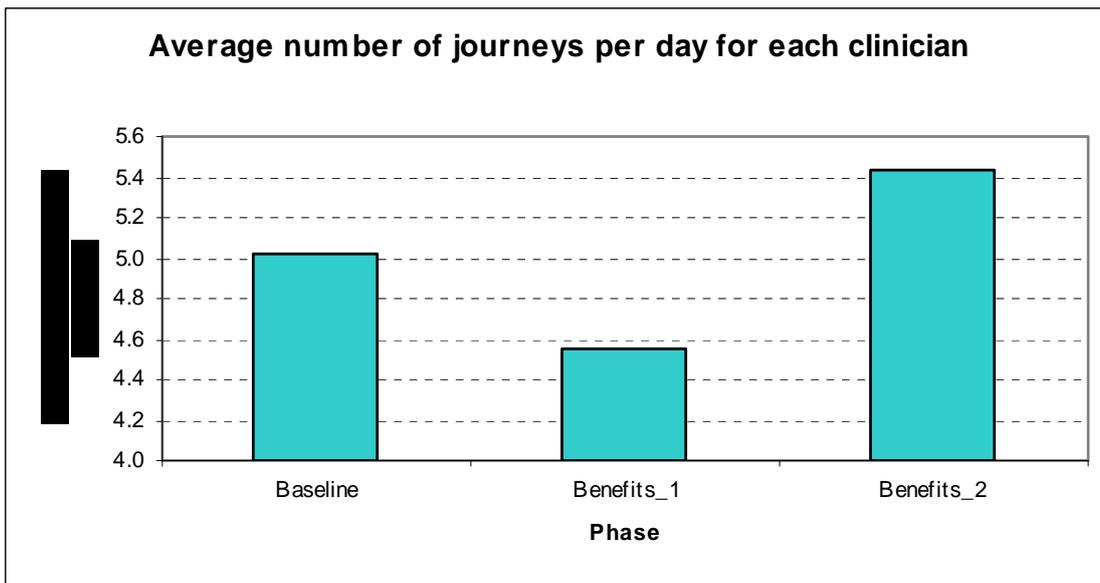


Figure 50 – Average journeys per clinician, per day

Although this shows an increase, it is a smaller increase than for contacts, indicating improved productivity for comparatively lower cost.

Journeys were also broken down into durations, and the results are shown in the following chart:

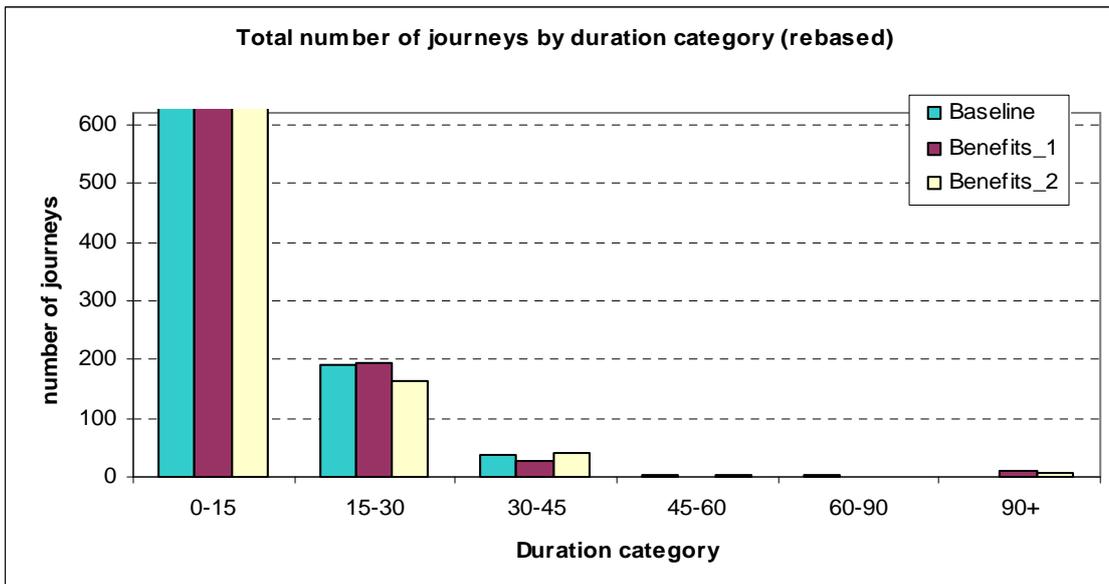


Figure 51 – Total journeys by duration

The journey profile shows a reduction in some mid length journeys (15-30min), but an increase in a couple of the longer duration categories (30-45 and over 90mins).

Journey durations increased by **4.9** percentage points from baseline to the second benefits collection.

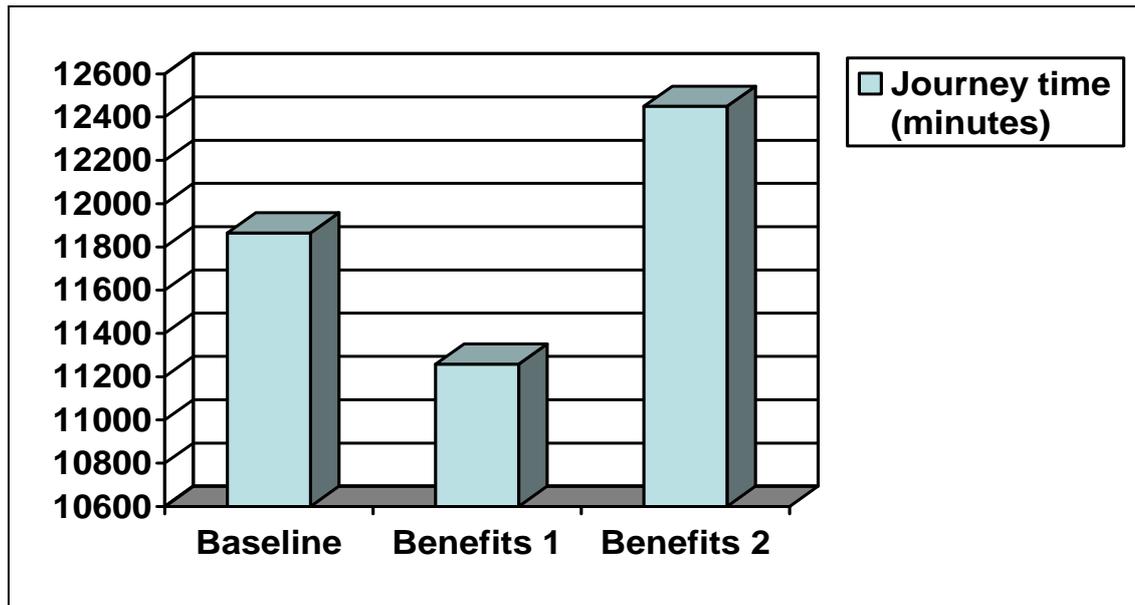


Figure 52 – Journey time (in minutes)

This reflects the change in the journey profile so that although number of journeys increased, the amount of time spent on journeys has not increased as much. This indicates increased planning of journeys and greater efficiency in use of time.

When broken down into the individual services, the metrics for journeys indicate that one service decreased numbers of journeys per day over the pilot duration:

Average journeys per day	Baseline	Benefits 1	Benefits 2	Change
District Nursing	6.5	7.2	8.1	+ 24.6%
Specialist Nursing	3.8	2.9	3.5	- 7.9%

Table 45 – Journeys by service

As previously stated the difference seen across the Services are likely to be due to the amount of change that could be introduced in the Service, which is limited by the availability of devices and the subsequent change in the working process of a service with only partial deployment.

As shown for Specialist Nursing services, it is possible to improve productivity, whilst reducing associated travelling.

Mileage:

Mileage	#1	#2	Change
All staff (16 returns)	3135	3392	+ 8.2%

Table 46 – Mileage

Mileage claimed for the site over the same period (taken from a sample of 16 clinicians who returned mileage data) indicated that mileage had increased by 8.2 percent.

This is calculated from smaller returns than the data collection, therefore may not be as representative, however although an increase is shown the increase is still smaller than the increase in productivity.

Referrals:

In total, **296** referrals were made over the Benefits period. Clinicians at Calderdale estimated that due to having access to the devices, they saved **27** potential referrals. This equates to an **8.4% saving** of referrals.

Admissions:

In total, **30** admissions were made over the Benefits period. Clinicians at Calderdale estimated that due to having access to the devices, they saved **8** potential admissions. This equates to a **21.1% saving** of admissions.

No access visits:

No access visits increased by **17.1** percentage points from the baseline measurement to the second benefits measurement period.

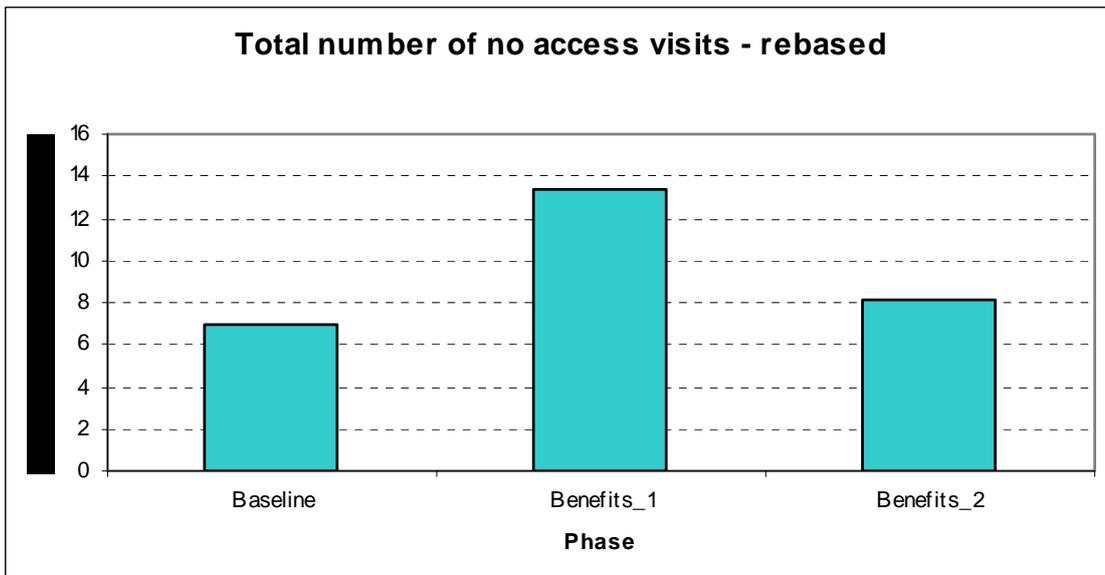


Figure 53 – No access visits

This figure correlates to the increase in contacts seen.

It may be due to an increase in opportunistic visiting resulting in more no access visits, or may be due to improved recording of this information.

Duplication of data:

The recordings taken in the second benefits collection period show an increase in data duplication of **33.3** percentage points from the baseline measurement.

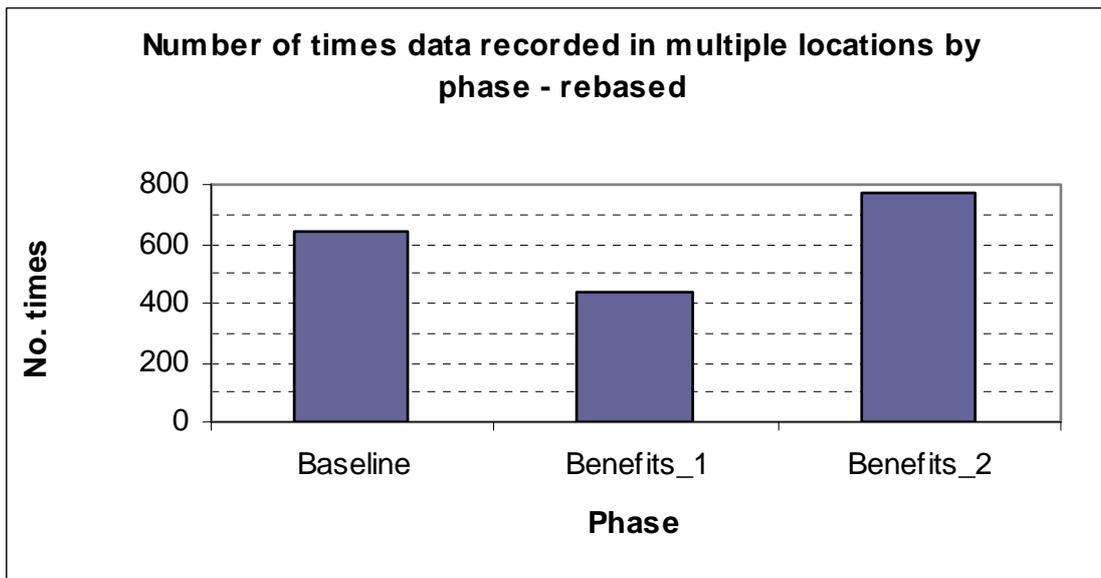


Figure 54 – Duplication of data

This site uses a shared electronic record; therefore the duplication of data could be expected to have reduced.

However when you see the breakdown by Service shown below, you see the huge variation across Services.

Duplication of data	Baseline	Benefits 1	Benefits 2	Change
District Nursing	5.2	5.1	8.6	+ 65.4%
Specialist Nursing	1.9	0.5	0.6	- 68.4%

Table 47 – Data duplication by service

This clearly identifies the ability of a service to make transformational change if most users have access to a device, and the limitations imposed by only having limited numbers of devices deployed.

The overall total has been skewed by the larger numbers reported in the District nursing returns.

Summary of Metric findings

- Contacts can be increased, and number of journeys reduced, demonstrating efficiency.
- Mileage can also be reduced indicating better planning of patient care.
- Savings have been shown in both referrals and admissions.
- The data for Calderdale has been supported by reports from the Clinical Application and was seen to be comparable to the project data, despite the difficulties in data collection.

Subjective findings

The items discussed in this section are those findings which were made based upon the subjective comments noted at the pilot site by the MHWP team, or reported in the free text comments on the data returns sheets

Patient peace of mind: Using the device has allowed Calderdale clinicians to access pathology results directly through the patient record in order to share results with patients at the point of care. This has helped to reduce patient anxieties and promote peace of mind.

Flexible working: Clinicians were pleased that the device offered the ability to work from home and to access their email from wherever a network signal was available. Devices proved especially useful during periods of staff shortages for example due to illness, as clinicians could pick up extra workload at short notice, accessing the latest information about a case through the patient records by using the device, without needing to return to base to read or collect notes. Clinicians can start and end their shifts by logging on to the device at home as well as using office bases other than their own to stop off and update work.

Out of hours and lone working: Having the device has improved conditions for clinicians working alone outside of normal office hours. Staff no longer needed to return to an unoccupied base to enter or retrieve data. Up-to-date patient details are available at short notice through the device, and clinicians can go into a patient's home fully apprised of any risks that have been noted by previous clinicians.

Contemporaneous records: Improved contemporaneous record keeping during out of hours working helps maintain the continuity of 24 hour care, with a reduced risk that vital information will get overlooked in the handover.

Independence: A dedicated piece of mobile kit for each clinician participating in the study meant that it was no longer necessary for those staff to have to wait and take turns in sharing the desktop devices at base locations as they often did previously. Staff also reported being able to use the devices, when undertaking independent study activities.

Internal communications: Through the use of email and messaging using the tasks functionality built into the clinical application, staff at the Calderdale site were able to communicate with colleagues more effectively whilst out in the field.

External communications: Visibility of clinical information for other services enables working process to move closer to the 'seamless' ideal – for example ambulance staff at MDT meetings can relate clinical information to the acute trust.

Service improvements: The project team and clinicians felt that the success of the MHWP pilot would allow them to begin to plan future process change, redesigning working processes with the mobile devices as the 'enabler' for change.

In their own words

The following are examples of direct quotes from clinicians and patients throughout the project with 16 patient comments and over 80 clinician comments.

Clinician comments

Pre-deployment

- “If I had the technology today I could have inputted information onto SystmOne for rapid response team. Instead I had to write it in the house. This duplicates about 1 hrs work. I worked 1 1/2 hours over my shift.”
- “Intermediate care support workers not being able to access the SystmOne caused 2 extra phone calls.”

Post-deployment

- “Very useful to have this device as travelling not good in the snow.”
- “Very useful to have access to SystmOne via Toughbook to record critical issues regarding patients and having to pass on and document this information with extensive multi-disciplinary group member across primary and secondary care network.”
- “Not appropriate to use Toughbook with interpreter at patient reviews.”
- “Toughbook light, user friendly and proved easy to use in either patient’s home or in the car.”
- ““Computer goes into hibernation too quickly and takes a lot of time up rebooting. Maybe this problem can be solved. However this does not out weigh the overall benefits.”
- Patient notes on system before weekend.”
- “Used Toughbook at patient house x 2 checking on previous consultations - worked well.”
- “Late start - working until 7pm. Laptop essential at these times.”
- “Patient thought it was a good idea. Only able to use in patient’s home as I had a student D/N with me who was able to perform care whilst I inputted details.”
- “I was able to use info with consent from patient to share with paramedics i.e., allergies, prior medical history.”
- “Able to work much more closely with Intermediate care because I could follow all the information I needed prior to visiting. Saved time in asking unnecessary questions.”
- “Been brilliant in a Community Matron meeting as date in front of us. Off duty sent straight off. Saved another hour’s work.”
- “Had to get a courtesy car this morning. Because I had my mobile device was able to sort out 4 patients - reply to answer-phone message which left no call back number and sort out emails before I went. This would have been backlogged during the day if I had had to go to a centre to use computer.”
- “Just got a lot of work done. All recorded and new referrals dealt with. I would not have managed to do as much if I could not work at home.”
- “Able to communicate better with DNs and specialist nurses as input is done quicker and available to use.”
- “Took to meeting - did off duty and sent it out by email straight away.”
- “Unable to get signal for 1hr. 2hrs taken ringing BT and IT (BT very helpful).”

National Mobile Health Worker Project: Progress Report

- “Positive; patient did not find it intrusive or a hindrance to effective communication during consultation.”
- “Health benefits for health care professionals related to shorter periods entering patient data at time of visit, rather than longer periods sitting at computer entering data for several patients. Facilitates improved posture. Prevents back strain, repetitive joint injuries.”
- “Immediate access to send GP task to refer to consultation notes and address issues as requested.”
- “Useful in data access from device for colleague to access their data and arrange visit. Prevented journey for medical notes.”
- “Worked well in accessing new patient information following recent stay in rapid response unit.”
- “Access data following peer off sick. Enable to access patient information, save journey time and carry out a prompt assessment.”
- “Could access RR data following new patient referral, able to then structure a clear management plan.”

Service user comments

Post-deployment

- “Patient felt reassured that I had access to appropriate information.”
- “Welcomed the use of mobile device.”
- Client comment: “Very proactive.”
- “Patient took interest and became more communicative.”
- Client comment: “Efficient use of time.”
- “Thinks it’s useful to access medical data in own home.”
- “Happy for sharing and wish the hospitals did the same.”
- “Patient noted that it will save me time having to document results twice.”
- “Patient appreciated that new system in place to facilitate improved sharing of records.”
- “Very proactive comments concerning will ensure earlier documentation onto data base to share with other health care professionals.”
- “Patient stated that she felt comfortable with me using Toughbook, and appreciated new technology.”
- “Proactive comments, appreciating that it can make record keeping easier to document.”
- “Access to health promotion information to facilitate understanding and rational regarding why further treatment required.”
- “Patient pleased that I can accept past reference/data whilst in the property.”
- “Useful tool to access recent HCP visits and note previous management plan.”
- “Family commented on benefit of not having to duplicate and write information in several places.”

Service Changes Seen

- Changes to working patterns
- Improved sharing of information

Conclusions

Impressions and achievements

The timing of the project raised some difficulties relating to the recent implementation of the clinical application and general organisational change.

Teams taking part were already stretched, dealing with vacancies and local changes (including handling four office moves in just twelve months). This did not create a stable atmosphere from which to introduce widespread working process change, structured or otherwise. Despite the organisational changes throughout the project, the services still achieved productivity increases.

Despite the difficulties of circumstance around the pilot, clinicians felt that the devices helped them to look at how to use applications differently and how to plan to use technology to improve working processes.

Benefits such as the ability to use alternate base locations and free up desktop PCs has allowed the consideration of a long term plan to reduce estates and free up finances that could be put to better use elsewhere.

Overall those taking part admitted that they could see the potential of the devices to help services become more efficient and move forward into the 21st century.

Lessons learned – what would we do differently?

Connectivity caused the biggest issue for users, and before undertaking another project of this kind, some resolution in terms of approach for dealing with this would need to be reached.

A local IT support helpdesk is also very important to prevent clinicians from wasting valuable time chasing or waiting for technical issues to be resolved.

Future plans for mobile working

- Implementation of a single point of access.
- Wider use of the Clinical Application and use of tasks for improved communications.
- Will hold Buffer stock of devices locally to support clinicians more responsively.
- Consideration of FON network for improved connectivity.

City and Hackney Teaching Primary Care Trust



Introduction

City and Hackney Community Services are based in the city of London. The application to take part in the MHWP pilot study was made by NHS City and Hackney Community Health Services (CHS) and supported by the organisation's Director of Community Health Services.

Initial Objectives

The following are the key objectives for the project as outlined by the organisation in the response to the MHWP invitation:

- Mobile working is a key development area in the organisation's operating plan and will help deliver on the 'Closer to Home' NHS strategy.
- Significant reduction in duplication of work leading to improved productivity and helping services to meet efficiency savings.
- Improvement in data quality with clinicians accessing real time data remotely during consultations in patients' homes.
- Provide widespread access to the RiO clinical systems to ensure continuity, business readiness and realisation of RiO objectives.

About the Project

Project Team

The local project team consisted of:

- Project lead;
- Technical lead (same resource as project manager);
- Business change lead (available as a resource to the project);
- Clinical lead (available as a resource to the project).

At a Glance

City & Hackney	
Number of devices	25
Geography	100% urban
Clinical systems used	RiO
Non-EPR requirements	Shared drive access, Therapy Support Systems, Communicate and Print software for SLT, Learning Trust's web mail for Children's services
SIM Provider	BT Mobile
Pilot go-live date	13 th December, 2010

Table 48 – At a Glance: City & Hackney

Service	Number of Users	Percentage of Service
Speech and Language therapists	8	20%
Children and Families	9	25%
Modern Matrons	8	25%

Table 49 – At a Glance: Services involved

Project Methodology

The City and Hackney pilot was run as a work stream forming part of the existing RiO implementation. There was clear sponsorship and highlight reports were taken to the RiO project board for recommendations and action.

Documentation produced and seen by the CIP liaison includes the following:

- Business case;
- Three highlight reports during the deployment period;
- A patient information leaflet detailing any changes that patients could expect with the adoption of mobile devices.

Change Management, Skills Analysis and Support

City and Hackney did not undertake any specific process mapping prior to the start of the pilot, as similar work had been carried out for the RiO implementation.

Staff were encouraged to make local changes to their working practices. These changes were not documented for the pilot study.

IT skills analysis was not undertaken for the pilot study. Staff participating in the pilot were already using RiO clinical application and it was determined that they did not require any further support to use the mobile devices.

Ostensibly, IT support was provided by the local helpdesk. In reality, the project manager acted as the single point of contact for all incoming staff issues. The project manager was responsible for triage of support calls from clinicians. Problems that could not be solved locally were referred on to the BT helpdesk.

Implementation Technical Detail

Information for this section has been collated from the technical information provided by BT during the implementation phase, as well as from direct discussions with the site project team. Please refer to the glossary of terms for clarification on the meaning of any of the technical items below.

Gold Build – At a Glance

City and Hackney opted to accept the standard TCS configurable Gold Build, plus the following items:

- RiO shortcuts / RiO DropZone Registry settings.
- AcceleNet client.
- Check Point VPN client.
- Communicate and Print installer.
- Sophos licence username and password.
- Check Point Pointsec PC encryption.

Clinical System

With the exception of Speech and Language Therapists (SLTs), all of the clinicians at the City and Hackney pilot site were live users of RiO EPR functionality at the commencement of the pilot study. SLTs began using RiO in January 2011, a few weeks after MHWP pilot go-live.

Other applications/functionality

As well as the main clinical application, devices deployed were equipped with additional applications intended to assist clinicians in their daily tasks.

Internet Explorer was provided to give clinician's access to the Internet (including the organisation's web mail accounts).

Shared network drives were mapped, giving clinician's real-time access to documents and resources at their base location.

Also included in the build were facilities that were already being used by staff such as Communicate and Print (used by Speech and Language Therapists).

Technical Issues

Pre-deployment

This section documents any technical issues that arose for the pilot site during the pre-deployment phase.

The City and Hackney pre-deployment phase suffered delays, resulting in the site being the last of the eleven to go live.

Following pilot kick-off in August, the MHWP encountered some difficulties with staff availability delaying conference calls, resulting in delays on vital decision-making from the outset.

Further delays were incurred when deadlines for installation of software were missed, and the incorrect installation of the VPN client meant a revised gold build was required and in turn this led to delays in user training. All of this moved the go-live date back from the originally intended date of October 8th.

The City and Hackney MHWP pilot was live on December 13th, 2010.

Post-deployment

A total of 3 issues were raised during the project period to the BT helpdesk, including:

- 1 issue relating to the device (initial build);
- 2 related to the Windows Operating System (application not responding).
- Clinicians at City & Hackney experienced some difficulty with the completion and submission of the MHWP baseline and benefit measurement tools, and several records were submitted in hardcopy form to the MHWP project team.

General issues

Effective and consistent technical support was an issue for the project. Using the project manager as the single point of contact for technical issues created a bottleneck in problem resolution, particularly where the project manager was unavailable due to absence or other work commitments. Being forced to return to one location to resolve issues was inconvenient for some users and resulted in devices not being used to their full potential.

Persistence of network connectivity has been a problem for users at City and Hackney. With RiO, if network connectivity is lost and the user clicks 'save' or 'submit' on a page, the work is lost. Device settings can be altered to keep the connection alive longer (such as extending the period before hibernation kicks in) but the problem relates mainly to the application rather than the device. A future release of RiO is planned that will address the session state issues with the "store and forward" capability

VPN and token lockouts were a common problem for some users. This was likely due to unfamiliarity of the tokens and the proper procedure for using the tokens.

Training had been cancelled due to pre-deployment issues (including third party software vendors making changes to the firewall).

Training was not given to users on how to use the Excel spreadsheet to record their baseline and benefits data, which resulted in some users resorting to printing out the spreadsheets, filling them in by hand and returning them to the project manager in paper form.

Some users reported that access to internet not always available, and that they were unable to print from device.

Study Findings

Metrics

The following section provides a summary of the metric analysis, collated from the spreadsheets returned to the MHWP team.

The table below gives an indication of the level of returns submitted by the 25 staff taking part at the City and Hackney pilot site. As discussed earlier in the report not all the returns could be used in the analysis.

Returns: overview

Returns	Percentage of users returning data
Baseline data	75%
Mileage month 1	100%
Mileage month 2	100%
Benefits month 1	42%
Benefits month 2	79%
Average return rate	79%

Table 50 – Rate of returns: City & Hackney

Metrics: overview

Clinicians	Number in project	Baseline returns	Benefits 1 returns	Benefits 2 returns
Children's & Family services	9	1	0	6
Modern Matrons	8	5	3	6
Speech & Language Therapists	8	8	3	5
Total	25	14	6	17

Table 51 – Overview of Returns used in analysis

Days data	Baseline	Benefits 1	Benefits 2	Totals
Children’s & Family services	15	0	89	104
Modern Matrons	49	28	62	139
Speech & Language Therapists	226	16	64	306
Total	290	44	215	549

Table 52 – Overview of Number of Days of data returned

Data Usage

The image below, generated from data usage statistics collected by BT, gives a visual indication of the data usage at the City and Hackney site as clinicians were training on the devices prior to the second rise in usage after the go live in December.

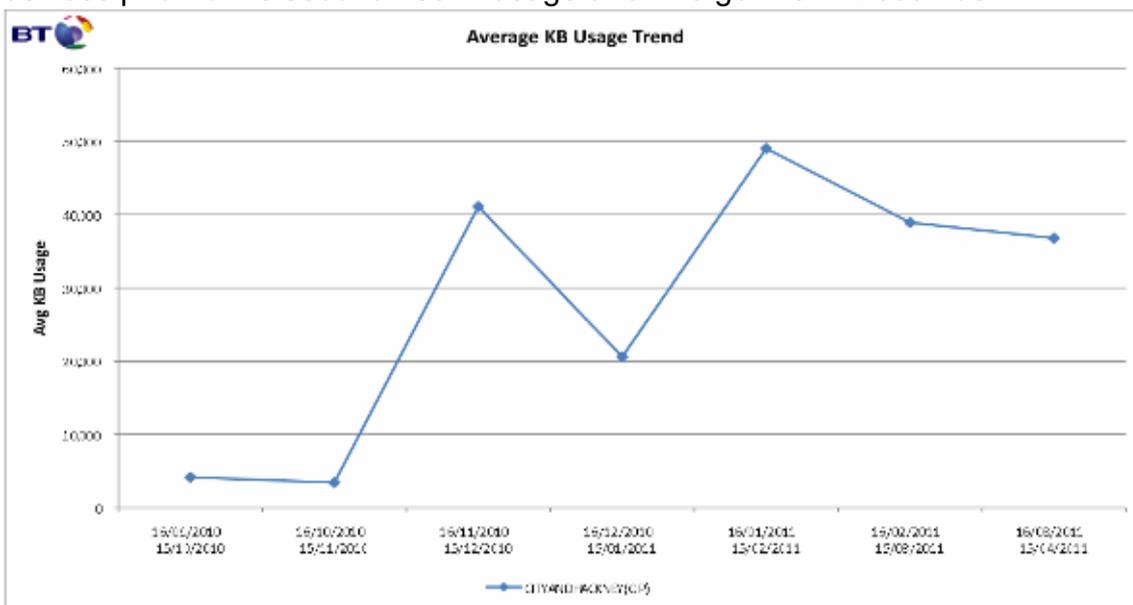


Figure 55 – Data usage trend

Contacts:

During the entire data recording phase, staff at the City and Hackney site recorded a total of **4321** contacts.

The number of contacts per day for each clinician fell by **31.7** percentage points from Baseline to Benefits 2

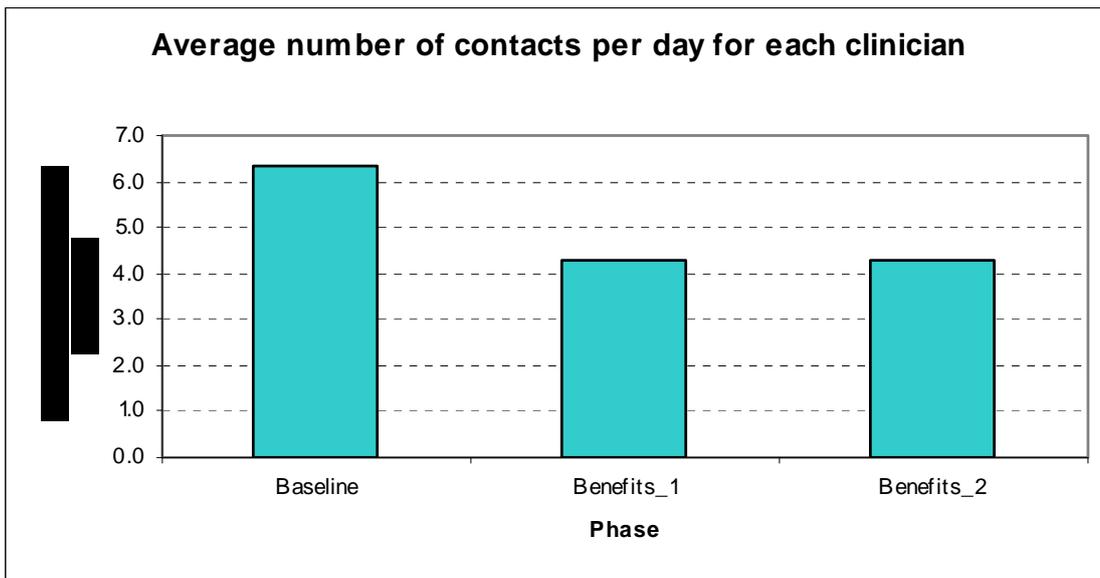


Figure 56 – Average contacts per clinician, per day

The fall in contacts could be attributed to the late go-live for this site. The site only went live on 13th December 2010, and the local project team chose to ask users to start collecting Benefits 1 data immediately, which was then followed immediately by Benefits 2 data collection.

Numbers of data returns for the project was poor which may have adversely affected the results.

Given the short time period between go-live and Benefits 2, it would be expected the contacts would fall, as this is likely to be an equivalent of Benefits 1 data for many of the other sites. If Benefits data had been collected one month later, different results could be expected.

Contacts were broken down into durations, and the results are shown in the following chart:

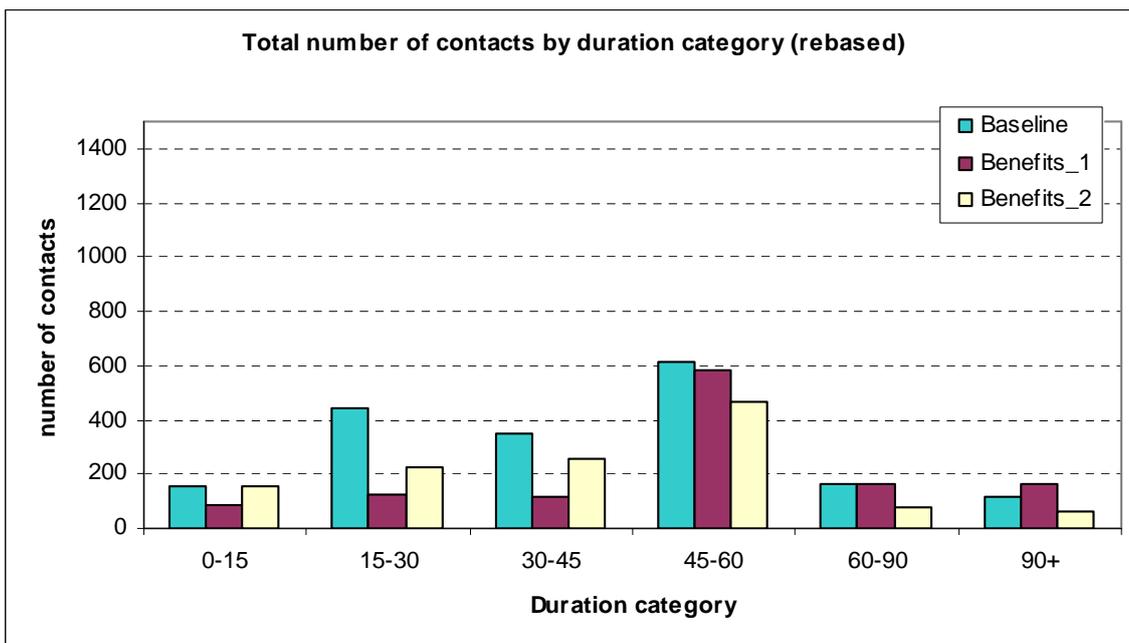


Figure 57 – Total contacts by duration

A fall in contacts can be seen across all contact duration categories.

Duration of face to face contact with patients

The site showed a significant change in contact durations, with a **34.4** percentage point decrease in the number of minutes spent with each patient.

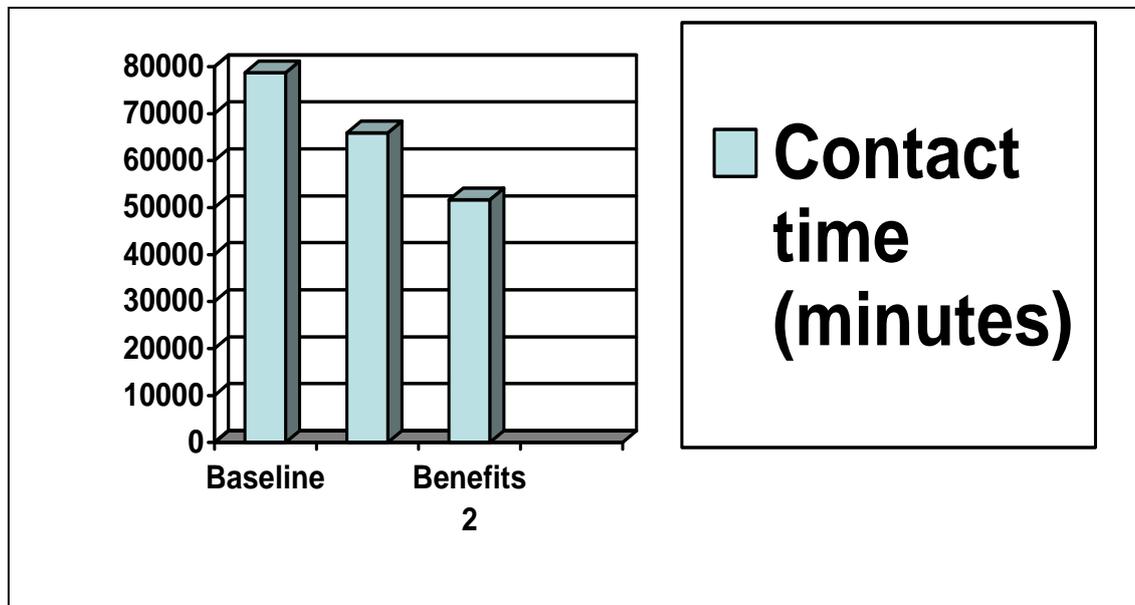


Figure 58 – Contact time (in minutes)

The reduction in time spent with patients is a direct reflection of the reduction in number of contacts.

When broken down into the individual services, the metrics for contacts indicate that all services recorded decreased contacts from Baseline to Benefits 2, and significant variation across Services is seen:

The data for Children and Family services is likely to be unreliable due to only one clinician having recorded any baseline activity.

Average contacts per day	Baseline	Benefits 1	Benefits 2	Change
Children’s & Family Services	8.4	-	2.9	- 65.5%
Modern Matrons	5.5	3.4	4.5	- 18.2%
Speech & Language Therapy	6.4	5.9	6.0	- 6.3%

Table 53 – Contacts by service

Journeys:

During the entire data recording phase, staff at the City and Hackney site recorded a total of **2294** journeys.

The number of journeys per day for each clinician fell by **11.1** percentage points from baseline to Benefits 2.

It is known that some clinicians were reducing the return to base journeys with the availability of the device and this would lead to a reduction in journeys.

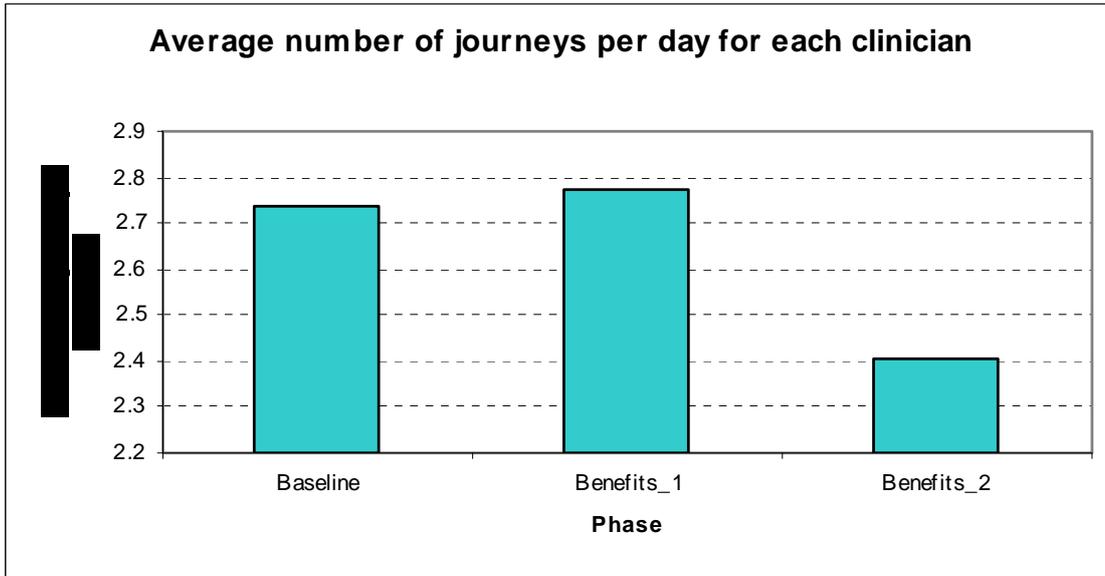


Figure 59 – Total journeys

The number of journeys has fallen by a lesser amount than the number of contacts, indicating that a large amount of journeys are not related to direct clinical activity.

Journeys were also broken down into durations, and the results are shown in the following chart:

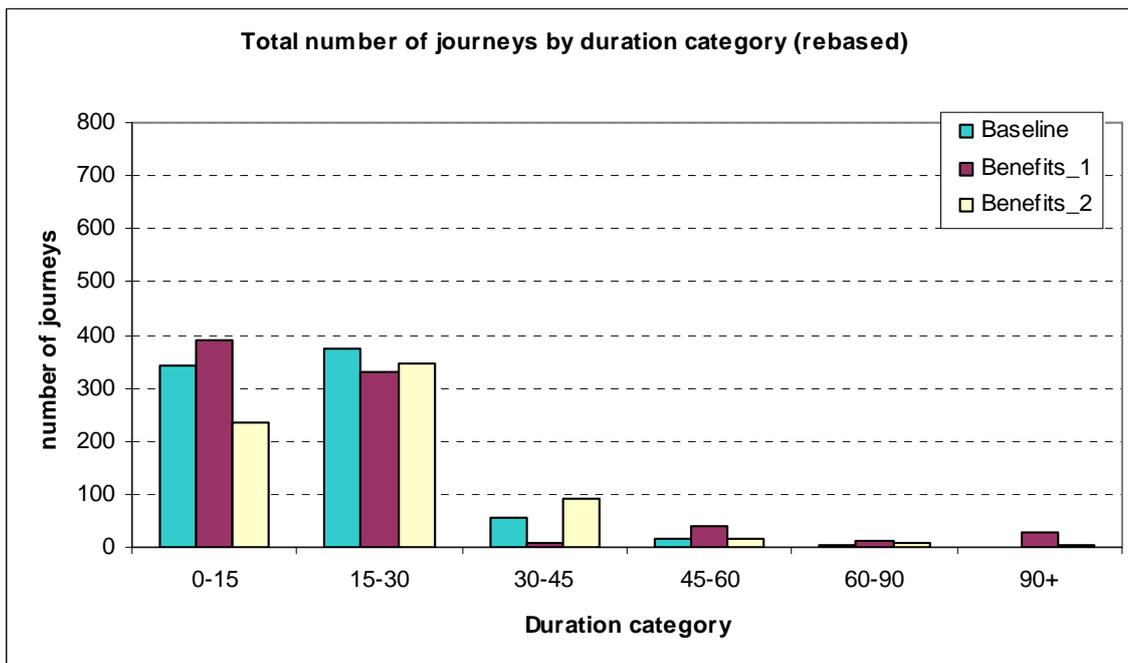


Figure 60 – Total journeys by duration

The graph shows that the number of journeys across all duration categories except 30-45 have fallen. The Project team cannot account for why only the journeys in the 30-45min category have increased.

Journey durations did not change significantly from baseline to the second benefits collection, with clinicians recording on average the minutes they spent travelling increased by 1.9 percentage points.

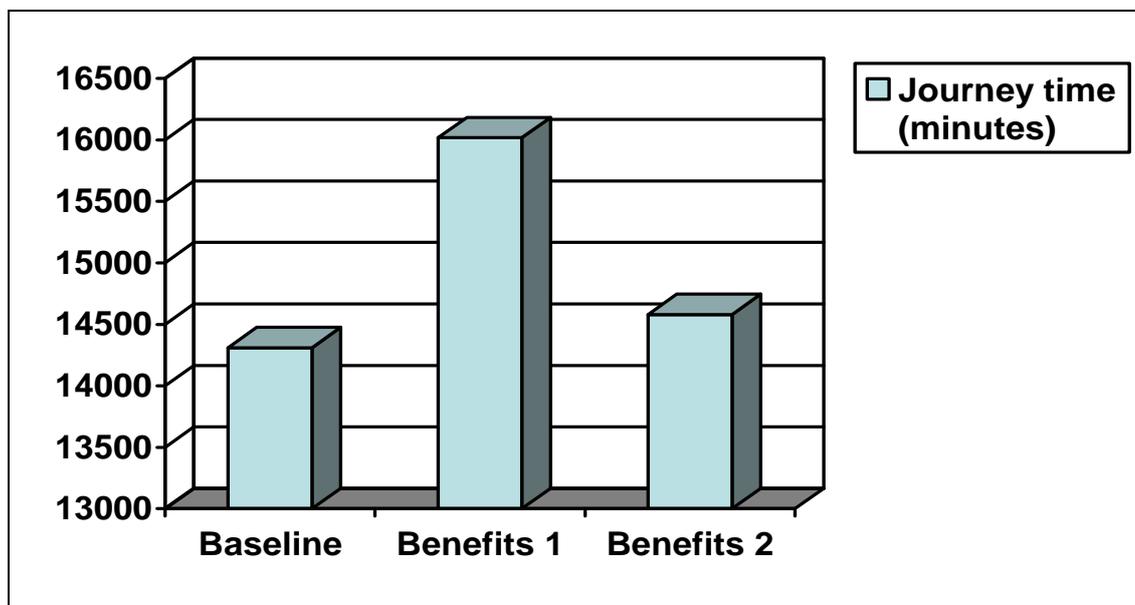


Figure 61 – Journey time (in minutes)

This reflects the change to the journey profile, so that despite number of journeys decreasing by a greater amount, the overall time spent on journeys is relatively stable.

When broken down into the individual services, the metrics for journeys indicate that all services decreased numbers of journeys per day over the pilot duration.

Though again Children and Family services data is likely to be unreliable due to only one clinician recording baseline activity.

Average journeys per day	Baseline	Benefits 1	Benefits 2	Change
Children’s & Family Services	3.9	-	1.6	- 59.0%
Modern Matrons	6.2	4.0	4.7	- 24.2%
Speech & Language Therapy	1.9	0.6	1.3	- 31.6%

Table 54 – Journeys by service

A significant difference across the services can be seen.

Mileage:

Mileage	#1	#2	Change
All staff (3 returns)	496	380	- 23.4%

Table 55 – Mileage

Mileage claimed for the site over the same period (taken from a sample of 3 clinicians who returned mileage data) indicated that mileage had decreased by **23.4** percent.

The data is based on very small returns and may not be representative.

There were significant difficulties in obtaining either mileage or travel related expense information due to the limited submission of this information within the London area. It is expected that this will be the case across any London based organisation.

Referrals:

In total, **70** referrals were made over the Benefits period. Clinicians at City and Hackney estimated that due to having access to the devices, they saved **23** potential referrals. This equates to a **24.7% saving** of referrals.

Admissions:

In total, **18** admissions were made over the Benefits period. Clinicians at City and Hackney did not identify any instances in which the device saved them from making an admission.

No access visits:

No access visits decreased by **51.4** percentage points from the baseline measurement to the second benefits measurement period

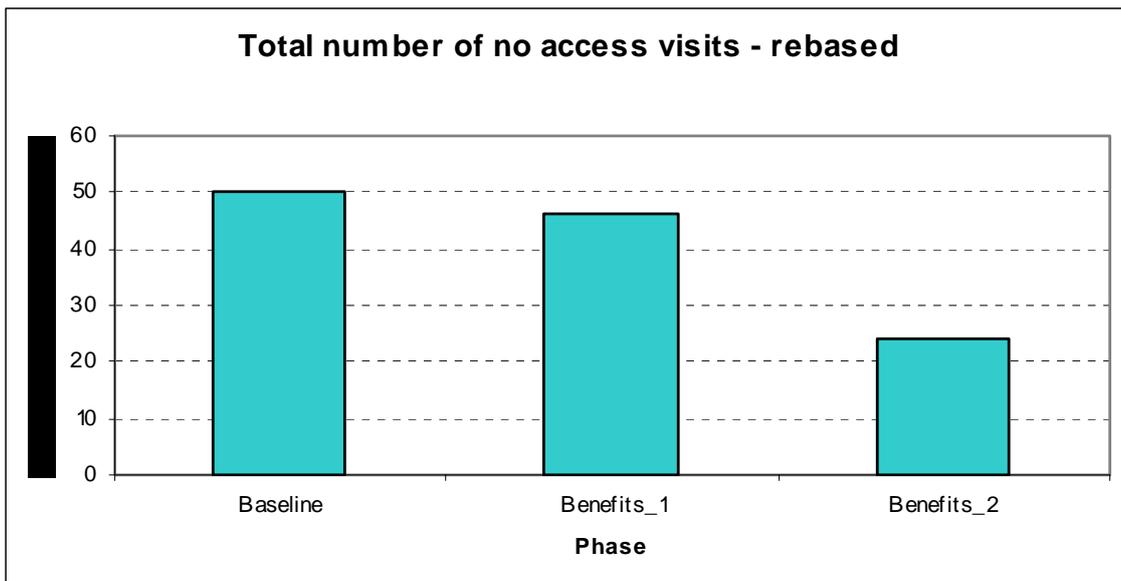


Figure 62 – No access visits

This was likely to be due to the improved access to both clinical and demographic information such as admissions, previous health care information and contact telephone numbers at the point of the visit.

Duplication of data:

The recordings taken in the second benefits collection period show a reduction in data duplication of 7.4 percentage points from the baseline measurement.

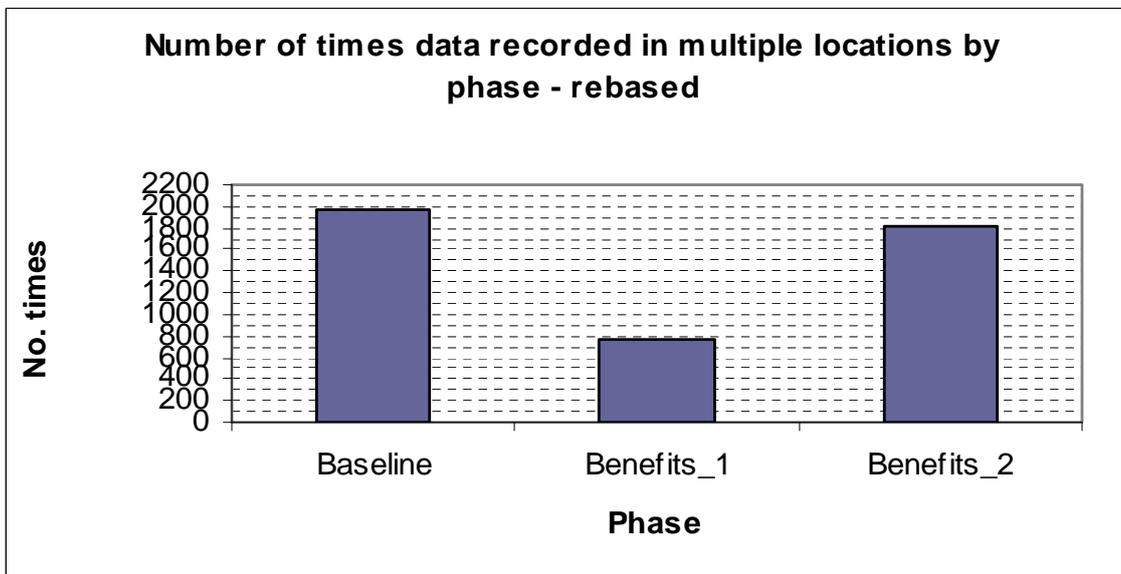


Figure 63 – Duplication of data

The breakdown by Service shown below reveals huge variations across Services.

Duplication of data	Baseline	Benefits 1	Benefits 2	Change
Children's & Family Services	0	-	4.2	+ 420%
Modern Matrons	4.4	1.1	6.5	+ 47.7%
Speech & Language Therapy	7.8	5.4	8.9	+ 14.1%

Table 56 – Data duplication by service

The local project team are not aware of any factors that would cause the huge increase in duplication for Children's and Family Services, and do not think this is a true representation. The team plan to investigate this further.

There is also the dependency on the roll out of RIO as a clinical application on duplication. How mature the EPR was in recording clinical information, as some staff would still be duplicating data until the relevant fields were available.

Summary of Metric findings

- Low returns in Children and Family services may have affected the data.
- There was a very large reduction in no access visits.
- Saving in the avoidance of referrals have been shown.

Subjective findings

The items discussed in this section are those findings which were made based upon the subjective comments noted at the pilot site by the MHWP team, or reported in the free text comments on the data returns sheets

Whole-service transformation: Clinicians felt that the devices made life easier but that it would have been better if the whole team had the technology. Working with only small percentages of the teams having access to the devices was not conducive to wholesale changes in working practice, as this meant that old methods of working must still be observed for members of teams without access to the new technology. Clinical leads expressed a wish to roll out the devices further to other teams who would benefit from the use of mobility.

Data entry: The devices allow patient information to be updated during episodes of care (such as in the patient's home or at vaccination clinics) rather than carrying out data entry administration retrospectively. This encourages best practice and improves data quality. This was especially useful for immunisations, and direct entry into records whilst working within schools, improving contemporaneous record keeping.

Contemporaneous records: Before the introduction of the devices, it was sometimes difficult to meet specified time constraints specifically with regards to case conferences as it could take one or two days to get back to the office to enter data. Clinicians with the devices could enter the data immediately which improved data quality

Joined-up care: Using the devices, clinicians have the ability to follow up A&E discharge slips recorded against the patient record and make any necessary follow-up visits in a timely fashion. This is particularly useful for Children's Services, where clinicians can have instant access to previous problems with a child or access child protection notes even if they are not the key worker assigned to that particular case. Clinicians can use this information to make decisions about care that could be critical to child safety particularly where there are existing concerns.

Note-taking: Clinicians reported that the ability to record notes straight into Microsoft Word during Child Protection Conferences and use this directly as a report was useful and saved a lot of time in retrospective admin.

Out of hours and handover: Having the device has improved conditions for clinicians working outside of normal office hours. Up-to-date patient details are available at short notice through the device, and clinicians can go into a patient's home fully apprised of any recent developments noted by other clinicians. Previous working practices meant that clinical information had to be prepared in advance of weekends and Bank Holidays, this is no longer required.

Continuity of care: Improved contemporaneous record keeping during out of hours working helps maintain the continuity of care between night and day shifts, with a reduced risk that vital information will get overlooked in the handover. Staff can undertake out of hours care from home (the 5pm to 7am service) and this also applies to weekends and Bank Holidays.

Communications: Through the use of email whilst on the move, staff within the City and Hackney pilot were able to communicate with colleagues more effectively. The devices gave staff easier and more direct access to GPs even whilst out in the field through system-based access, and the ability to book joint visits with GP via NHS mail.

External communication: Communication with professionals outside of the organisation has been improved. For example, staff now have experienced the ability to send documents directly to a barrister for tribunals, and have easier/quicker access to GPs. GP contact was felt to be less intrusive, as clinicians had direct access to a duty doctor via the clinical system.

Flexible working: Clinicians were pleased that the device offered the ability to work from home and to access their email from wherever a network signal was available. Clinicians can start and end their shifts by logging on to the device at home as well as using office bases other than their own to stop off and update work. Clinicians felt that they spent less time on planning to handover patient information for Out of Hours (OOH) working, and OOH shifts could now be undertaken from home. There was some concern amongst staff that this could lead to extended working days (or the expectation of them) – staff were encouraged to set their own boundaries to avoid work bleeding over into personal time.

Patient and client satisfaction: Staff at City and Hackney reported that patients and clients were very impressed with the devices.

Reduced admissions: Some clinicians noted that they often had to attend complex cases involving children on ventilators at home. If staff were unable to resolve issues due to a lack of information on the patient, calling for an ambulance and a hospital admission is often the only option. Clinicians felt that timely and accurate information on patients at all times would lead to a reduction in admissions. The metric data collected on admissions during the pilot does not reveal any instances where the clinicians recorded that access to the devices allowed them to prevent any admissions.

Mobile resources: The use of resources such as websites, video clips and images when working with and assessing children allows clinicians to make more informed decisions about care.

Remote working: Clinicians now have the ability to work in schools and children's centres which do not have access to NHS Networks. Staff can now spend more time in schools, which increases the visibility of the service and encourages partnership working. This is very important given that in the future, schools and educational establishments will be commissioners. The devices could also be used at home to access email, meaning that team leaders could still support staff when on leave.

Productivity: Work (such as administrative tasks) can now be carried out between appointments, for example clinicians based in schools or at clinics. The devices gave clinicians the ability to complete administrative tasks in what would have previously been 'dead time' between appointments, such as data entry or making up resource packs.

Security: Security and confidentiality is improved, with the necessity for paper notes reduced and no patient records stored on the device hard drive.

Reduced administrative burden: Staff were able to make local changes to their working practices and could update TSS (Therapy Support Systems) themselves without the need for admin staff to update on their behalf.

Reduced physical burden: Clinicians felt that the devices meant they had less printed notes and summaries to carry around with them.

In their own words

The following are examples of direct quotes from clinicians and patients throughout the project with 4 patients comments and over 50 clinician comments.

Clinician comments

Post-Deployment

- “Following a meeting at school, I had a 1 1/2 hour gap before I could see my next client. I was able to use the Toughbook to update RiO and write reports in school, rather than going back to the office for half an hour.”
- “I will be taking the Toughbook to the school residential where we will be delivering training. There are not enough computers at the venue for the training, so without the Toughbook we would have had to rely on paper handouts.”
- “1 additional journey avoided as phoned beforehand. Child UTA, absent from school.”
- “This is great and facilitates easy documentation and efficient record keeping and reduced duplication/triplication of documentation by clinicians.”
- “Signal has been great this week.”
- “Booking appointments onto RiO using Toughbook, RiO took a long time to complete as data needed updating/adding/clients needed to be added to caseloads.”
- “Running universal group - recorded on RiO, stats and attendance sheet.”
- “Able to record outcomes of groups more quickly this week using RiO.”
- “Groups recorded on RiO using Toughbook, Once no longer need to collect data for stats, the number of places need to record data will drop by a third.”
- “Helpful to have laptop when sharing office with other SLT and we only have one computer between us.”
- “In meetings and delivering staff training all day. Was able to use laptop in caseload meeting to update directly onto the caseload spreadsheet, rather than carrying a paper copy of the caseload to school and then updating later when got back to the office.”
- “Was able to use Toughbook to access the g drive to help prepare power point for school training session, rather than having to go to the Ark, or starting the power point from scratch.”
- “Enable to me check immunisation data and other client details and enter their information.”
- “Staff commented at case conference efficiency of technology was able to check data whilst out of borough.”
- “Using device was able to give blood results when parent requested in clinic.”
- “Rather slow in clients home. RIO input slow as screen "froze" on & off for about 5 mines at a time.”

Service user comments

Post-Deployment

- Client said: “Your job is now very easy with your little computer. And thank you for contacting social services.”

Service Changes Seen

- Working patterns changed.
- Improved record keeping and data quality.

Conclusions

Impressions and achievements

All of the clinicians involved in the pilot have embraced the use of the device, and those who were not selected to take part initially are looking forward to further deployments so that they can take advantage of the benefits across the services.

The project team felt that the MHWP has resulted in an increased use of the clinical application RiO and an increased recording of data across the board. The team were surprised at just how well the clinicians took to the devices, and at the appetite for more to be deployed soon.

Lessons learned – what would we do differently?

The baseline and benefit tools provided by the MHWP team for clinicians to record metric data were not applicable or relevant to all services taking part. They were focused very much on clinicians making home visits, and so do not capture benefits achieved by Speech and Language Therapists working in schools, for example.

Limiting the IT support for clinicians to one contact point (the project manager) caused a lot of frustration for clinicians with issues that needed resolving quickly to allow them to carry on with clinical work.

A local helpdesk designated to deal with issues such as token re sets a requirement for a smooth operation when mobile devices are concerned.

In the future, the project team would more carefully consider the timing of putting technical aspects in place and how best to fit this around clinical work.

Local delays to the pilot project meant that go-live coincided with Christmas 2010, which was not ideal for clinicians or project team staff.

Future plans for mobile working

- There is a desire in the project team to deploy the devices to the tissue viability team. This would allow clinicians to view wounds remotely and assess them appropriately (telemedicine).
- An updated release of the Rio clinical application will allow disconnected working for clinicians (expected in the next 6 months). This will ameliorate some of the issues around work being lost when network connection is dropped.
- The deployment of the Rio EPR application hand in hand with this technology leads to improved data quality and record keeping. This will be taken in to account in future deployments

Doncaster Community Healthcare

(NHS Doncaster)



Introduction

The application to be included in the project was made by the Assistant Director of Business Development, on behalf of Doncaster Community Healthcare (the provider arm of NHS Doncaster).

The Trust have deployed the clinical solution TPP SystemOne across all core services, and this is considered to be the primary care record at Doncaster. Supporting agile working is a long-term goal of the Trust, and it is recognised that in order to take full advantage of the clinical system, mobile technology needs to be implemented.

Initial Objectives

The following are the key objectives for the project as outlined by the organisation in the response to the MHWP invitation:

- Generation of efficiency savings;
- Reducing unnecessary journeys;
- Reducing amount of 'non-productive' time e.g. time spent travelling or 'dead time' between appointments;
- Reducing paperwork;
- Increasing time available for patient contact;
- Improved communication and information sharing;
- Access to see and update 'real-time' information;
- Improved accuracy in record keeping;
- Improved patient safety, particularly in regard to prescribing.

About the Project

Project Team

The local project team consisted of:

- Project lead;
- Technical lead (same resource as project lead);
- Business change lead (role fulfilled by clinical engagement manager);
- Clinical lead.

At a Glance

Doncaster	
Number of devices	25
Geography	High proportion of urban, some rural
Clinical systems used	SystemOne Community
Non-EPR requirements	Web mail, internet
SIM Provider	Mixed 50% BT Mobile and 50% O ₂
Pilot go-live date	22 nd October, 2010

Table 57 – At a Glance: Doncaster

Service	Number of Users	Percentage of Service
Health Visitors	25	20%

Table 58 – At a Glance: Services involved

Project Methodology

The Doncaster pilot was intended to run as a formal⁴ project alongside the organisation’s ‘Productive Series’ project.

There was clear sponsorship and leadership for the project from the start and plans had long existed for the deployment of agile working throughout the local health community. The main barrier to this had been the identification of funding, and published data to support a business case for mobile working has been difficult to find.

The local governance for the Project was undertaken via the Business Development directorate, and progress was reported throughout the deployment to the Executive Board. Regular communications were produced to maintain interest and keep momentum for the project going.

Documentation produced to support the project includes the following:

- Business Case;
- PID;
- Project Brief;
- Progress meeting minutes;
- Localised Tough-book User Guide.

Change Management, Skills Analysis and Support

Prior to commencement of the project, change management activities including process mapping were due to be conducted across many services including the Health Visitors taking part in the MHWP. It was anticipated that ongoing business change activities would be led by the Productive Series work-stream. However, a significant way through the mobile implementation it was decided that the Productive Series output was too broad to be useful for the mobile working project. Due to the impending reconfiguration of community services in Doncaster under the Transforming Community Services policy the Trust was unable to invest in and benefit from of a dedicated business change resource.

The project team were keen for service redesign suggestions to come from users, with a bottom up approach. In this spirit, staff were able to make changes to their working practices as they saw fit in order to maximise the benefits from the devices. It was accepted that those clinicians working within the project would be permitted the freedom to innovate and work flexibly in the knowledge of and with support from their managers. The changes in working practice were monitored and this resulted in amendments to existing policies/procedures as an outcome of the project, including the reconciliation of clinical system templates where mobile working had helped to identify how to reduce duplication.

⁴ In this context, ‘formal’ denotes a project that produced formal project documentation seen by the MHWP team

IT skills analysis was not formally undertaken as part of the project, as these had been assessed a number of years ago, when the clinical solution deployment started, although it was anticipated some users may need additional training as part of this project. It was assumed that the users who volunteered to participate in the project would probably already have a fairly good level of IT skills and be confident using IT.

The recommended first line support for users was for them to contact BT directly with any problems relating to the device. A dedicated local Helpdesk number could not be implemented for Mobile Workers, and so both 1st and 2nd line support continued to be provided by BT. The project lead also acted as a coordinator for some issues that BT were unable to resolve.

Implementation Technical Detail

Information for this section has been collated from technical information provided by BT during the implementation phase as well as from direct discussions with the site project team.

Gold Build – At a Glance

Doncaster opted to accept the standard TCS configurable Gold Build, plus the following items:

- WebMail Desktop shortcut;
- Helpdesk contact details wallpaper;
- Screen Saver password protection locked;
- Sophos licence username and password;
- 2e2 SafeBoot installer.

Clinical System

The clinical application in use at Doncaster for the MHW pilot was TPP's SystemOne Community module. The mobile users had access to the full patient record using the clinical application.

Technical Issues

Pre-deployment

This section documents any technical issues that arose for the pilot site during the pre-deployment phase.

The Doncaster deployment was initially scheduled for the first week in October. This date was delayed slightly by the Safeboot issue that affected eight out of the eleven sites in September, pushing back the go-live date for many deployments including Doncaster. The eventual go-live date for Doncaster was October 22nd, 2010, pushed back from October 14th due to training issues.

Post-deployment

A total of 40 issues were raised during the project period to the BT helpdesk. Please refer to the glossary of terms for clarification on the purpose of any of the technical items below:

- 28 issues related to the devices:
 - 14 MobileXpress issues;
 - 10 VPN issues;
 - 2 faulty modem/GPRS connection failed;
 - 2 communications failure issues;
- 2 related to device peripherals:
 - 2 SIM cards exchanged;
- 10 issues related to the Windows Operating System:
 - 4 application not responding;
 - 2 information required;
 - 4 clinical system issues.

Clinicians at Doncaster experienced some problems with the baseline MHWP data collection spreadsheets, due to MS Office release and service pack incompatibilities on existing Desktop PCs, resulting in the production of a version with the macros removed. These issues were not present for the 1st and 2nd periods of data capture, as these were recorded on the Toughbook itself.

Connectivity issues emerged for clinicians during the course of the pilot, and the project team adopted the approach of swapping SIM card providers between users to see if this improved connectivity.

The project team noted that with the advent of mobile working, the host organisation (NHS Doncaster) needed to update their user policies. The trust did not have any wireless LAN in place, but some users were able to connect to their wireless networks at home, though the incumbent IT provider (RDASH) were unable to provide any technical assistance for this.

General issues

Clinicians reported problems with connectivity and slowness when trying to use the device with patients. As with other sites, network connectivity was variable depending upon geographical location, and this limited the usefulness of the device.

The hibernation settings for the device were amended during the pilot in order to prevent the network connection from being lost when the device lid was closed or when the device was idle for too long.

Users also noted that the 'battery low' warning often came too late for them to save work in progress or find a power outlet.

Configurable changes such as the hibernation and battery issues are common, and easily rectified. A local IT support desk (as opposed to the BT Helpdesk used in this pilot) should be well placed to receive and quickly resolve such issues.

Study Findings

Metrics

The following section provides a summary of the metric analysis, collated from the spreadsheets returned to the MHWP team.

The table below gives an indication of the level of returns submitted by the 25 staff taking part at the Doncaster pilot site. As discussed earlier in the report, not all returns could be used in the analysis.

Returns: overview

Returns	Percentage of users returning data
Baseline data	100%
Mileage month 1	100%
Mileage month 2	64%
Benefits month 1	92%
Benefits month 2	92%
Average return rate	90%

Table 59 – Rate of returns: Doncaster

Metrics: overview

Clinicians	Number in project	Baseline returns	Benefits 1 returns	Benefits 2 returns
Health visitors	25	25	22	23

Table 60 – Overview of Returns used in analysis

Days data	Baseline	Benefits 1	Benefits 2	Total
Health visitors	322	401	428	1151

Table 61 – Overview of Number of Days of data returned

Data Usage

The image below, generated from data usage statistics collected by BT, gives a visual indication of the data usage at the Doncaster site as clinicians take up and learn how to use the devices.

The initial spike in activity correlates with the go-live, when training would have occurred, followed by a drop as equipment is deployed, then a slow increase in usage that would be expected as clinicians become more confident using the devices.

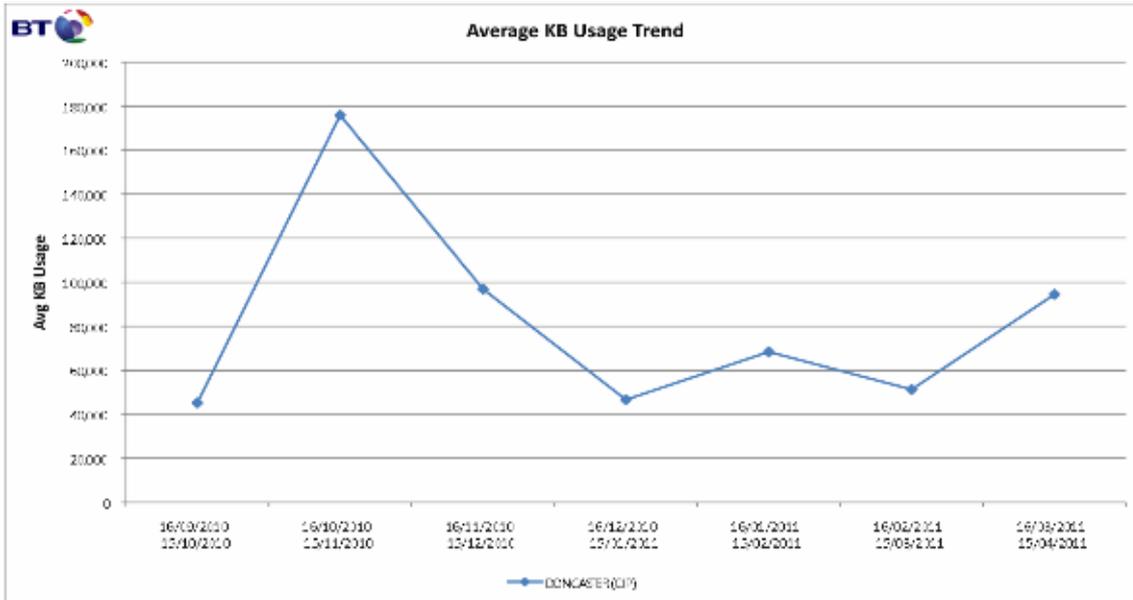


Figure 64 – Data usage trend

Contacts:

During the entire data recording phase, staff at the Doncaster site recorded a total of **3648** contacts.

The number of contacts per day for each clinician rose by **5.1** percentage points from Baseline to Benefits 2.

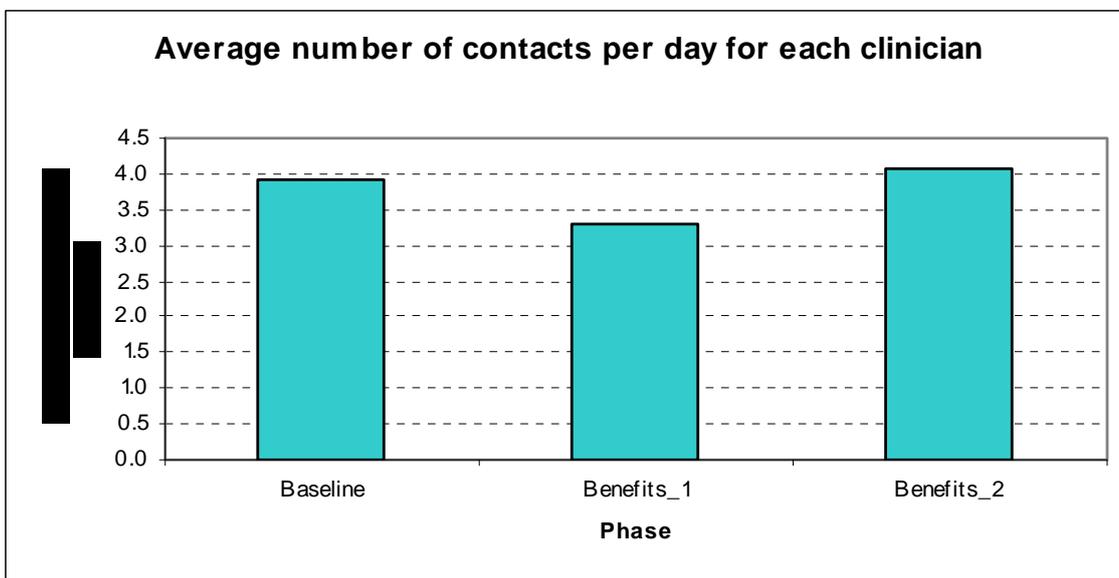


Figure 65 – Average contacts per clinician, per day

The Doncaster project team confirmed that this supports reports from clinicians that productivity is increased.

Contacts were broken down by duration, and the results across each duration can be seen on the following chart:

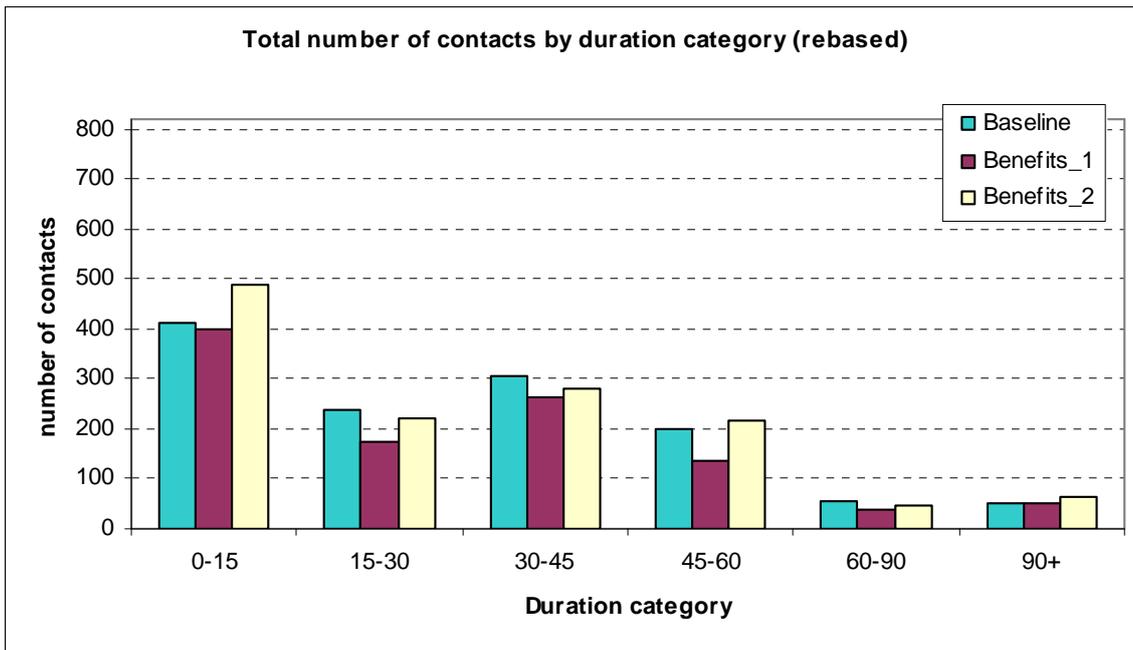


Figure 66 – Total contacts by duration

The graph shows an increase in the 0-15 min duration contacts, the 45-60 min duration contacts, and the over 90 min contacts. This indicates that they are able to make more, shorter visits, probably due to improved efficiency in time management, and they are also making slightly longer visits, where they are capturing more information and negating the need for a further visit. This metric confirms the reports being given to the project team by users locally.

Duration of face to face contact with patients

The clinicians recorded a 1.4 percentage point increase in the number of minutes spent with patients.

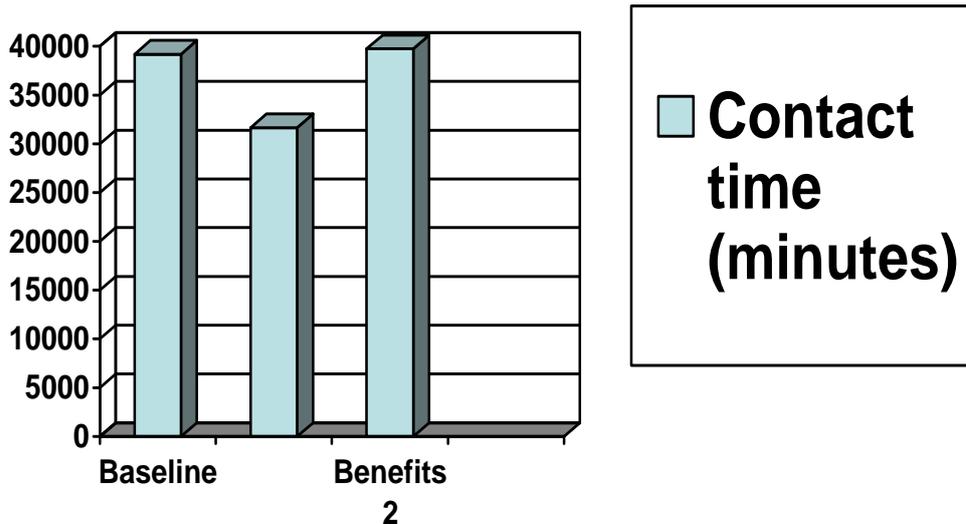


Figure 67 – Contact time (in minutes)

This confirms the changes seen in the duration categories, with number of contacts in some durations falling, but increasing in others, giving an overall slight increase in total contact time with patients.

Journeys:

During the entire data recording phase, staff at the Doncaster site recorded a total of **2995** journeys.

The number of journeys per day for each clinician fell by **2.9** percentage points from Baseline to Benefits 2.

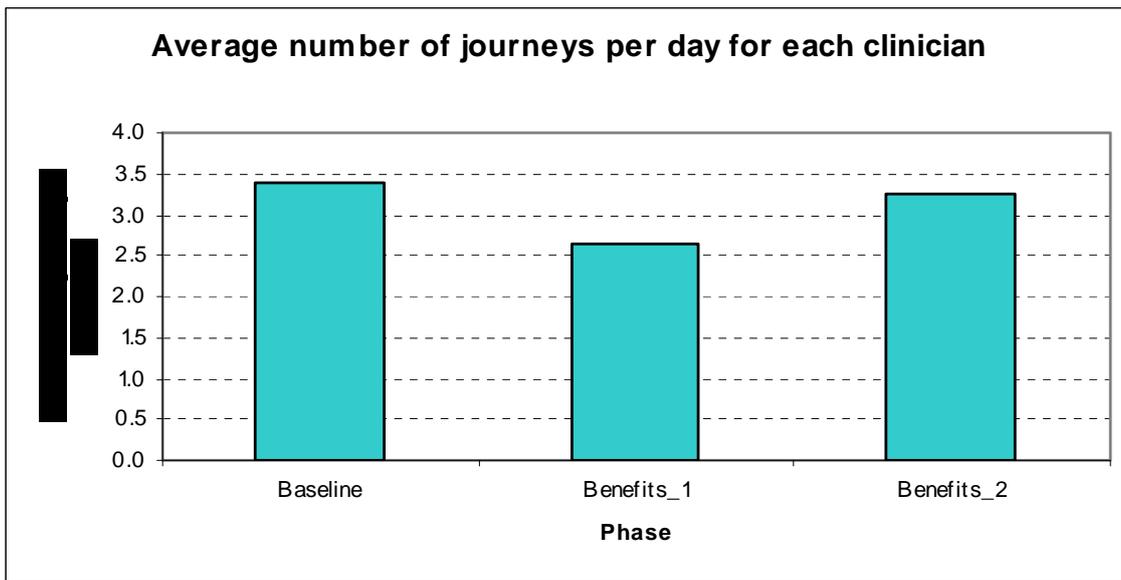


Figure 68 – Average journeys per clinician, per day

This metric is supported by the subjective findings of clinicians reporting they felt they had reduced unnecessary journeys, and is despite contacts increasing.

Journeys were also broken down into durations, and the results are shown in the following chart:

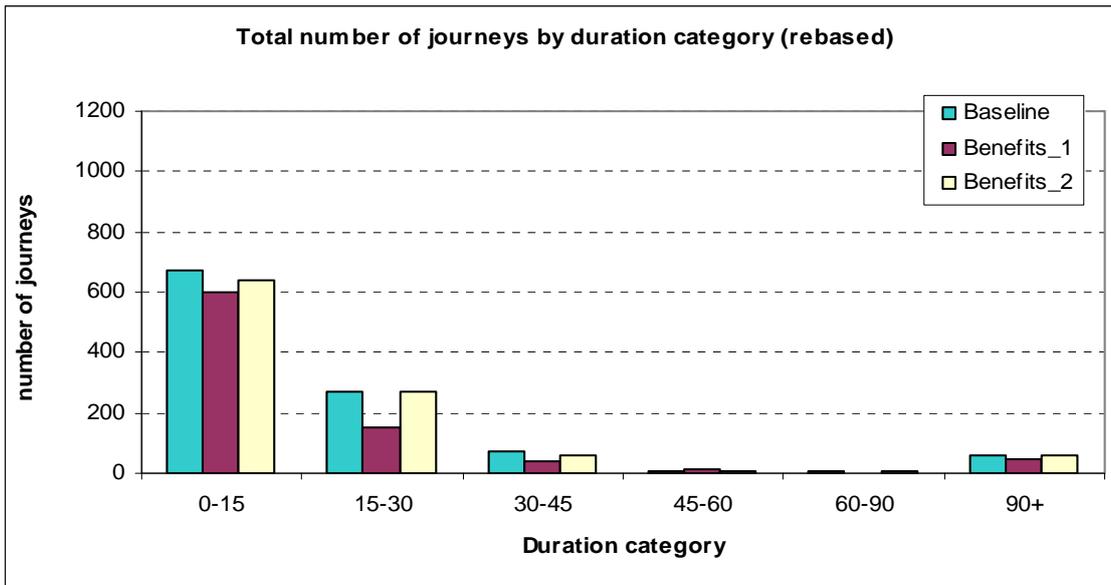


Figure 69 – Total journeys by duration

A fall in number of journeys across the duration categories can be seen.

Journey durations decreased slightly from Baseline to the Benefits 2 collection, with clinicians recording the minutes they spent travelling decreased by 1.4 percentage points.

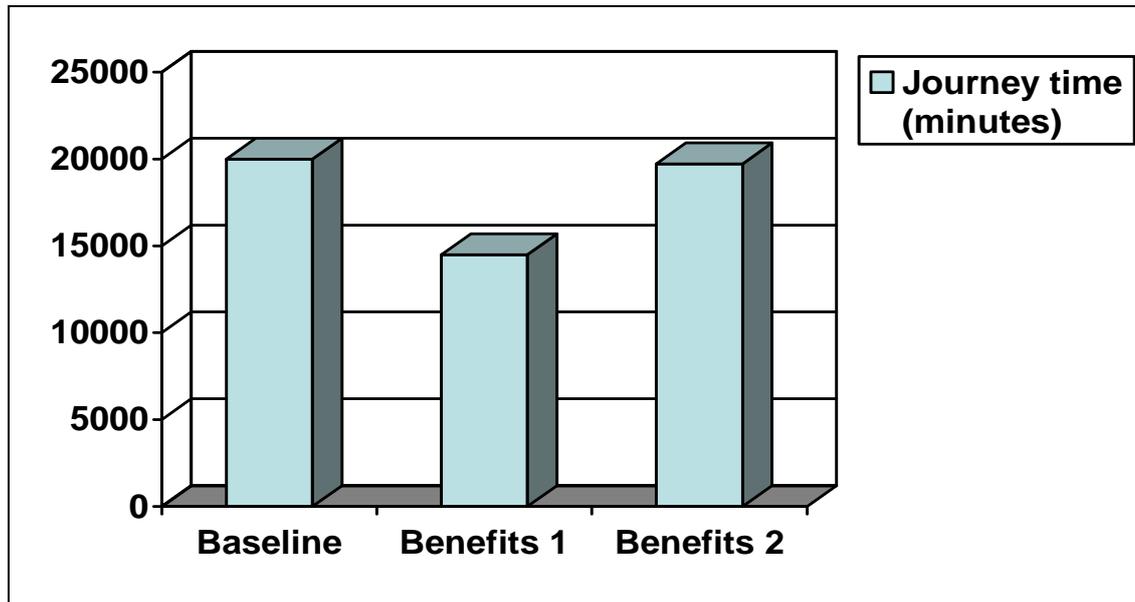


Figure 70 – Journey time (in minutes)

Mileage:

Mileage	#1	#2	Change
All staff (14 returns)	930.0	1269.0	+ 36.5%

Table 62 - Mileage

Mileage claimed for the site over the same period (taken from a sample of 14 clinicians who returned mileage data) indicated that mileage had increased by 36.5%.

Compared to the data collection returns, there was a low number of mileage returns, which may have affected the results. Based on the number of journeys and journey time decreasing, it would be expected the mileage would also have decreased.

The project team had difficulty submitting mileage information, due to the delay in being able to report it out of the Electronic Staff Record system. It was felt this may have impacted on the results, coupled with the mileage report periods differing from the data collection periods.

Referrals:

In total, **60** referrals were made over the Benefits period. Clinicians at Doncaster estimated that due to having access to the devices, they saved **15** potential referrals. This equates to a **20% saving** of referrals.

Admissions:

No admissions were recorded by clinicians at Doncaster during the Benefits period. One clinician recorded that s/he felt that the device had prevented **1** admission. This equates to a **100%** saving of admissions.

No access visits:

No access visits decreased by **20.7** percentage points from the baseline measurement to the second benefits measurement period.

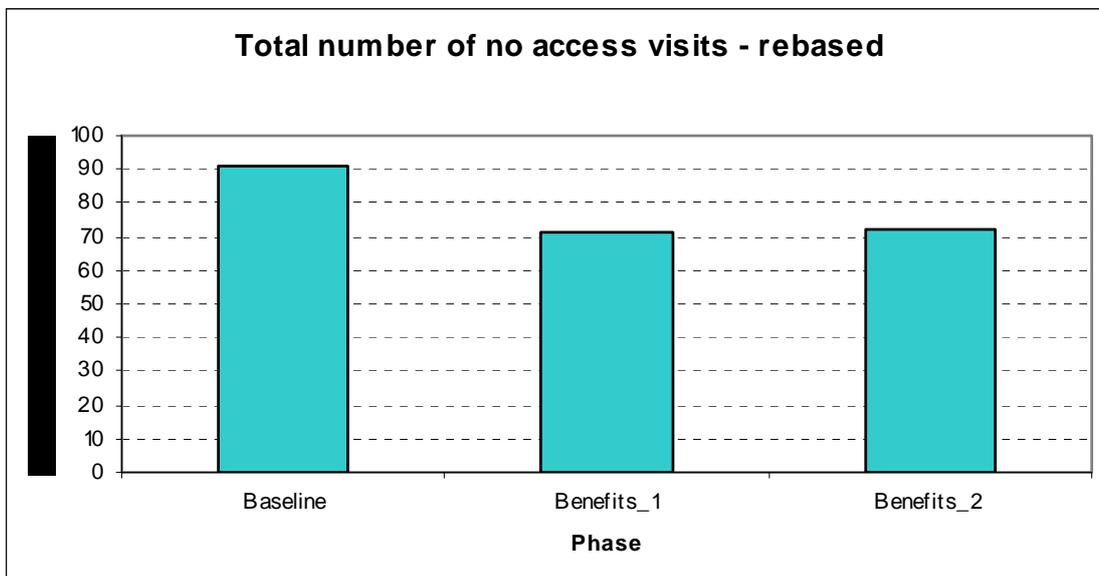


Figure 71 – No access visits

This is likely to be due to improved access to information at the visit, such as telephone contact numbers and other appointment information.

Duplication of data:

The metrics show a reduction in duplication of data of **50** percentage points from the Baseline measurement to Benefits 2.

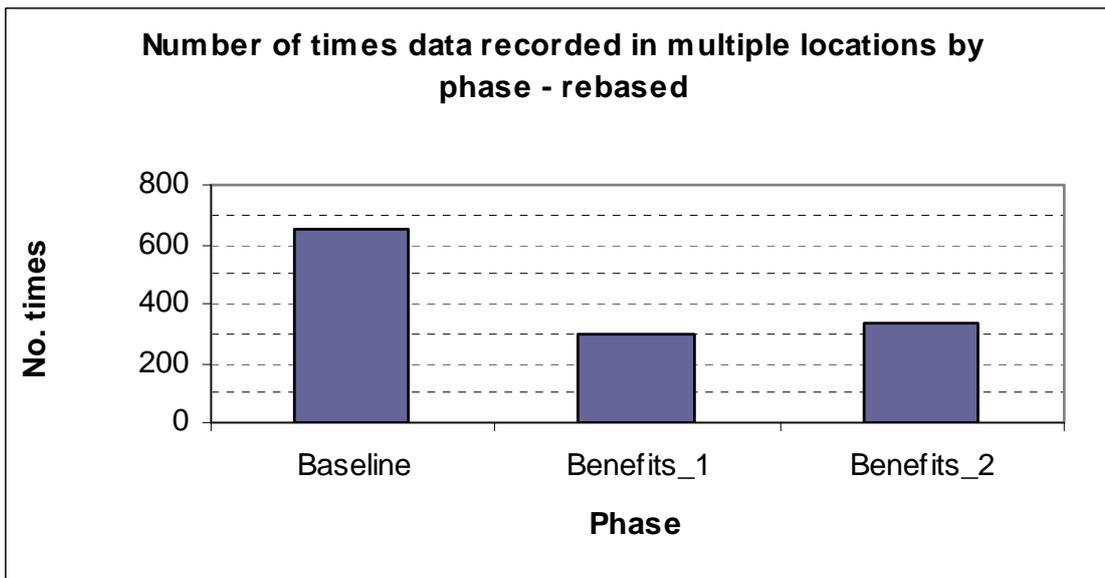


Figure 72 – Duplication of data

This reflects the improved access to records, and being able to input data directly into the electronic clinical record at the point of care. Work is being undertaken locally, cross sector, in Children’s Services to further rationalise data recording and reduce unnecessary duplication.

Summary of Metric findings

- The data shows increases in productivity combined with efficiency savings, and reduction in travel can be achieved.
- Significant savings are possible in Referrals.
- Significant reductions in no access visits and duplication of data have been shown.

Subjective findings

The items discussed in this section are those findings which were made based upon the subjective comments noted at the pilot site by the MHWP team, or reported in the free text comments on the data returns spreadsheets.

Ease of use: Clinicians found the devices easy to use and quickly adapted to using them with patients.

Reduced estates: Use of the devices, even just 20% of a team, has freed up the office desktops and eased the pressure on existing resources.

Whole-service transformation: Clinicians felt that the devices made life easier but that benefits would be less constrained if the whole team had the technology. Working with only a small percentage of the team having access to the devices limited the ability to make changes in working practice as old methods of working must still be observed for team members without access to the new technology.

Efficiency and productivity: The clinicians' experiences suggested to them that the device allows more productive use of time and greater efficiency. Efficiencies include the utilising previous 'dead' time for administrative work - clinicians can now do this in between visits or the additional ad-hoc telephone contacts that can be made from wherever a network signal allows contact details to be accessed.

Flexible working: Clinicians were pleased that the device offered the ability to work from home and to access their email from wherever a network signal was available. Clinicians can now start and end their shifts by logging on to the device at home as well as using office bases other than their own to stop off and update work. The feeling from users was that this helped them 'stay on top of things' particularly at busy times such as shift handover or preparing to go on annual leave.

Data quantity and quality: Clinicians felt that the improved accuracy of information being recorded and the increased access to up to date information was helping to make patient care safer. The device has given users the ability to write detailed reports with access to everything needed to support their analysis (e.g. clinical records). The primary clinical information can be recorded contemporaneously and is written up in full at the time of care, and local audits have confirmed that records of mobile device users are of higher quality. Tasks such as updating addresses, checking Vaccination and Immunisation status is far more likely to be completed in a timely and seamless manner.

Decreased travel: Staff at Doncaster perceived that there should be a decrease in unnecessary journeys made by their services, resulting in time savings.

Communications: Through the use of email and instant messaging, staff at the Doncaster site were able to communicate with colleagues more effectively whilst out in the field. They found that they were able to send each other messages instantly, unobtrusively and securely, helping to join up the workflows of the individuals participating in the MHWP study. It has also been found that there are examples of improved transfer of information, such as the transfer of care to School Nursing, where the records are much more comprehensive.

Out of hours and lone working: Having the device has improved conditions for clinicians working alone outside of normal office hours. Up-to-date patient details are available at short notice through the device, and clinicians can go into a patient's home fully apprised of any risks that have been noted by previous visitors. Improved contemporaneous record keeping during out of hours working helps maintain the continuity of care between night and day shifts, with a reduced risk that vital information will get overlooked in the handover.

Service continuity: During the period of wintry weather at the end of 2010, clinicians at Doncaster felt that the devices were largely responsible for allowing them to continue to operate their services remotely and ensure business continuity. Users with devices were able to set up work at home, answering emails, accessing patient records and making phone calls and (where required) making use of 4x4 vehicles provided to get them to their most vulnerable patients. The devices enabled clinicians to continue to provide their service to clients where previously they would have been unable to provide any service at all.

External resources: With access to the internet through the device where a network connection can be made, staff were able to access patient support websites/information on-line to show to patients during contacts. This led to a perceived reduction in amount of patient information leaflets that need to be ordered and printed.

Security: Some clinicians expressed concerns regarding general security when using device in car in certain areas. They agreed that the usual sensible precautions should be taken when using valuable equipment that might be attractive to thieves.

Duplication of data: Reconciliation of clinical system templates and reducing duplication has already taken place locally – a larger, multi-agency review of records for Children's Service is being led by the local Council.

Ergonomics: One member of staff participating in the MHWP reported increased back-pain since beginning to use the device. Project leaders and the organisation's Human Resources department need to make sure users are fully aware that they need to continue to follow moving and handling/posture and ergonomics guidance as they do for other devices and equipment.

Patient engagement: Early fears about the devices being a 'barrier' between clinician and patient proved to be unfounded. Some clinicians stated that the device helped to engage patients' interest, inadvertently getting them more closely involved with what is being recorded about them and increasing transparency.

IT literacy: Participating clinicians' IT skills have increased with the deployment of the clinical solution.

Improved effectiveness at point of care: Clinicians felt the improved access to up to date information allowed them to make better informed decisions, allowing them to be more effective. Having the device can lead to longer visits, as more information can be captured, which can reduce the need to further visits.

Connectivity Issues: Frequent connectivity issues can lead to frustration in the clinicians, as they can see how well it can support them if working well. Hibernation problems encountered have been addressed by the project team.

Improved sharing of information: Availability of the clinical record during case conferences has helped facilitate improved sharing of information across sectors/professionals.

In their own words

The following are examples of direct quotes from clinicians and patients throughout the project taken from the 40 patient comments and over 95 clinician comments that were received.

Clinician comments

Pre-deployment

- “Discussed during our 'Team day' and positive feedback made on the use of Toughbooks and the efficiency it will potentially have.”
- “Discussed with colleague in clinic session about saving time typing records on system through this mobile working. Colleague informed she is currently using Toughbooks and informed of benefits to her work load.”

Post-deployment

- “I was able to access emails during the area meeting (which was of help to my manager) and took minutes in a word document from my colleagues which I will send via email as we sometimes find it difficult to find time to share information after the meeting.”
- “Unable to get connection in community centre or children centre today.”
- “At home due to weather conditions. Contact made with BT helpdesk who resolved problem with VPN token in 7 minutes!!! Able to access emails and system one. Completed some work on system one and am now up to date.”
- “Got connected in children centre building but then was too busy to use during clinic session as went into hibernation mode and takes a long time to get going again.”
- “Enabled me to work at home following completion of all my visits.”
- “Unable to travel due to snow. Utilised Toughbook working from home to complete documentation on system one for client contacts within guidance of NMC professional responsibility (within 24hrs).”
- “Advised by management not to travel due to snow. Able to work from home with Toughbook., accessing e-mails, contacting clients by phone as had access to details on system, report writing.”
- “Utilised Toughbook to access system one and complete forward work planning within team day.”
- “Use of Toughbook enabled me to work flexibly in order to manage work around current health issues.”
- “Comment from a Social Worker that it would make their workload more easier and efficient if they were to have a similar device as the Toughbooks.”
- “Interpreter commented on convenience of tracking clients telephone numbers and confirming appointments using this device as opposed to only having access from Office.”
- “Whilst out and about I received a message to call a client to give advice. Without having to return to the office I was able to access records for telephone number and recent contacts which gave me more information prior to my call.”
- “Reduced travel as able to record contacts with out returning to the office.”

- “Had our information screen in clinic but would have gained huge benefits if we had the GP information on screen for some clients.”
- “Was able to access emails whilst waiting for clients to turn up for a group.”
- “Used Toughbook in clinic successfully. Saved time, able to write straight onto records.”
- “Used Toughbook in Team Meeting to access information and forward plan work.”
- “Great when working but can be unreliable.”

Service user comments

Pre-deployment

- “One parent said would be more convenient if needed to find out history of medical or any relevant information to them.”
- “Discussed during clinic session, positive feedback received about saving time / money for NHS.”
- “One parent commented on moving 'forward with the times' and it being better to have access to records to hand.”

Post-deployment

- “One lady thought it was a good time saving exercise when she saw me using it in clinic.”
- “A patient says it was a good way of doing things and easier than paper.”
- “A couple of patients made comments saying it provided efficiency as we could record information straight into the record and then and we could also give them information there and then rather than having to contact them with information later.”
- “Patient thought it was very efficient and saved duplication of work.”
- “Convenient device for NHS staff to use whilst out on visits.”
- “Convenient device whilst use in Patient home and convenient for tracking previous relevant information to client.”
- “One parent commented on saving paper and saving on filling in paper work as well.”
- “Useful in the home when completing assessment and arranging further appointment.”
- “Useful to see the records as you write them.”
- “Useful to have immediate access [to information].”
- “One record is a good idea. It might help to save some of the children who are abused.”
- “Use of Toughbook in a clinic - Family felt it made sense to put input recordings directly.”
- “One mum on a visit found it beneficial in tracking a future appointment with another health visitor.”
- “Parent commented on ease at arranging an appointment to review speech in a few months - direct onto child's records - during the visit.”
- “Was convenient to rearrange next appointment in the home and inform parent at the same time, which was convenient for both.”
- “Was able to make a referral for a child to Speech and Language therapy as requested by mum during the visit, so she was able to see referral being commenced.”
- “The client commented that it was time that the NHS got up to date with technology.”
- “Client liked the access to records and to update phone numbers.”

Service Changes seen

- Improved patient choice, particularly around appointments
- Changes to working patterns
- Improved accuracy, and more complete clinical records
- Improved activity recording
- Improved communications
- Noticeably improved work-life balance for staff.
- Release of clinical time

Conclusions

Impressions and achievements

The Doncaster project team and clinicians interviewed feel that the project has been successful, due in part to the regular contact from DH which has helped those involved to maintain a focus on the project.

The fact that the technology used had been proven in a similar study prior to the project saved a lot of time locally. The mixed economy of IT skills was a bit of a surprise to the project team, who admitted that they may have underestimated the amount of work needed to bring everyone's IT skills to a similar level.

The project has demonstrated that agile working is effective, that flexible working is possible and positive changes can be made to working practices. It has also shown users that there are achievable ways to enhance the work-life balance.

One of the most noticeable effects of the project is the achievement of higher quality patient records that are contemporaneous, as proven internally by routine record audits.

The project has shown clinicians that patients expect and are comfortable with their carers using technology and are not unduly worried by the devices. Contrary to what was believed before the MHWP pilot, clinicians having the device and using it at the point of care does not detract from the relationship with the patient.

Lessons learned – what would we do differently?

The business change management on this pilot project did not evolve as anticipated initially. The project team stated that any future projects would benefit greatly from planned and structured business change activities factored in from the start.

In the future, Doncaster would like to try and target an entire team for adoption of the devices, to prove benefits of whole-service transformation.

Working closely with the organisation's IT service to ensure more progressive policies for the use of mobile equipment (such as the ability of a user to connect securely via their home broadband) would be an advantage to future projects.

Greater involvement of higher management personnel for sponsorship and support is another goal of the Doncaster project team, who believe that management taking a more pro-active role in the project would be highly beneficial.

External pressures and short timescales prevented a full analysis of how the device would benefit different service types. The Doncaster project team felt that if the pilot were to be repeated, they would try to look more closely at the service types involved to ensure maximum utilisation of devices, and that future projects would take a more proactive approach to understanding the IT skills of intended users.

Future plans for mobile working

- Local funding has been secured to extend the scope of mobile working, and further devices have already been purchased. It is anticipated that the next phase may show greater

objective benefits, due to the greater number of patient contacts the services have, and the 24/7 nature of the service.

- Some changes have been made to the Gold Build for the new devices based on technical lessons learned from the first phase of the MHWP, including changes to the power management settings and options to add standardised printers.

North Tees and Hartlepool NHS Foundation Trust



Introduction

The application to be included in the project was made by the Head of Service and Business Improvement, on behalf of Community Services across North of Tees.

The Trust have successfully implemented the clinical solution TPP SystemOne, and deployment of mobile solutions was an underpinning local strategy to ensure the delivery of efficient and effective, quality Community Services.

Initial Objectives

The following are the key objectives for the project as outlined by the organisation in the response to the MHWP invitation:

- Reduction in duplication of work
- Reduction in travel due to ability to work remotely
- Increase patient facing time or increase number of patient contacts
- Reduce comparative costs
- Improved quality of care through improved access to information at point of contact
- Contemporaneous data entry into patient records and more timely recording of information
- Increased usage of clinical system, allowing increased standardisation

About the Project

Project Team

The local Project team consisted of:

- Project Lead (Role fulfilled by Clinical IT Trainer);
- Business Change support provided by the Improvement and Development Facilitator and the Clinical IT Trainer;
- Clinical leadership was provided by clinical leads from each service involved;
- Technical leadership was provided by the ICT Infrastructure Services Manager.

At a Glance

Hartlepool	
Number of devices	50
Geography	Predominantly urban
Clinical systems used	SystemOne Community
Non-EPR requirements	NHS Mail, Microsoft Office applications, ICE (results software)
SIM Provider	Vodafone
Pilot go-live date	September 27 th – 1 st October, 2010

Table 63 – At a Glance: Hartlepool

Service	Number of Users	Percentage of Service
District Nursing	18	36%
Community Matrons	3	6%
Speech & Language Therapy	20	40%
Stroke Rehabilitation	9	18%

Table 64 – At a Glance: Services involved

Project Methodology

The North Tees and Hartlepool pilot was launched as a follow-up work stream to the SystemOne implementation project at the site. The local governance for the Project was undertaken via the Clinical Information Group (reporting to the TCS Programme Board) and there was clear sponsorship and leadership across the Trust, in particular from the organisation's Associate Director and Head of Improvement.

Discussions around the requirement for mobile solutions had already begun amongst the different services prior to the pilot project, which greatly simplified the task of fitting the devices available with the local need.

Documentation produced and seen by the CIP liaison includes the following:

- Service Process Maps (as-is and to-be),
- Baseline capture tool user guide,
- 2E2 training slides,
- Risk & Issue log,
- Press releases.

Change Management, Skills Analysis and Support

Change management and business change was supported by the Business Support team.

Process mapping began as soon as the participating services were identified, with potential service redesign identified and documented. Due to the small percentage of users in a service with a mobile solution, changes were limited initially, with plans to continually re-visit the maps to make further incremental changes as more users gain access to devices.

Staff were able to make local changes to their working practices to maximise the benefits from the devices. Use of the devices encouraged the Stroke team to examine the format of their working days and to begin to adjust their practices accordingly.

IT skills analysis had already been undertaken as part of the SystemOne project, and it was not repeated for the MHWP pilot.

IT support was provided by the local helpdesk. The recommended first line support for users was to contact the project lead, who would signpost users either to contact the local IT helpdesk or the BT helpdesk directly.

Implementation Technical Detail

Information for this section has been collated from the technical information provided by BT during the implementation phase as well as from direct discussions with the site project team. Please refer to the glossary of terms for clarification on the meaning of any of the technical items below.

Gold Build – At a Glance

Hartlepool opted to accept the standard TCS configurable Gold Build, plus the following items:

- Sophos licence username and password.
- 2e2 SafeBoot installer.

Clinical System

The clinical system in use at North Tees and Hartlepool is the recently deployed TPP SystemOne Community module.

Other applications/functionality

The devices were used for more than just accessing the clinical record.

Other uses included access to the internet and NHS Mail, and the use of Microsoft Office applications such as Word to take notes in meetings and conferences.

In addition, clinicians at Hartlepool had access to pathology results software called Anglia ICE which allowed users to access patients' results at the point of care.

Technical Issues

Pre-deployment

This section documents any technical issues that arose for the pilot site during the pre-deployment phase.

The Hartlepool pre-deployment work took a little time to get off the ground due to issues with the core team moving offices at the same time as the pilots were commencing. Once contact was established, information was gathered quickly and issues were resolved without delay. User training was booked in early, and the site was the first of the eleven pilot sites to go live on October 4th, 2010.

Post go-live, the site was affected by the Safeboot issue that caused delays across the MHWP pilot sites. Devices that were affected were quickly recalled, repaired and redeployed.

Post-deployment

A total of 118 issues were raised during the project period to the BT helpdesk by users at North Tees and Hartlepool. Please refer to the glossary of terms for clarification on the purpose of any of the technical items below:

- 106 issues related to the devices:
 - o 16 MobileXpress;
 - o 30 VPN issues;

- 48 Safeboot issues;
- 11 settings/configuration issues;
- 1 damaged device.
- 12 issues related to the Windows Operating System:
 - 8 application not responding;
 - 3 information required;
 - 1 GPRS (cellular network) connection failure.

Users reported that the devices started up more quickly from being completely powered down than from being in 'hibernation' mode, which was causing problems on the move. BT advised that hibernation mode not be used, and that users should instead lock Windows and travel with the device left on. It was acknowledged that this approach would need to be approved from an IT security perspective, and also that it would shorten battery life between charges.

An issue around an error message related to Microsoft products installed on the device interrupting workflow was reported after deployment.

General issues

Connectivity and persistence: Variable connectivity proved to be an issue for Hartlepool as it was for many of the other sites in the pilot study. Unstable connectivity, poor session persistence and slow connection speeds proved to be the biggest issues affecting use of the devices.

IT Support: A lack of reliable IT technical support proved to be problematic for users at North Tees and Hartlepool. Issues that could have been solved easily with access to a local helpdesk sometimes took two or three days to solve through the BT helpdesk call centre.

Study Findings

Metrics

The following section provides a summary of the metric analysis, collated from the spreadsheets returned to the MHWP team.

The table below gives an indication of the level of returns submitted by the 50 staff taking part at the North Tees and Hartlepool pilot site. As discussed earlier in the report, not all returns could be used in the analysis.

Returns: overview

Returns	Percentage of users returning data
Baseline data	100%
Mileage month 1	88%
Mileage month 2	86%
Benefits month 1	100%
Benefits month 2	100%
Average return rate	95%

Table 65 – Rate of returns: Hartlepool

Metrics: overview

Clinicians	Number in project	Baseline returns	Benefits 1 returns	Benefits 2 returns
District Nursing	18	15	15	18
Stroke Team	9	9	7	8
Specialist Nursing	3	2	1	1
Speech & Language Therapists	20	20	20	19
Total	50	46	43	46

Table 66 – Overview of Returns used in Analysis

Days data	Baseline	Benefits 1	Benefits 2	Totals
District Nursing	160	158	359	677
Stroke Team	78	74	83	235
Specialist Nursing	33	15	34	82
Speech & Language Therapists	283	283	356	922
Total	554	530	832	1916

Table 67 – Overview of Number of Days of data returned

Data Usage

The image below, generated from data usage statistics collected by BT, gives a visual indication of the data usage at the North Tees and Hartlepool site as clinicians take up and learn how to use the devices. The graph indicates a drop in activity initially following go-live, then a sharp increase, before starting to fall away in the later stages.

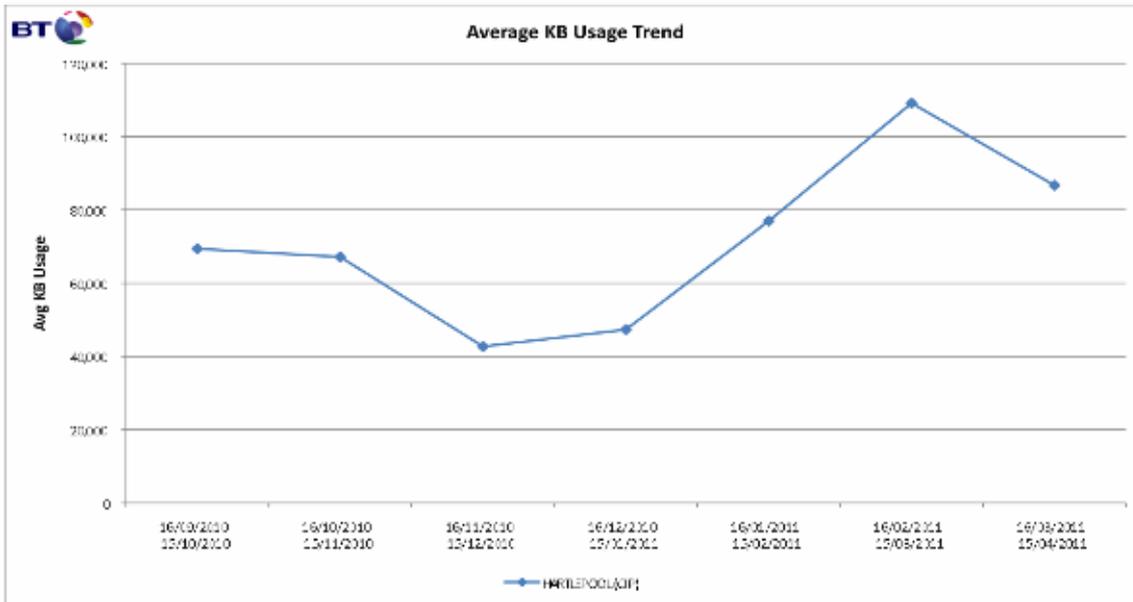


Figure 73 – Data usage trend

Contacts:

During the entire data recording phase, staff at the Hartlepool site recorded **10,034** contacts. The number of contacts per day for each clinician rose by **15.5** percentage points from Baseline to Benefits 2.

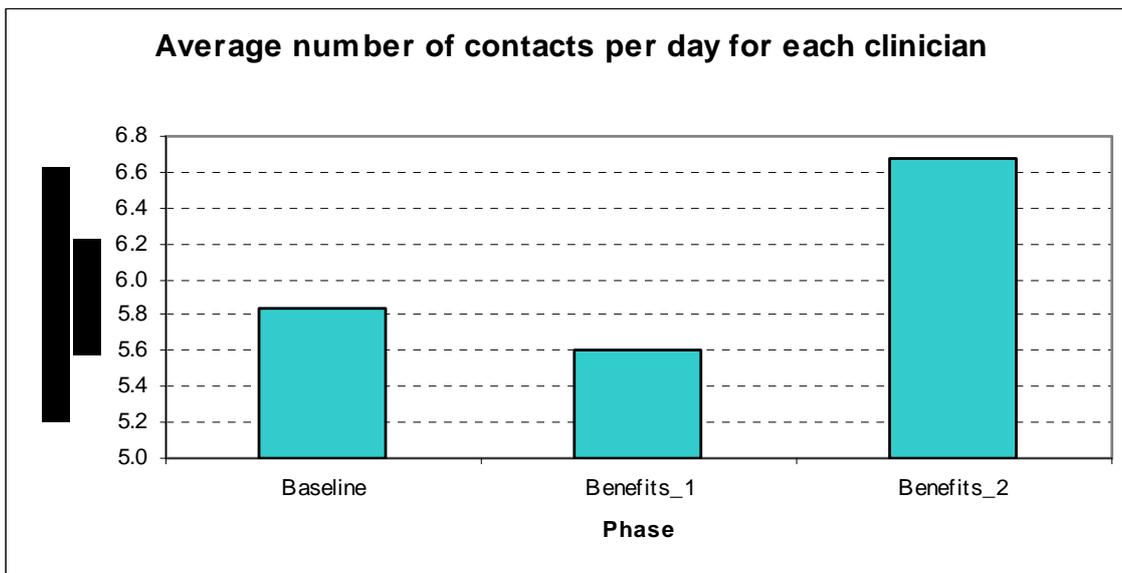


Figure 74 – Average contacts per clinician, per day

This supports reports from users about being able to be more efficient with their use of time, and not having to block out large portions of time to allow them to be able to update records retrospectively.

Contacts were broken down by duration, and the results across each duration can be seen on the following chart:

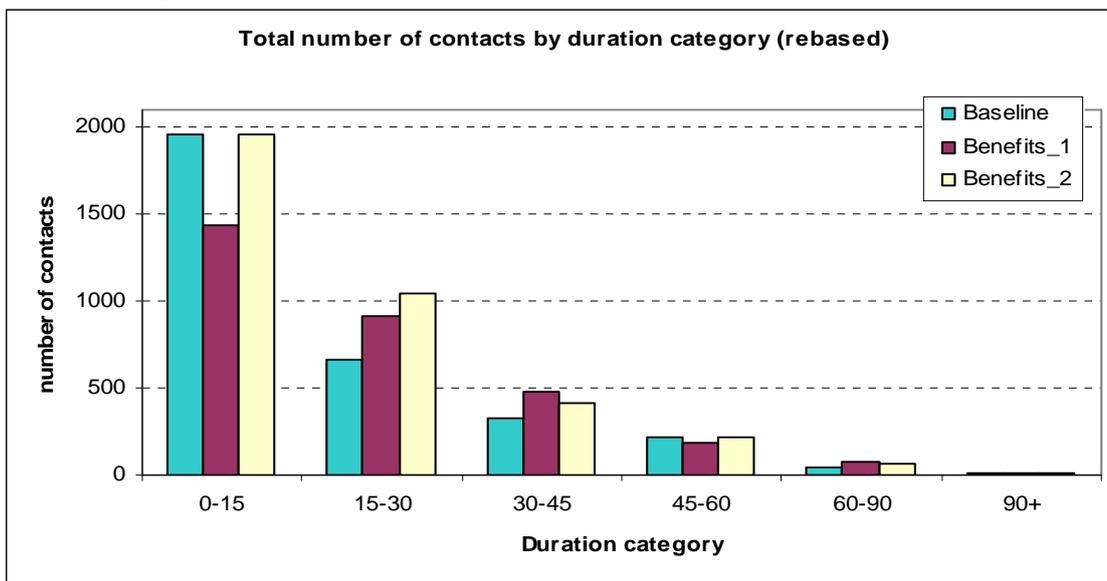


Figure 75 – Total contacts by duration

The graph shows increases in the number of contacts made across the duration categories, to varying degrees. The increase in the mid durations (15-30mins) may be due to the visit taking longer due to imputing data directly onto the device. The longer durations are likely to be increased due to the ability to be able to input data at the point of care, therefore more data is gathered, knowing it does not have to be transcribed later. This can reduce the need for further visits, and improve care provided at visits.

Duration of face to face contact with patients

The site demonstrated a significant change in contact durations, with an overall **22** percentage point increase in the number of minutes spent with patients.

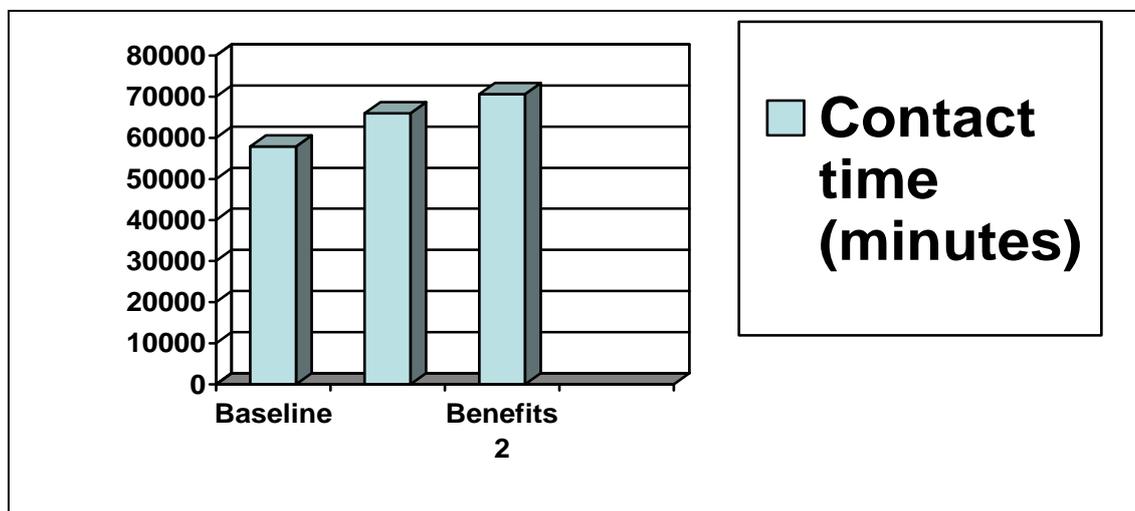


Figure 76 – Contact time (in minutes)

This increase in contact time spent with patients reflects the increased number of visits, and also the increases in the longer contact durations.

When broken down into the individual services, the metrics for contacts indicate that two of the services recorded increased contacts from Baseline to Benefits 2, and significant variation across Services is seen:

Average contacts per day	Baseline	Benefits 1	Benefits 2	Change
District Nursing	12.4	13.1	12.6	+ 2%
Speech & Language Therapy	1.8	1.9	1.7	- 5.6%
Stroke Team	7.4	7.7	8.1	+ 9.5%
Specialist Nursing	3.0	2.3	1.8	- 40%

Table 68 – Contacts by service

These figures reflect the subjective findings reported by the Services, with the Stroke team reporting it was able to make time efficiencies and changes to working patterns, resulting in increased productivity.

Some services were concerned by the apparently low average contacts per day – it should be remembered that the figures are averages and will be affected by periods of annual leave, sickness, non clinical work, and proportion of workers who work reduced (e.g. part-time) hours.

Journeys:

During the entire data recording phase, staff at the North Tees and Hartlepool site recorded a total of **12,060** journeys.

The number of journeys per day for each clinician rose by **11.4** percentage points from Baseline to Benefits 2.

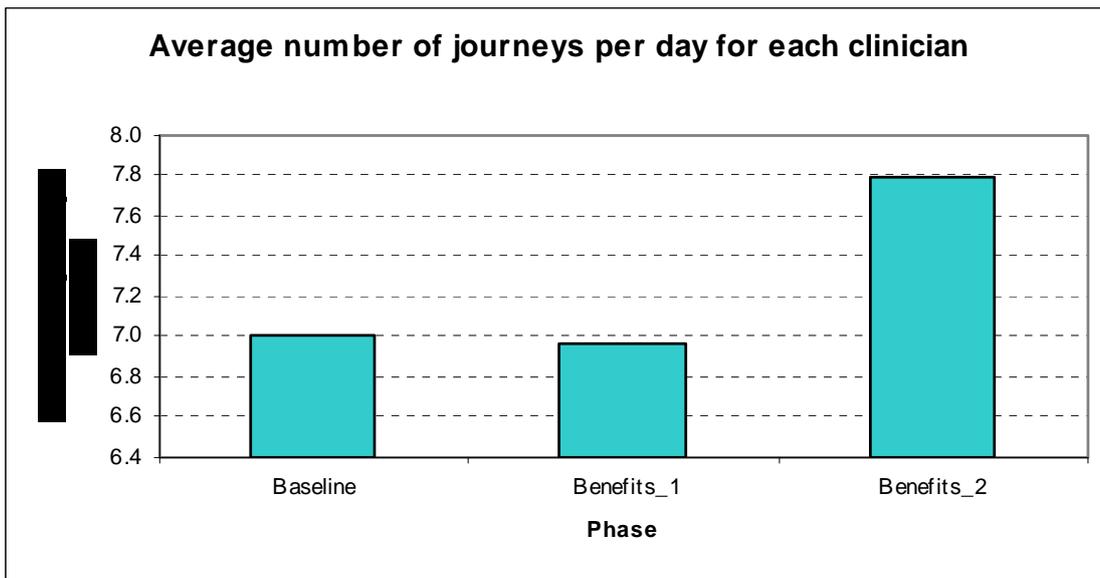


Figure 77 – Average journeys per clinician, per day

This increase is not as great as the increase in contacts, suggesting an improved schedule/route and improved planning of journeys.

Journeys were also broken down into durations, and the results are shown in the following chart:

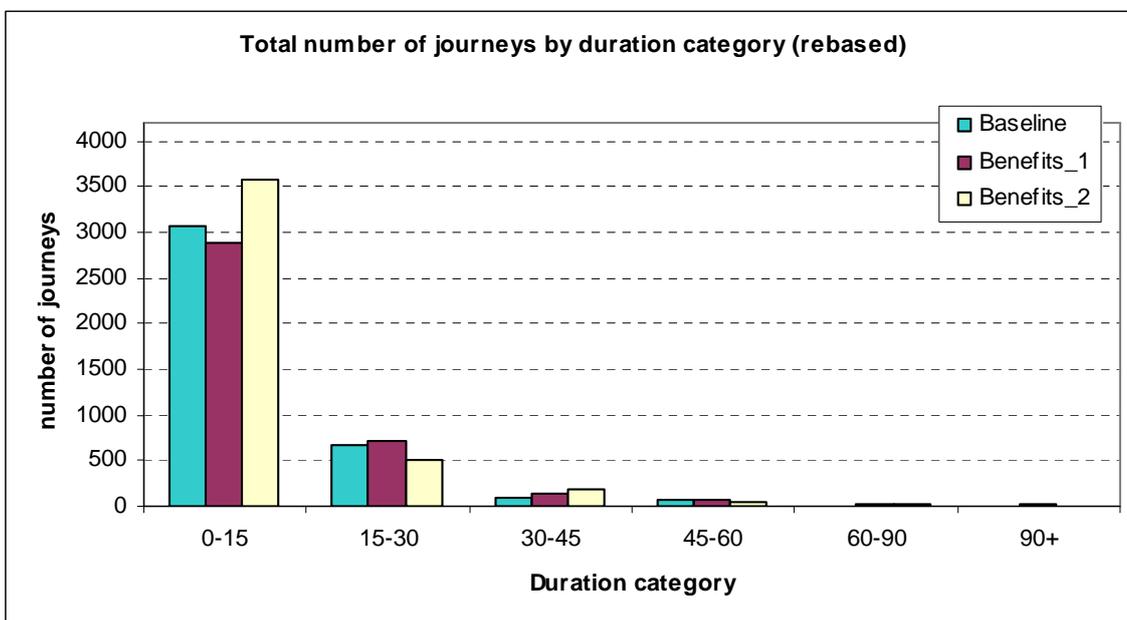


Figure 78 – Total journeys by duration

The graph shows an increase in the number of journeys in the duration category 0-15mins, which is likely to be as a result of improved planning of journeys, and the cause of the reduction in the 15-30min category. There is also an increase in the duration category 30-45mins – the local project team report this could be due to a change in base for one of the Services (SLT), resulting in increased journeys to weekly team meetings.

The number of minutes that participating staff spent travelling increased by 6.1 percentage points from baseline to the second benefits collection.

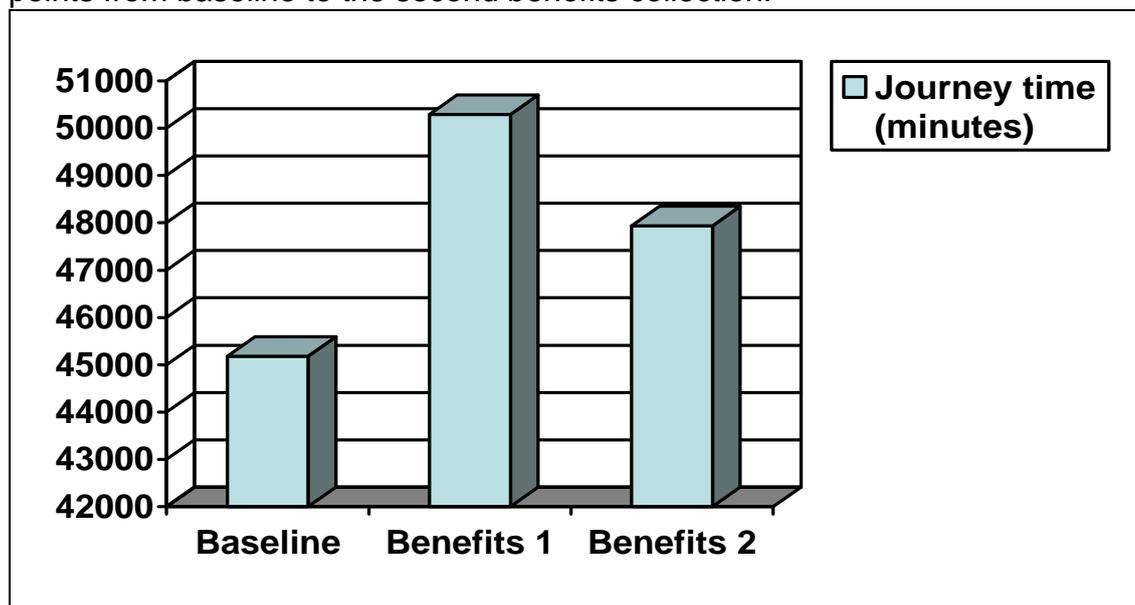


Figure 79 – Journey time (in minutes)

This is a smaller increase than the number of journeys taken, and reflects the change in journey duration profiles.

When broken down into the individual services, the metrics for journeys indicate that three services decreased numbers of journeys per day over the pilot duration:

Average journeys per day	Baseline	Benefits 1	Benefits 2	Change
District Nursing	13.0	13.7	13.3	+ 2.3%
Speech & Language Therapy	4.8	4.8	4.5	- 6.3%
Stroke Team	5.8	4.6	4.4	- 24.1%
Specialist Nursing	4.4	3.9	3.4	- 22.7%

Table 69 – Journeys by service

The small increase seen in District Nursing has skewed the overall figures due to the larger numbers involved, however this increase in journeys is in line with the increase in activity seen in district nursing.

Speech Therapy and Specialist Nursing both show a reduction in journeys, however both also showed a reduction in activity.

The Stroke team showed significant reduction in journeys, whilst showing an increase in contacts, indicating a strong improvement in efficiency – this is supported by the subjective reports from the Stroke team.

Mileage:

Mileage	#1	#2	Change
All staff (34 returns	6748.6	8176.5	+ 21.2%

Table 70 – Mileage

Mileage claimed for the site over the same period (taken from a sample of 34 clinicians who returned mileage data) indicated that mileage had increased by 21.2%.

As previously mentioned, it is suspected that a change of base for one of the Services may have influenced the mileage figures, so that they are not a true representation of the study.

This finding is not supported by the subjective reports from staff, who feel they have reduced un-necessary travel through having a mobile device.

As with some other sites, it was felt that if only ‘clinical’ mileage had been reported, it would have shown different results.

Referrals:

In total, 630 referrals were made over the Benefits period. Clinicians at Hartlepool estimated that due to having access to the devices, they saved 33 potential referrals. This equates to a 5% saving of referrals.

Admissions:

In total 19 admissions were made over the Benefits period. Clinicians at Hartlepool estimated that due to having access to the devices, they saved 10 potential admissions. This equates to a 34.5% saving of admissions.

No access visits:

No access visits increased by 20.0 percentage points from the baseline measurement to the second benefits measurement period.

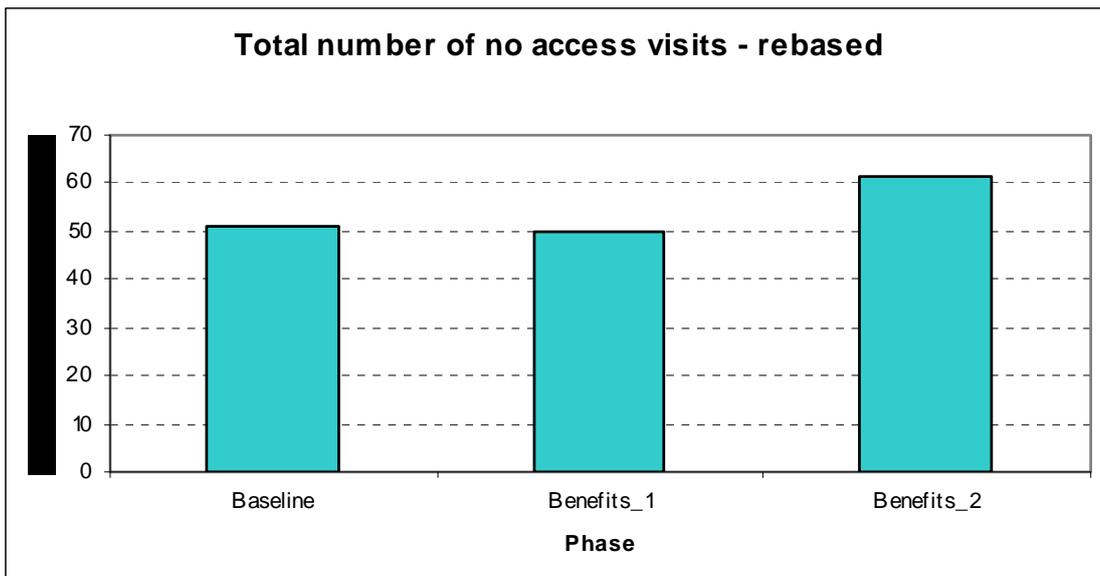


Figure 80 – No access visits

This is not thought to be a true reflection by the project team, who suspect that the baseline measurement may not be robust. This is due to staff not routinely capturing this information prior to the study, and it is thought the increase may be attributed to improved recording of no access visits, rather than an actual increase in the numbers. The staff do not support an increase, and subjective reports are they feel the numbers of no access visits have dropped.

Duplication of data:

The recordings taken in the second benefits collection period show a reduction in duplicated data recording of 8.5 percentage points from the baseline measurement.

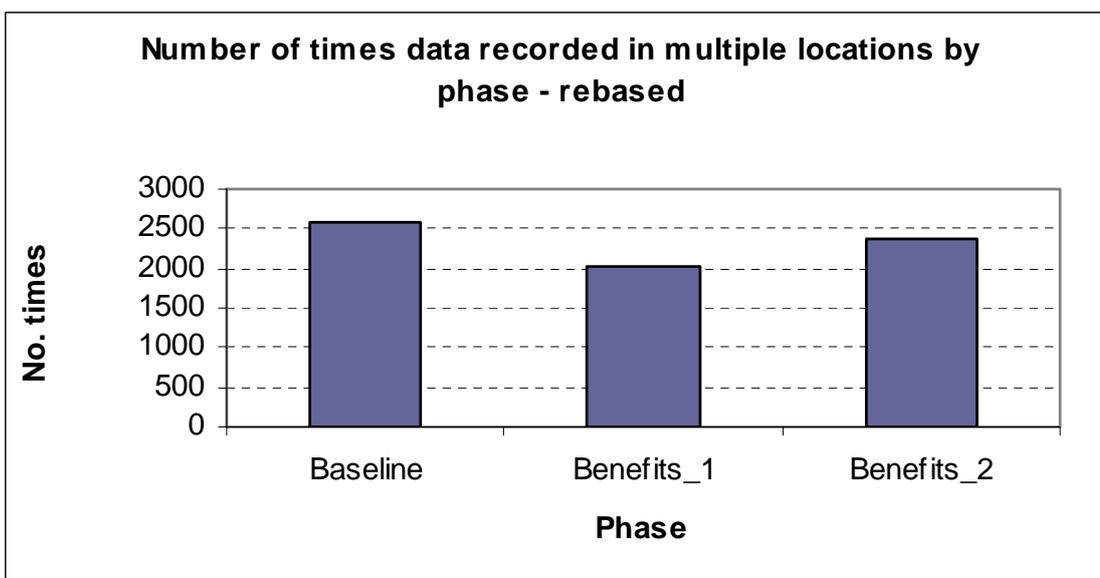


Figure 81 – Duplication of data

A shared electronic clinical record is used at this site, making it easier to reduce duplication with a mobile device, however the project has highlighted a significant variation in the amount of data captured in the electronic record by different clinicians. The reduction in duplication was

also limited by the limited number of devices available in each service, resulting in existing processes having to be maintained.

Duplication of data	Baseline	Benefits 1	Benefits 2	Change
District Nursing	9.6	7.5	7.7	- 19.8%
Speech & Language Therapy	0.5	0.1	0.0	- 100%
Stroke Team	7.5	6.8	7.4	- 1.3%
Specialist Nursing	2.7	2.2	1.6	- 40.7%

Table 71 – Data duplication by service

All Services show a reduction in duplication, however there is a significant variation seen across the Services.

The small reduction seen in the Stroke team is because they had already undergone a record rationalisation, and had already reduced their duplication significantly prior to commencing the mobile working project. This small reduction skews the overall finding - excluding the result would substantially improve the overall reduction in duplication.

Summary of Metric findings

- The data shows significant variation across Services
- The Stroke team have demonstrated that it is possible to achieve increases in productivity whilst making savings on travel
- Savings are possible in both Referrals and Admissions, the data showing significant savings being demonstrated for the latter at this site.
- Duplication of data can be reduced significantly in Services where this has not already been addressed.

Subjective findings

The items discussed in this section are those findings which were made based upon the subjective comments noted at the pilot site by the MHWP team, or reported in the free text comments on the data returns spreadsheets

Data entry: The devices allow patient information and care activities to be recorded and updated during episodes of care (for example in the patient's home) rather than carrying out data entry administration retrospectively. This encourages best practice and improves data quality. Records were reported to be higher quality and more accurate when a mobile device was used.

Access to resources: Clinicians felt that using the devices gave them greatly improved access to corporate policies and information which can be called up and discussed when they are needed rather than printed and discussed at a later time.

Contemporaneous data entry: Clinicians found that recording data about contacts at or around the point of care reduced the burden of retrospective data entry, helping to avoid the need to block out long periods of time to catch up on paperwork. The devices also helped avoid duplication of data entry.

Patient engagement: Rather than feeling alienated by the technology, patients seemed interested in what was being recorded and how. Clinicians felt that this extra engagement encouraged greater accuracy in data recording. Patients also appeared to be impressed with the way the devices improved clinicians' access to information, and it made them feel more involved in their own care. Clinicians felt that the devices helped improve patient confidence, for instance being able to show them resources that demonstrate objective improvements, such as medical drawings.

Patient choice: The ability for patients to book further appointments at the point of care with the clinician was one way that staff felt patient choice was improved through use of the devices.

Improved standards of care: Using tough-books has provided clinicians with evidence that care standards demanded of them are being met. For example it is now possible to demonstrate that palliative care patients are being seen within one hour of contacting service.

Decreased travel: Staff at Hartlepool perceived a decrease in unnecessary journeys made by their services, and time savings generated from this.

IT Support: The project struggled with local IT support due to uncertainty about where support for the site in general will sit in future. Some dissatisfaction with the waiting times associated with the BT helpdesk was expressed by users.

Improved effectiveness: Staff reported they felt better able to make fully informed decisions due to the improved access to information.

Business Continuity: The staff were able to maintain an acceptable level of Service provision during adverse weather conditions by utilising the mobile devices.

Flexible working: Staff were able to change their working patterns to better suit both the clients and the service – this led to staff feeling far more efficient in the use of their time.

Connectivity issues: Frequent and persistent connectivity problems were frustrating for staff, and restricted their ability to implement further changes to working practice.

In their own words

The following are examples of direct quotes from clinicians and patients throughout the project taken from the 18 patient comments and over 85 clinician comments that were received.

Clinician comments

Post-deployment

- “It is really hard to concentrate on system one with patients / family speaking to you.”
- “Toughbook taking long time to download [data].”
- “Having Toughbook meant I could write notes in between sessions whilst mobile without the unnecessary return to office base.”
- “I was able to work from home on this day. If I did not have my Toughbook I would have had to drive 50 minutes to office base and back.”
- “Avoided a no access visit as called before hand. Able to work from home around dental appt therefore maintained productivity.”
- “Worked from home am therefore maintained productivity during weather / travel difficulties.”
- “Got snowed in. Able to work from home until 10am when able to move car again.”
- “Now [my data is] recorded in 2 places instead of three.”
- “Accessed records for 5 clients to answer teacher queries in SSLC [Student Staff Liaison Committee]. Previously would have had to write down queries, go back to base to look up records, and then phone teacher or return to school.”
- “I feel that this device is enabling me to be productive. I can complete my notes continually at home at the end of the day. It is saving journey times and allowing myself as I travel on the buses to use the working hours in the day to be spent with patients.”
- “Was able to contact the patient over the phone when there was no answer at the door. Where as previously I would have rung back the office to chase contact telephone.”
- “Worked from home due to bad weather - was able to contact clients to cancel booked appointments but importantly did most of my managerial admin work without lots of distractions.”
- “Could not get to one patient because they requested a later time for their home visit and I was able to log on and contact another patient who lived in the same area as my previous visit.”
- “Able to go home to complete SystemOne update rather than having another journey to base.”
- “On late duty tried as much as possible to log each event at time of origin, found it difficult at times as carrying the phone, the number of phone calls means stopping and recording frequently.”
- “Started 8am had half hour lunch which was incorporated with team meeting, finished 5.30pm (2 hours extra, tried to use system 1 as designed at each point of contact until 4pm when still had 3 more patients to see before 5pm , computer then ran out of battery.”

Service user comments

Post-deployment

National Mobile Health Worker Project: Progress Report

- “Patient made positive comment re how this may make things more efficient.”
- “Patient commented that the computers reduce 'notes' writing as you can simply ‘type away’.”
- Client comment: “Clever use of technology.”
- Client comment: “It may save some time if you don’t need to go to office.”
- “Patients commented that they feel it is the way forward.”
- “One client commented that IT Systems always throws up [more] unexpected problems than they are worth.”
- “Unable to get G3 access so negative comments only re: time consuming.”
- “Patient liked that I could look back at past entries whilst in house.”
- “Able to tell staff at care homes when other patient visits are booked.”
- “Patient feels it should help nurses but wishes nurses did not have to do everything twice.”
- Client comment: “Very handy little thing it is then.”
- “Patient commented that we have enough to carry around without the laptops.”
- “Patient made comment re: inefficiency of paper notes.”
- “The client felt reassured that information sharing will mean fewer times that he may be asked the same questions.”

Service Changes seen

- Able to report on Palliative targets
- Improved choice offered to patients
- Working patterns changed
- Improved record keeping
- Improved activity recording

Conclusions

Impressions and achievements

The overall impression of the North Tees and Hartlepool pilot from the project team and the clinicians is that it was a very successful implementation. Participating staff noted that they have felt informed throughout and there has been great anticipation for the arrival of the devices for some time. The devices have been well received by everyone.

The pilot has significantly raised the profile of mobile technology within the organisation, demonstrating how it can be used to improve clinical care. It has also changed the emphasis on 'increased productivity' helping it to be accepted as a more positive and desirable state.

The increased flexibility in working processes and the perceived reduction in unnecessary travel have been well-received, with clinicians stating that the devices were helping them to better fulfil their roles.

Lessons learned – what would we do differently?

The timescales for implementation during the MHWP pilot were extremely challenging. The project team noted that ideally they would have benefitted from more preparation time.

Establishing realistic expectations amongst users, especially around connectivity, is important to minimise frustration when users are getting used to new technology.

The project team felt that for future projects they would want to look at alternatives to the N3 tokens currently used for secure network connections, as these proved to be the cause of the majority of issues reported to the BT helpdesk.

Clinicians and project personnel alike felt that the baseline and benefits tool provided by the MHWP team was overly complex, and that a simplified version would be much more appropriate for future projects.

Future plans for mobile working

- As a result of this project, the Clinical IT Steering Group has been established. With the participation of the Caldecott guardian, the group's remit is to discuss a range of IT issues, including taking mobile working forward.
- All of the clinicians involved see this pilot as the start of a long process, during which they will learn more and gradually increase the scope of the implementation.
- Current thinking is that in the future the mobile devices will be deployed as standard equipment instead of desktops unless a desktop is specifically requested.

NHS Northamptonshire Provider Services

(NHS Northamptonshire Healthcare Foundation Trust)



Introduction

The application to be included in the project was made by the Associate Director of IM&T, on behalf of NHS Northamptonshire Provider Services.

The Trust have deployed the clinical solution SystmOne across the health community.

Prior to the MHWP pilot, there were already approximately sixty district nurses using laptops with a VPN/3G connection and seventy child/young people's nurses, and six family nurse partnership nurses using mobile solutions, and the Trust want to further roll out mobile devices, to build on the benefits already experienced.

Initial Objectives

The following key objectives were stated by the organisation in their response to the MHWP invitation:

- Improved access to patient records, reducing risk in patient care;
- Improved recording of contemporaneous information;
- Scheduling further appointments at point of care;
- Improved resource planning;
- Improved sharing of up to date information;
- Improvement in data quality and timeliness of input;
- Reduced information governance risks;
- Improved access to clinical guidance;
- Improved access to online resources such as Map of Medicine, BNF, patient information leaflets;
- Delivery of productivity savings;
- Decreased mileage;
- Increased patient contact;
- Maximise efficiency;
- Enable more focussed and patient centred care.

About the Project

Project Team

- Project Lead

The service project lead had a clinical background and was seconded into the role of SystmOne Specialist for the lifetime of the project.

At a Glance

Northampton	
Number of devices	50
Geography	Predominantly rural
Clinical systems used	SystemOne Community
Non-EPR requirements	Web mail, intranet, internet, Microsoft Office applications
SIM provider	O ₂
Pilot go-live date	November 18 th , 2010

Table 72 – At a Glance: Northampton

Service	Number of Users	Percentage of Service
Community Nursing	50	15%

Table 73 – At a Glance: Services involved

Project Methodology

The Northampton pilot was run as a work stream initially applied for and developed by the IM&T Directorate before being handed over to the Community Nursing and Project Lead on commencement of the pilot. There was clear sponsorship and leadership for the project initially, however the delivery of the project was passed over to the Service leads.

The Project Lead was responsible to the Strategic Development Lead for all aspects of the project.

There was no formal local governance for the pilot – the project’s progress was reported informally by the Project Manager to the Strategic Development Lead

There was no documentation produced locally to support the project.

Change Management, Skills Analysis and Support

Due to the tight timescales and the lack of continuity in personnel, change management activities were not conducted prior to commencing the pilot. It was anticipated business change activities, including process mapping would occur at a later date. Throughout the project, service redesign suggestions came directly from users, creating a ‘bottom up’ approach to business change. This allowed staff to take their time learning to use the devices, building their confidence at their own pace and identifying changes to their own working practices as they occurred naturally. It was acknowledged locally that a significant cultural change, based on the observations made by clinicians, would be needed to realise the full benefits of mobile solutions.

In order for clinicians to identify process changes, their IT skills must be of a sufficiently high level for them to feel confident using the devices independently, experimenting with different applications to see if they are of use. IT skills analysis was not formally undertaken as part of the Northamptonshire project; however, recent clinical application refresher training had just occurred and this was considered to be sufficient preparation for the pilot work.

In terms of IT support, the recommended first line contact for users during the pilot was their designated ‘superuser’. Superusers had been identified in the recent Refresh project, having received extra SystemOne training and being observed to be competent IT users. If this link

person was unavailable or unable to help, users were directed to contact the designated Project lead or project support who would in turn direct them to either the local IT helpdesk or the BT helpdesk, depending on the nature of the problem.

Implementation Technical Detail

Information for this section has been collated from the technical information provided by BT during the implementation phase, as well as from direct discussions with the site project team. Please refer to the glossary of terms for clarification on the meaning of any of the technical items below.

Gold Build – At a Glance

Northampton opted to accept the standard TCS configurable Gold Build, plus the following items:

- Sophos licence username and password.
- 2e2 SafeBoot installer.

Technical Issues

Pre-deployment

This section documents any technical issues that arose for the pilot site during the pre-deployment phase.

There was a minor delay in the site receiving the Safeboot licenses which delayed the test laptops build. In addition to this BT also experienced issues with the Gold Build which delayed the test device delivery by a further 2 weeks, and as a result the 3G cards were only able to be tested for a couple of days.

The biggest delay was caused due to a delay in the organisation agreeing which network provider should supply the SIM cards for the devices.

An issue with the Sophos firewall caused training at the Northampton site scheduled for October 14th to be abandoned and laptops were returned to BT for investigation. Training was rescheduled for November, and the site eventually went live on November 18th 2010.

Post-deployment

A total of 29 issues were raised during the project period to the BT helpdesk. Please refer to the glossary of terms for clarification on the purpose of any of the technical items below:

- 20 issues relating to the device:
 - o 2 setting/configuration issues;
 - o 11 mobile express;
 - o 7 VPN issues.
- 1 issue related to peripherals:
 - o SmartCard faulty/lost.
- 8 issues related to the Windows Operating System:
 - o 5 application not responding;
 - o 2 information required;
 - o 1 clinical system issue.

General issues

Teething problems: The pilot implementation seemed to have lots of small technical problems to start with, as detailed in the pre-deployment section above. It took a while to get the gold build right, and users experienced connectivity issues in training sessions as well as problems with Safeboot encryption software registration initially.

Connectivity: Once these initial problems had been tackled, the main technical issue for users were the ongoing slowness/connectivity problems experienced by many other sites.

Study Findings

Metrics

The following section provides a summary of the metric analysis, collated from the spreadsheets returned to the MHWP team.

The table below gives an indication of the level of returns submitted by the 50 staff taking part at the Northamptonshire pilot site. As discussed earlier in the report, not all returns could be used in the analysis.

Returns: overview

Returns	Percentage of users returning data
Baseline data	62%
Mileage month 1	94%
Mileage month 2	90%
Benefits month 1	70%
Benefits month 2	60%
Average return rate	75%

Table 74 – Rate of returns: Northampton

Metrics: overview

Clinicians	Number in project	Baseline returns	Benefits 1 returns	Benefits 2 returns
Community Nursing	50	27	27	26

Table 75 – Overview of Returns used in analysis

Days data	Baseline	Benefits 1	Benefits 2	Totals
Community Nursing	414	274	437	1125

Table 76 – Overview of Number of Days of data returned

Data Usage

The image below, generated from data usage statistics collected by BT, gives a visual indication of the data usage at the Northamptonshire site as clinicians take up and learn how to use the devices. The graph shows an overall trend of a steady increase after deployment.

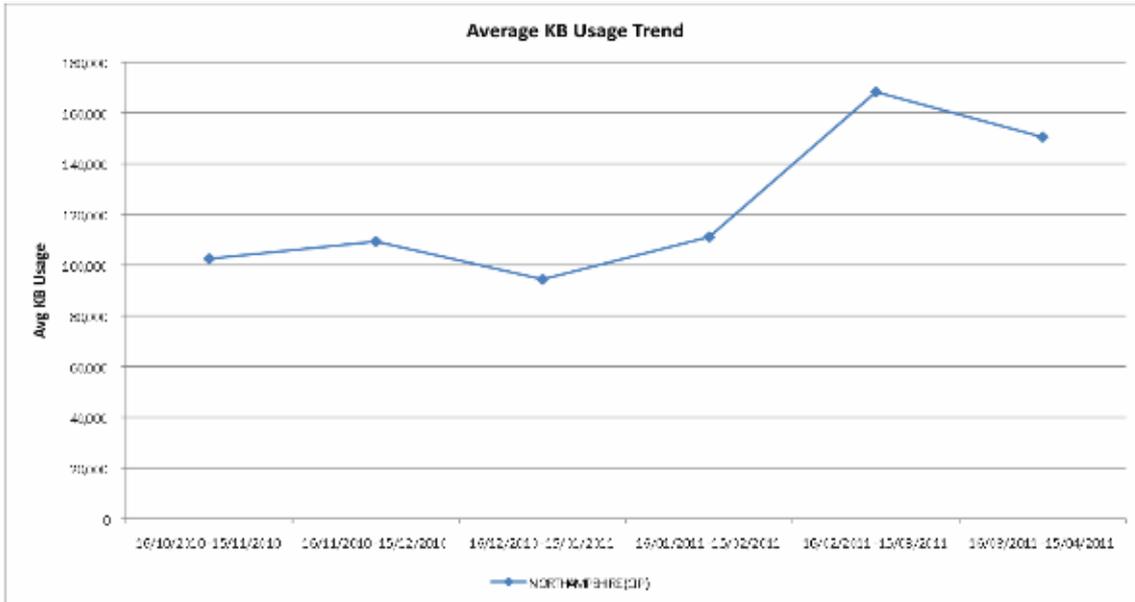


Figure 82 – Data usage trend

Contacts:

During the entire data recording phase, staff at the Northamptonshire site recorded a total of **8111** contacts.

The number of contacts per day for each clinician fell by **10.1** percentage points from Baseline to Benefits 2:

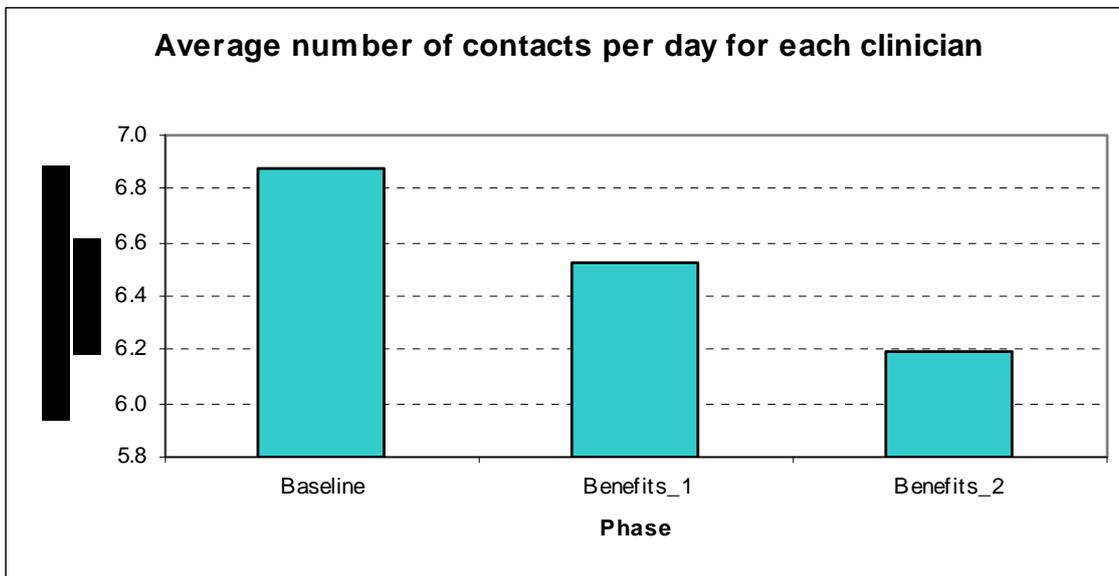


Figure 83 – Average contacts per clinician, per day

The project was quite late to go-live and their actual go-live date was on 18th November 2010, just 4 days before the Benefits 1 collection period.

Due to this, at Benefits 2 collection users had only been using the device for 2 months, and were struggling with using the devices effectively. The metric confirms reports from users that they felt using the device was taking them longer to perform visits.

Low returns may also have affected the results – if more returns were provided, or if users had been able to complete a further data collection 1 month later, it may have shown different results. The local project team struggled to train staff on the use of the data collection spreadsheets, and there were issues on availability of the spreadsheets locally.

Contacts were broken down by duration, and the results across each duration can be seen on the following chart:

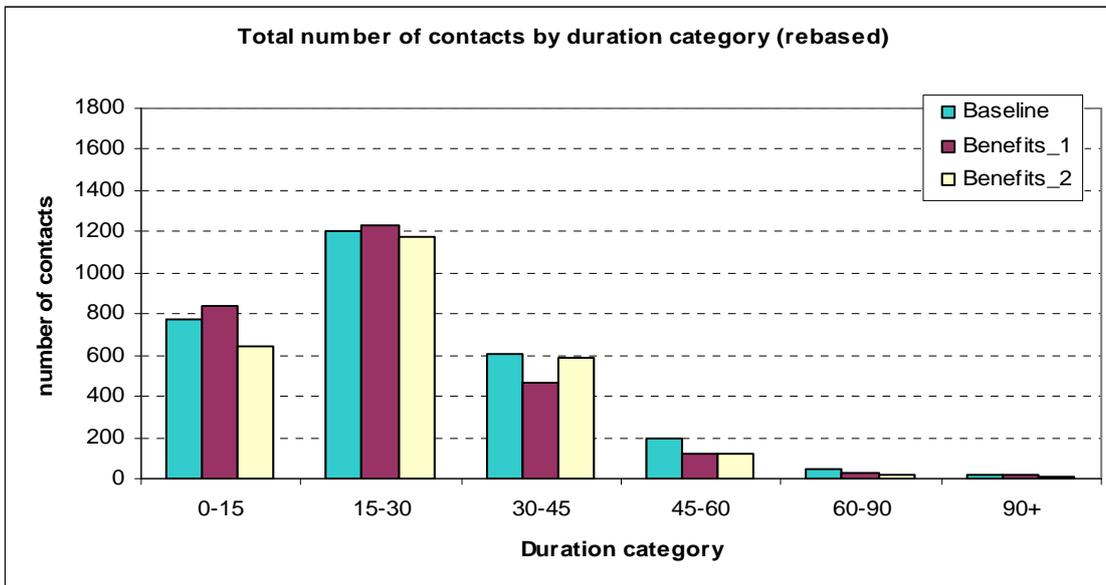


Figure 84 – Total contacts by duration

The above graph confirms that contacts across all duration categories fell.

Duration of face to face contact with patients

The site recorded a **12.9** percentage point decrease in the number of minutes spent with patients.

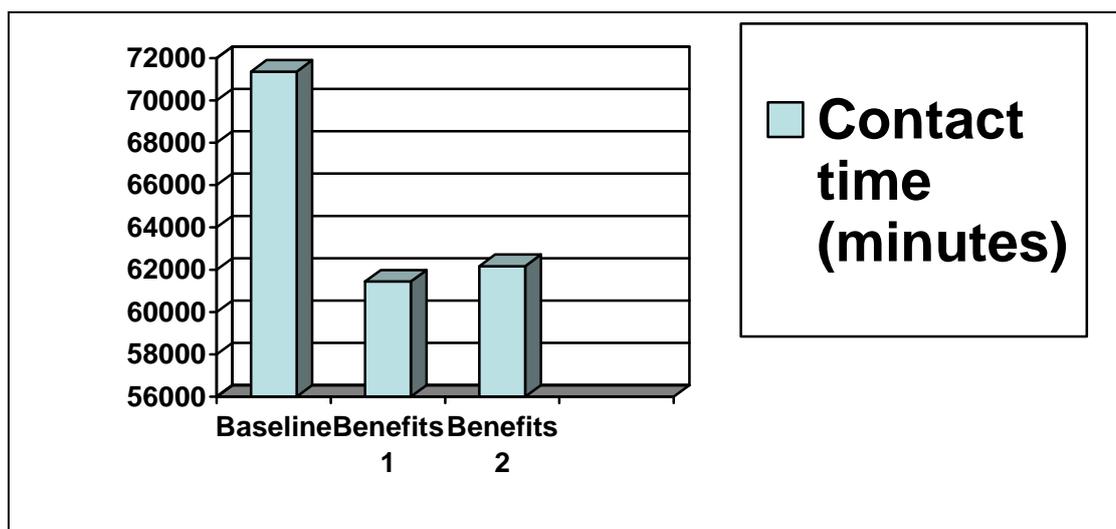


Figure 85 – Contact time (in minutes)

This finding is in line with the reduction in number of contacts and the fall in contacts across all duration categories.

Journeys:

During the entire data recording phase, staff at the Northamptonshire site recorded a total of **8430** journeys.

The number of journeys per day for each clinician fell by **6.9** percentage points over the course of the pilot.

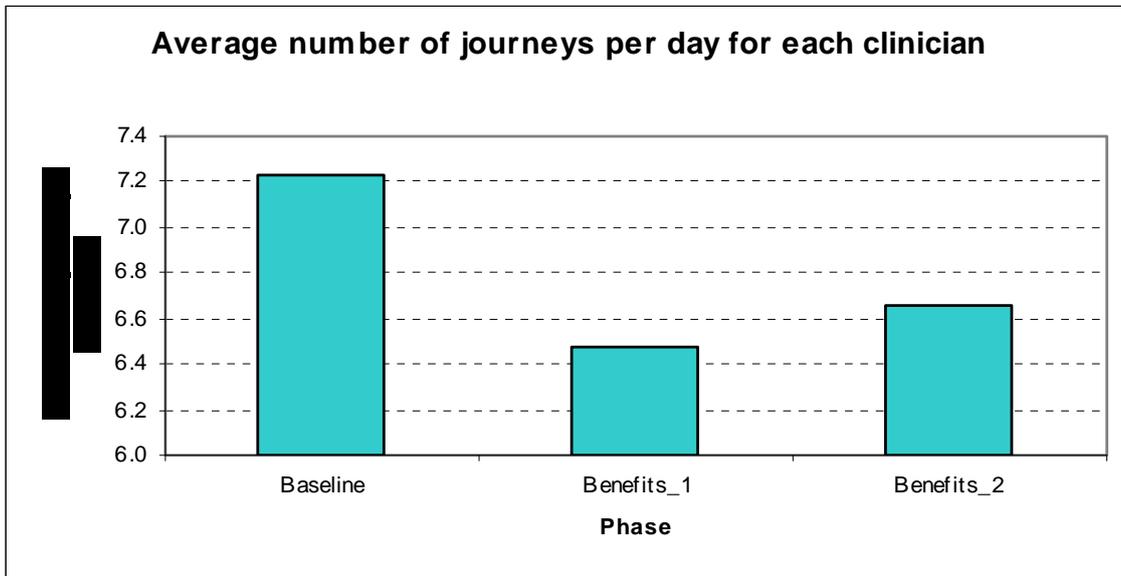


Figure 86 – Total journeys

Although the number of journeys fell, the amount was not as large as the associated fall in contacts.

Journeys were also broken down into durations, and the results are shown in the following chart:

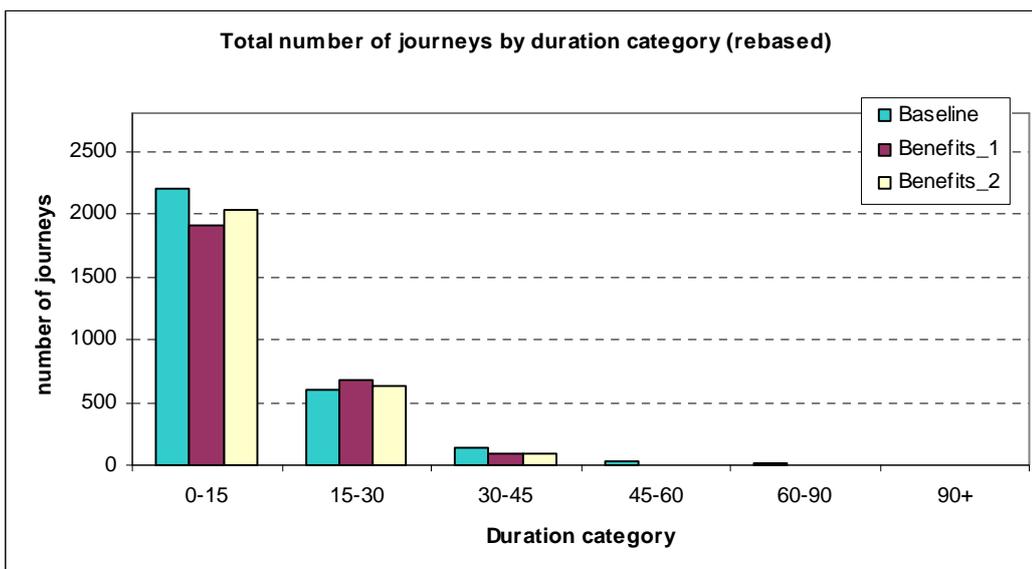


Figure 87 – Total journeys by duration

Number of journeys across all duration categories fell, except in the 15-30min category, which showed a slight increase.

Clinicians recorded that the minutes they spent travelling decreased by **12.6** percentage points from Baseline to Benefits 2.

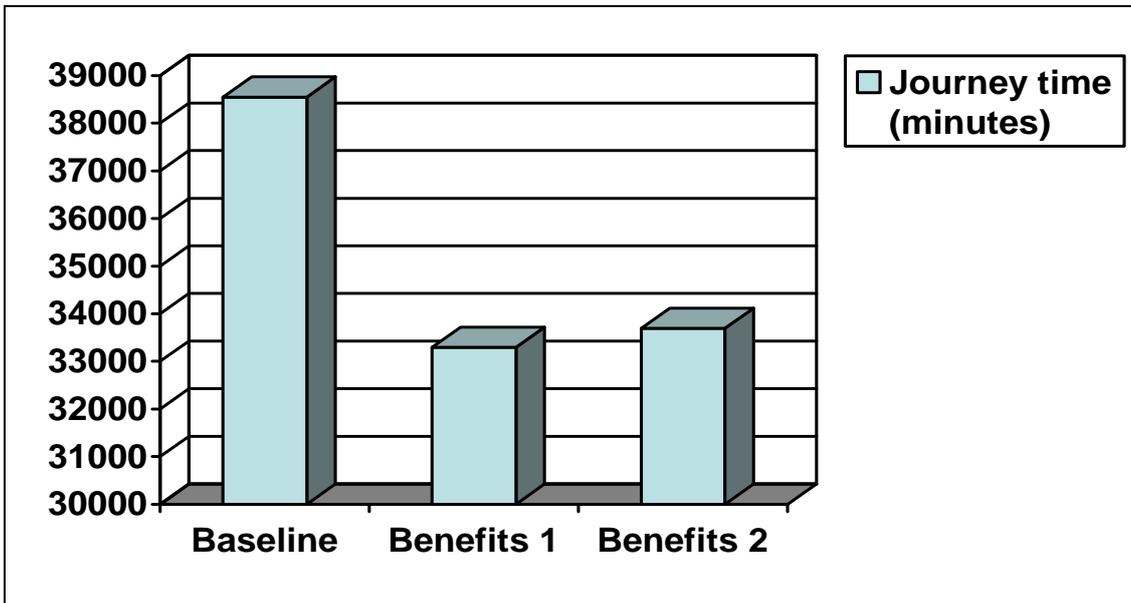


Figure 88 – Journey time (in minutes)

This is a greater reduction than seen in number of journeys, and reflects the reductions seen in the longer journey duration categories.

Mileage:

Mileage	#1	#2	Change
All staff (33 returns)	12697	10557	- 16.9%

Table 77 – Mileage

Mileage claimed for the site over the same period (taken from a sample of 33 clinicians who returned mileage data) indicated that mileage had decreased by 16.9 percent.

Number of mileage returns was higher than number of data collection returns, therefore this may give a more representative reflection of the outcome of the project than the journeys data.

It may also reflect the reduced travel to/from base that has been reported in the subjective findings.

Referrals:

In total, **528** referrals were made over the Benefits period. Clinicians at Northamptonshire estimated that due to having access to the devices, they saved **66** potential referrals. This equates to a **11% saving** of referrals.

Admissions:

In total, **34** admissions were made over the Benefits period. Clinicians at Northamptonshire estimated that due to having access to the devices, they saved **10** potential admissions. This equates to a **23% saving** of admissions.

No access visits:

No access visits decreased by **26.6** percentage points from the baseline measurement to the second benefits measurement period.

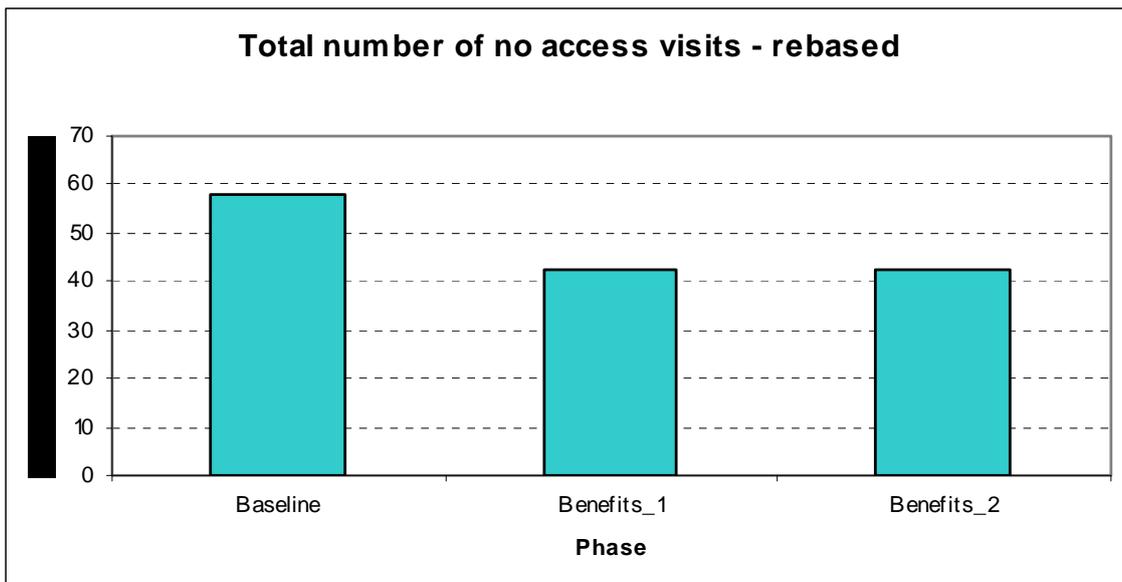


Figure 89 – No access visits

This is likely to be due to improved access to information at the visit, such as telephone contact numbers and other appointment information.

Duplication of data:

The metrics show an increase in duplication of data of **5.0** percentage points from the baseline measurement to Benefits 2

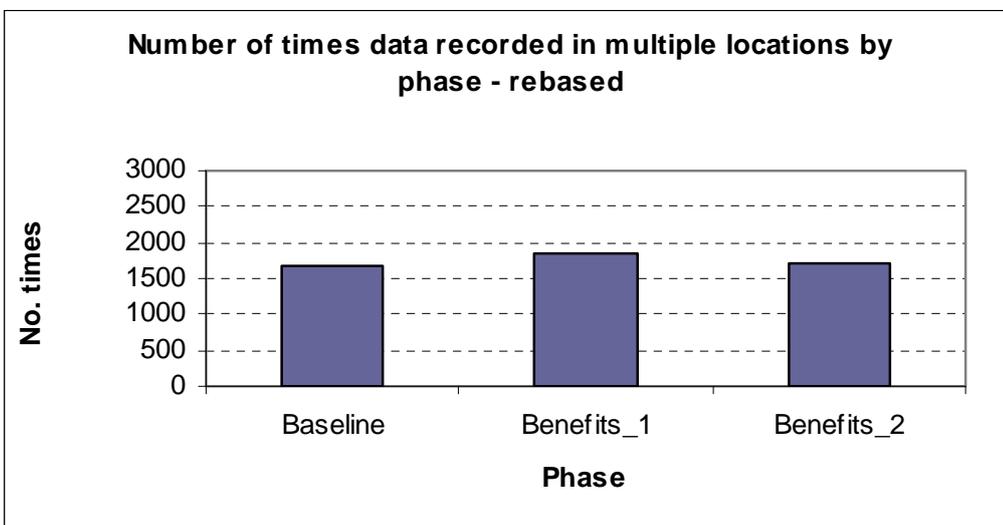


Figure 90 – Duplication of data

As this site uses an electronic patient record, it was expected that duplication would fall, however there was a transition during the project period from staff considering their paper records to be their legal clinical record, to the electronic record being their main legal record. This may have resulted in duplication of recording and processes, with staff without devices finding it difficult to make the transition.

Difficulties with connectivity also led to increased duplication, due to fear of losing information, or having to re-type it, and the local project team felt some staff may have considered the completion of the data collection forms themselves as a duplication.

Summary of Metric findings

- The low data returns and the lateness of the go-live make the data analysis for Northamptonshire difficult to interpret with any degree of confidence.
- Despite connectivity issues, savings in travel costs have been shown.
- Savings are possible in both Referrals and Admissions.
- Significant reductions in no access visits have been shown

Subjective findings

The items discussed in this section are those findings which were made based upon the subjective comments noted at the pilot site by the MHWP team, or reported in the free text comments on the data returns spreadsheets.

Battery life: Unlike some other sites, users at Northampton reported that the device battery life was good, on the whole lasting a 'usual' working day without the need for recharging.

Clinical information: Access to clinical information at the point of care was a big bonus to clinicians at Northampton, who felt that this improved access would have a positive effect on patient safety, as well as improving staff confidence in relation to processes such as nurse prescribing.

Service continuity: During the period of wintry weather at the end of 2010, clinicians at Northampton felt that the devices helped them to continue to operate their services remotely, maintaining contact with patients whilst working from their homes. This helped to avoid unnecessary and possibly hazardous journeys in the bad weather.

Flexible working: Clinicians were pleased that the device offered the ability to work from home and to access their email from wherever a network signal was available. Clinicians can now start and end their shifts by logging on to the device at home as well as using office bases other than their own to stop off and update work. Northampton clinicians found the devices particularly useful for accessing email on the move and for on-line training. Having remote access to such resources allows tasks such as training to be fitted into their days whenever it was convenient for them, rather than having to block time out for it specifically.

Whole-service transformation: Clinicians felt that the devices made life easier but that benefits would be less constrained if the whole team had the mobile technology. Working with only a small percentage of the team having access to the devices was not conducive to wholesale changes in working practice as old methods of working must still be observed for team members without access to the new technology.

Connectivity issues: There are large areas of limited connectivity at this site and this lead to frustrations in staff. They found visits were taking longer as they struggled with connections, and found having the devices generally time-consuming. When the connection was good they found the devices improved efficiency and felt more effective.

Improved access to email: Staff liked to improved access to email and also to online training – this allowed them to not have to set time aside to perform these tasks, but could do them as and when they had spare time.

In their own words

The following are examples of direct quotes from clinicians and patients throughout the project taken from the 1 patient comment and 8 clinician comments that were received.

Clinician comments

Post-deployment

- “I’m not pleased with length of time delayed due to inputting.”
- “Concerned that the amount of money spent on laptops would have been better spent making sure we had enough staff.”
- “Took 10 minutes to access patients record even though already logged into SystemOne. Spent 15 out of the 35 minute visit just on SystemOne. Time consuming!”
- “Poor reception in Spratton and Cold Ashby. Couldn’t use Toughbook effectively and became very frustrating as needed patient contact details and to access scheduler for weekend.”
- “Not used at patients homes today as too many visits and not enough time to individually add data at each visit, as struggling to fit in even seeing the patients.”
- “Was very useful when trying to contact a patient when out- was able to access patients details and contact them.”

Service user comments

Post-deployment

- “Patient liked the Toughbook. Thought it was very light.”

Service Changes Seen

- No changes were seen at Northamptonshire, due to the limited number of users in the Service with a device and the connectivity issues experienced.

Conclusions

Impressions and achievements

The project underwent a change of team between commencement and go-live, and communication between the two teams could have been improved. The project team felt that better communication could have improved local management of the pilot.

For the users who did not experience connectivity problems, the pilot demonstrated that flexible working and access to up to date medical information at the point of care is possible. Unfortunately, the project team reported that only a small proportion of users did not experience connectivity issues which limited the benefits of the pilot.

Lessons learned – what would we do differently?

The project team reported that the pilot may have benefitted from better overarching communication and planning locally in the early stages of the project, and more involvement from IT services.

They concluded that active IT services involvement throughout the project is needed to keep on top of technical aspects of mobile working, and that the involvement of IT services would also promote a more structured approach to mobile projects.

Future plans for mobile working

- A business case is being written to roll-out mobile working across the District Nursing Service in Northamptonshire. This is based on utilising existing hardware (Dell laptops) and will use Vodafone SIMS, which are acknowledged to have issues with coverage across the locality, but there is a need to make use of the investment already made.
- At present there is currently a rollout plan to take mobile working forward in other Community Services.
- The local project team are negotiating with their SIM provider to use 'preferential' bandwidth to improve the connectivity issues.

South West Essex Primary Care Trust part of North East London Foundation Trust



Introduction

The application to be included in the project was made by South West Essex Community Services, which has successfully implemented the clinical solution SystemOne across the organisation.

Initial Objectives

The following key objectives were outlined by the organisation in their response to the MHWP invitation:

- More effective communication
- Delivery of better care resulting in reduced admissions
- Improved data collection and reporting
- Improved data quality and governance
- Improved planning of clinical resource
- Real time data entry
- The electronic record to become the “legal clinical record”
- More informed clinical decisions
- Staff feeling more valued
- Reduction in serious untoward incidents (SUI) due to improved access to information

About the Project

At a Glance

South West Essex	
Number of devices	52
Geography	60% urban, 40% rural (estimated)
Clinical systems used	SystemOne Community
Non-EPR requirements	Email, intranet, web-based training
SIM provider	BT Mobile & O ₂
Pilot go-live date	November 17 th , 2010

Table 78 – At a Glance: South West Essex

Service	Number of Users	Percentage of Service
COPD	5	30%
Heart Failure	4	66%
End of Life	2	100%
Children's SLT	11	40%
District Nursing	15	5%
Health Visiting	15	12%
Total	52	

Table 79 – At a Glance: Services involved

Project Team

The local Project team consisted of:

- Project lead;
- Business change resource (led by Transformation Team, also undertaking Productive Community work with other staff groups);
- Clinical lead;
- Technical lead.

Project Methodology

The local governance for the project was with the leadership team at management level and was fully supported by the managing director. Monthly meetings were held to discuss effectiveness. There was clear sponsorship and leadership from the organisation.

Documentation produced and seen by the CIP liaison includes the following:

- Local Clinical Activity reports,
- Project Plan,
- Risks and issues log,
- Local communication on mobile working to all managers,
- Mobile working Benefit report

Change Management, Skills Analysis and Support

Mapping of working processes and the transformation thereof has been a continual process for South West Essex Community Services. The Transformation Team have worked alongside Mobile Health Workers to identify and bring about different ways of working. As a key part of South West Essex's mobile working strategy, a working group of clinicians has been formed to steer the implementation and roll out of devices and associated working practices. Staff are always encouraged to look at how the devices could enable them to work in different ways to maximise the benefits from the devices.

The standard BT training was augmented by the project lead with the production of a video designed to show staff how to use the MHWP baseline and benefit tools to collect metric data for the pilot which proved to be very effective.

IT support for the project was provided through SLAs with the Acute Trust.

The IT Support service was proactively involved and supportive throughout the pilot.

South West Essex welcomed the managed IT service from BT, and therefore the recommended first line support for users was to contact the BT helpdesk number directly and to refer back to the local support only if the helpdesk could not resolve the issue.

South West Essex 'super users' extended their remit from SystemOne to include mobile working, providing an extra layer of support and advice for other clinicians as they were deploying the mobile devices.

Implementation Technical Detail

Information for this section has been collated from the technical information provided by BT during the implementation phase, as well as from direct discussions with the site project team. Please refer to the glossary of terms for clarification on the meaning of any of the technical items below.

Gold Build – At a Glance

South West Essex opted to provide their own Windows 7 build for the pilot and this was checked over for compatibility with Mobile Xpress by BT. The build included access to Microsoft Exchange mail server for staff emails.

Technical Issues

Pre-deployment

This section documents any technical issues that arose for the pilot site during the pre-deployment phase.

The South West Essex pilot deployment had a relatively slow start, with some delays around the ordering of N3 tokens and the availability of personnel to verify whether Windows 7 would be compatible with the VPN software used across all pilot sites. The time taken to ensure compatibility of Windows 7 did in fact prove that applications would work with this operating system and South West Essex were the only site to deploy with Windows 7. The VPN client used is compatible with Windows 7 and is now in use on SWECS desktops and Toughbooks

The issues of ordering new Windows licences and working with the newly released Windows 7 delayed the completion of the gold build and resulted in several weeks of delay that had a knock-on effect on scheduled training and the project go-live date.

Users began to go-live at South West Essex towards the end of October.

Once all issues had been resolved and the final gold build had been signed off, the remaining users were all live by November 17th, 2010.

Post-deployment

A total of 90 issues were raised during the project period to the BT helpdesk, including:

- 74 issues relating to the device:
 - o 23 mobile express/GPRS connection failure issues;
 - o 29 VPN issues;
 - o 20 settings/configuration issues;
 - o 2 communications failure issues.
- 8 issues related to peripherals:
 - 5 smartcards faulty/lost;
 - 2 SIM swaps;
 - 1 faulty adapter.
- 8 issues related to the Windows Operating System:
 - 4 application not responding;

National Mobile Health Worker Project: Progress Report

- 3 information required;
- 1 clinical system.

General issues

IT support: The project team had not anticipated the limited capacity of their IT Support service and this caused delays in resolving issues with the device gold build.

Battery life: The battery life of the devices was not as good as hoped, with some users needing to charge the devices during the day at their base location.

Study Findings

Metrics

The following section provides a summary of the metric analysis, collated from the spreadsheets returned to the MHWP team.

The table below gives an indication of the level of returns submitted by the 52 staff taking part at the South West Essex pilot site. As discussed earlier in the report not all the returns could be used in the analysis,

Returns: overview

Returns	Percentage of users returning data
Baseline data	68%
Mileage month 1	52%
Mileage month 2	32%
Benefits month 1	42%
Benefits month 2	44%
Average return rate	48%

Table 80 – Rate of returns: South West Essex

Metrics: overview

Clinicians	No. in project	Baseline returns	Benefits 1 returns	Benefits 2 returns
Health Visiting	15	9	3	2
District Nursing	15	11	6	13
End of Life	2	2	2	1
COPD	5	3	0	5
Heart Failure	4	3	0	0
Children's SLT	11	5	0	0
Total	52	33	11	21

Table 81 – Overview of Returns used in analysis

Days data	Baseline	Benefits 1	Benefits 2	Totals
Health Visiting	50	31	28	109
District Nursing	78	47	224	349
End of Life	29	27	30	86
COPD	24	0	23	47
Heart Failure	17	0	0	17
Children’s SLT	39	0	0	39
Total	237	105	305	647

Table 82 – Overview of Number of Days of data returned

Data Usage

The image below, generated from data usage statistics collected by BT, gives a visual indication of the data usage at the South West Essex site as clinicians take up and learn how to use the devices with a significant increase in data usage following the go live which continues to rise.

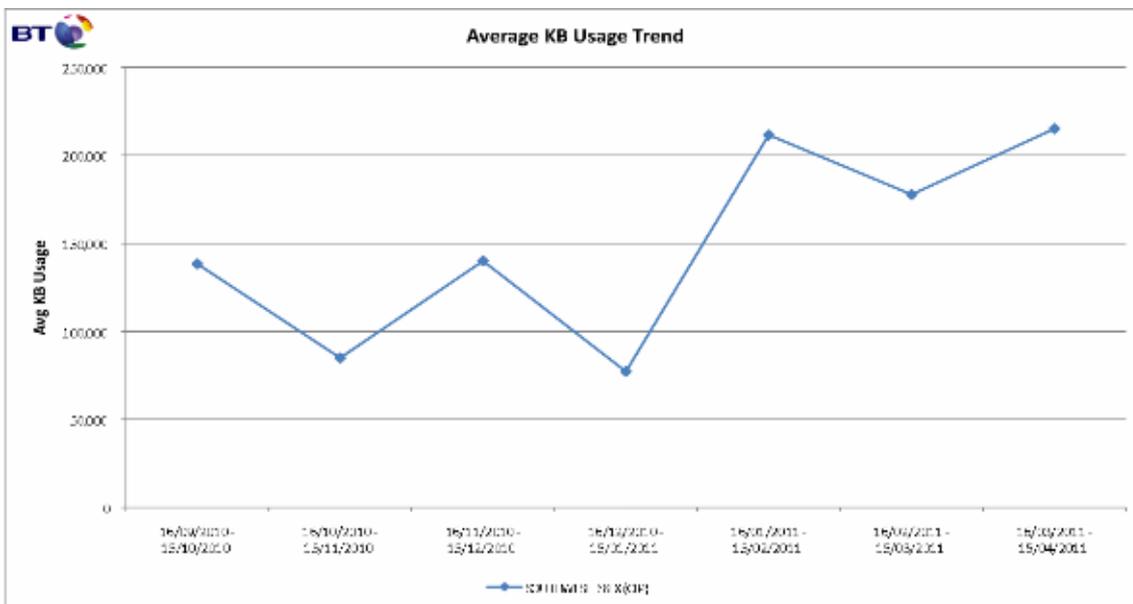


Figure 91 – Data usage trend

Contacts:

During the entire data recording phase, staff at the South West Essex site recorded a total of **4695** contacts.

The number of contacts per day for each clinician rose by **76.6** percentage points over the course of the pilot.

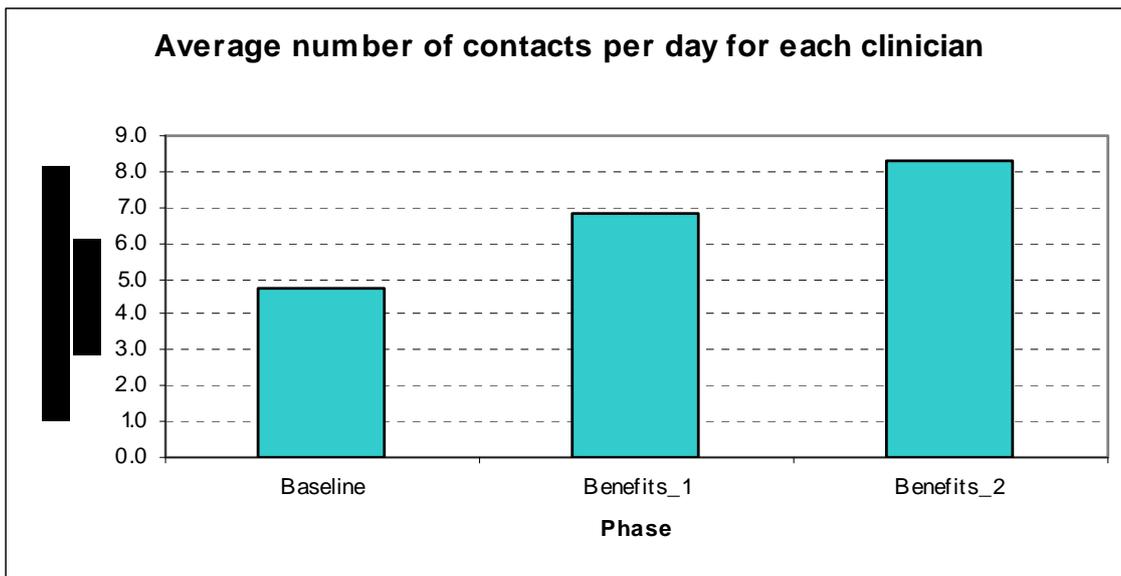


Figure 92 – Average contacts per clinician, per day

However, the South West Essex project team have conducted their own analysis from the same time periods from their clinical system, which support an increase from Baseline to Benefits 2, although at a reduced level of 6%. The project team feel that low levels of submissions may have impacted on the reliability of the data

Contacts were broken down into durations, and the results are shown in the following chart:

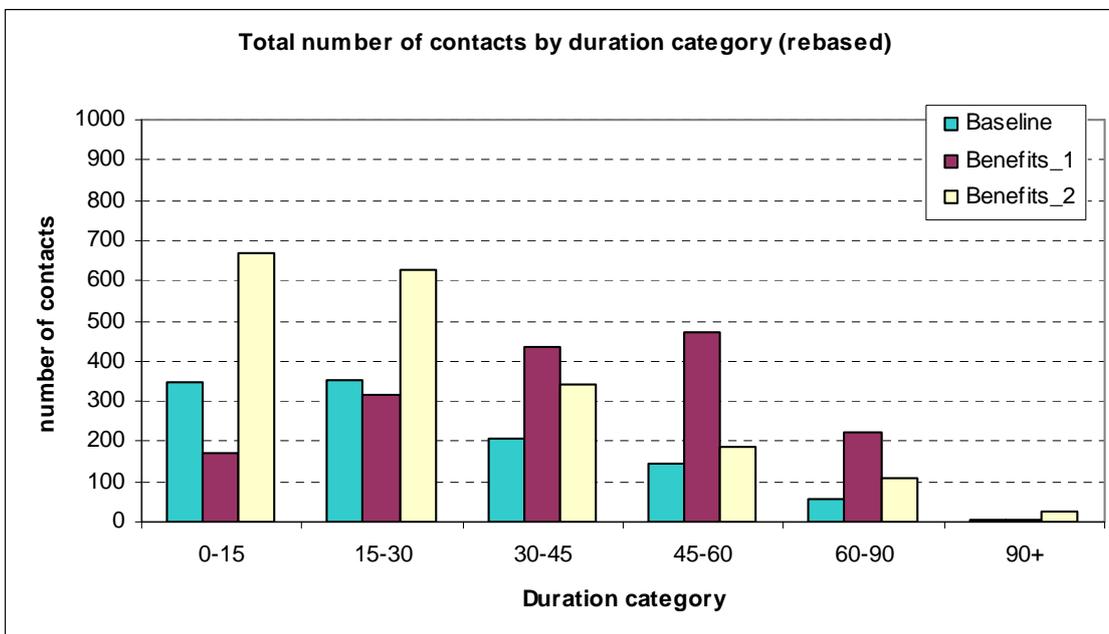


Figure 93 – Total contacts by duration

An increase in contacts across all duration categories can be seen.

Duration of face to face contact with patients

The site demonstrated a significant increase in contact durations, with a **69.7** percentage point increase in the number of minutes spent with patients.

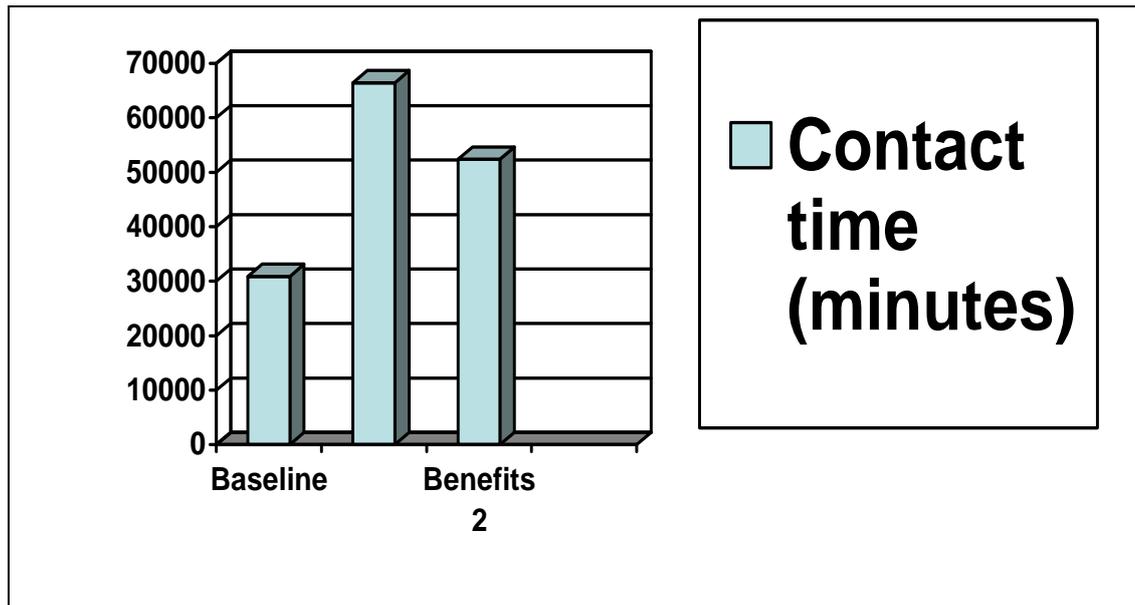


Figure 94 – Contact time (in minutes)

This increase reflects the change in the contact duration profile, which shows greater increases across the shorter durations.

When broken down into the individual services, the metrics for contacts indicate that all services recorded increased contacts from Baseline to Benefits 2, and significant variation across Services is seen:

Average contacts per day	Baseline	Benefits 1	Benefits 2	Change
Health Visiting	6.8	8.0	12.9	+ 89.7%
District Nursing	6.1	8.5	8.9	+ 45.9%
End of Life	1.8	2.6	2.0	+ 11.1%
COPD	2.1	-	5.0	+ 138.1%

Table 83 – Contacts by service

The South West Essex Project team have investigated the findings locally and believe the Health visitor data has been affected by the inclusion of immunisation clinic data in Benefits 2 analysis, which has skewed the results.

They found the District Nursing data and the End of Life Service data to be representative; however the COPD baseline may not be representative as they were undergoing a review process at the time of collection. Their clinical system shows average activity prior to this was around 5 contacts per day.

Journeys:

During the entire data recording phase, staff at the South West Essex site recorded a total of **4008** journeys.

The number of journeys per day for each clinician rose by **90.2** percentage points over the course of the pilot.

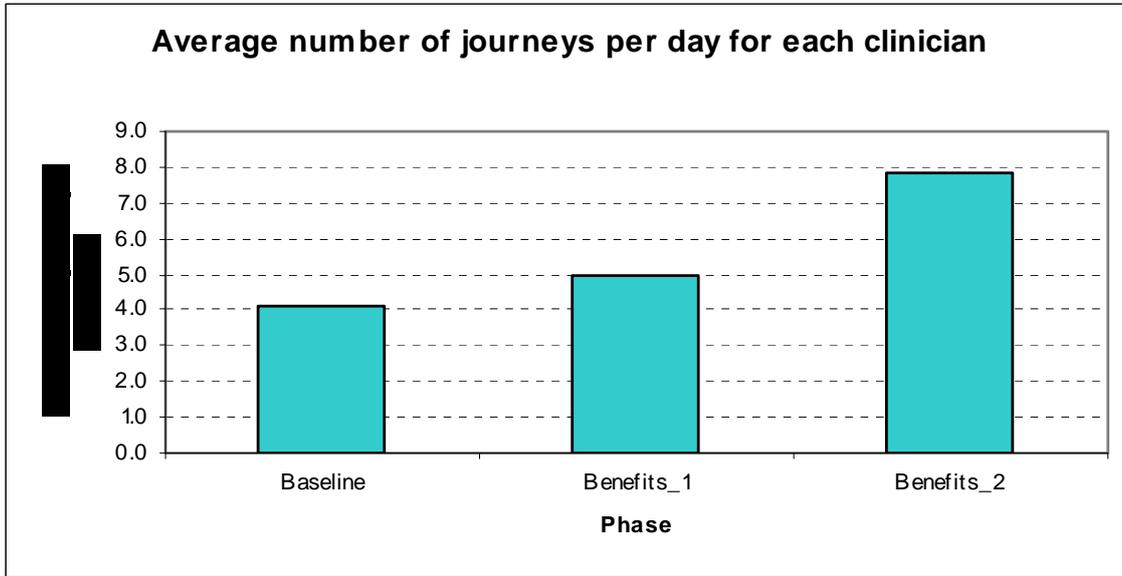


Figure 95 – Total journeys

The journeys appear to have increased slightly more than the contacts have increased.

Journeys were also broken down into durations, and the results are shown in the following chart:

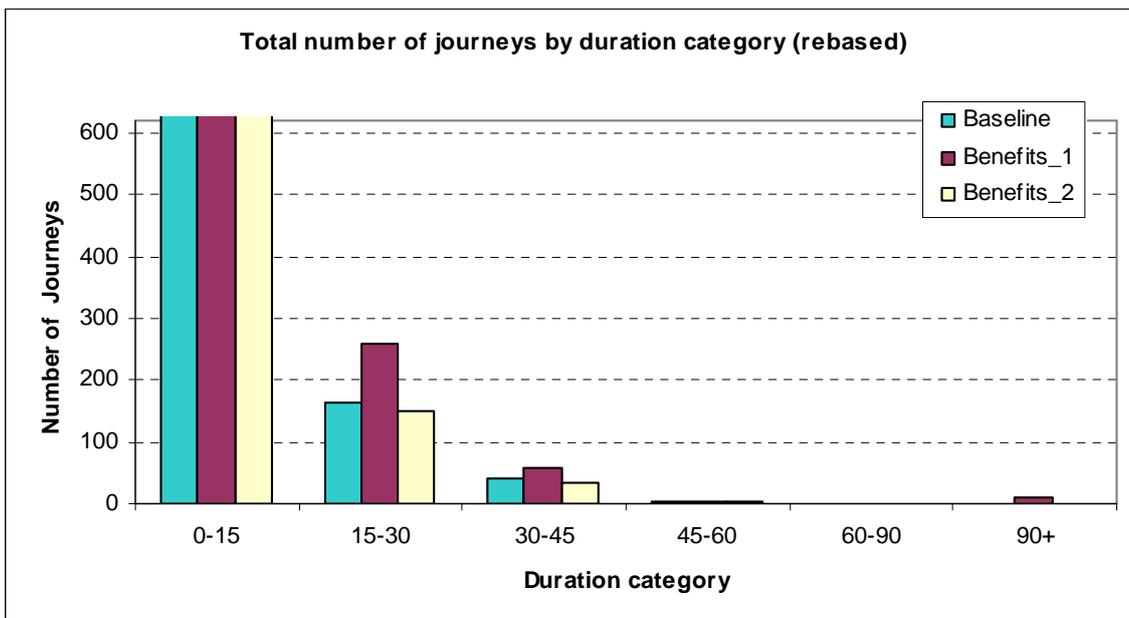


Figure 96 – Total journeys by duration

The number of journeys appear to have fallen across all duration categories except the shortest duration category (0-15min).

Journey durations changed significantly from baseline to the second benefits collection, with clinicians recording on average the minutes they spent travelling increased by **56.8** percentage points.

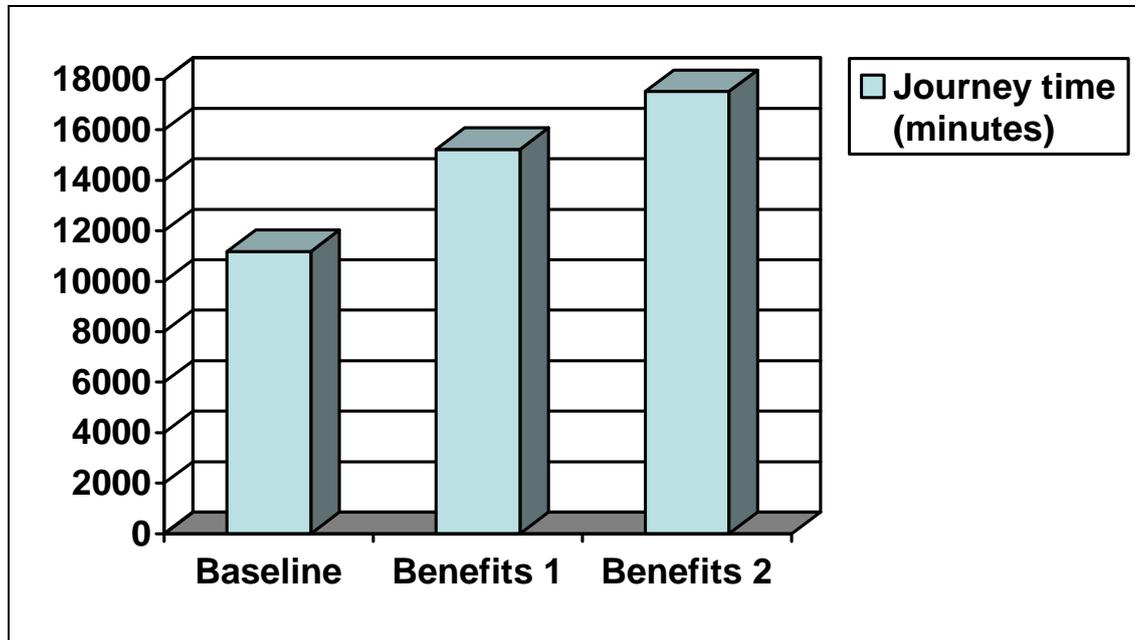


Figure 97 – Journey time (in minutes)

This represents the increase in number of journeys, but reflects the increase is in the shortest duration category.

When broken down into the individual services, the metrics for journeys indicate that one service decreased numbers of journeys per day over the pilot duration:

Average journeys per day	Baseline	Benefits 1	Benefits 2	Change
Health Visiting	3.2	1.4	3.5	+ 9.4%
District Nursing	7.1	8.3	9.0	+ 26.8%
End of Life	3.2	3.3	4.5	+ 40.6%
COPD	2.5	-	5.4	+ 116.0%

Table 84 – Journeys by service

The Project team could not reproduce journey information from their clinical system, but feel the End of Life data is probably representative, as this is a service of 2 people, and only 1 was covering across the large geographical area at that time.

Mileage:

Mileage	#1	#2	Change
All staff (13 returns)	2466	4560	+ 84.9%

Table 85 – Mileage

Mileage claimed for the site over the same period (taken from a sample of only 13 clinicians who returned mileage data) indicated that mileage had increased by **84.9** percent.

The project team have reported their expenditure on travel increased by just 13% from Baseline to Benefits 2 collection.

Referrals:

In total, **421** referrals were made over the Benefits period. Clinicians at South West Essex estimated that due to having access to the devices, they saved **14** potential referrals. This equates to a **3.2% saving** of referrals.

Admissions:

In total, 6 admissions were made over the Benefits period. Clinicians at South West Essex did not record any instances in which they felt that the device saved them from making an admission.

No access visits:

No access visits decreased by 23.9 percentage points from the baseline measurement to the second benefits measurement period.

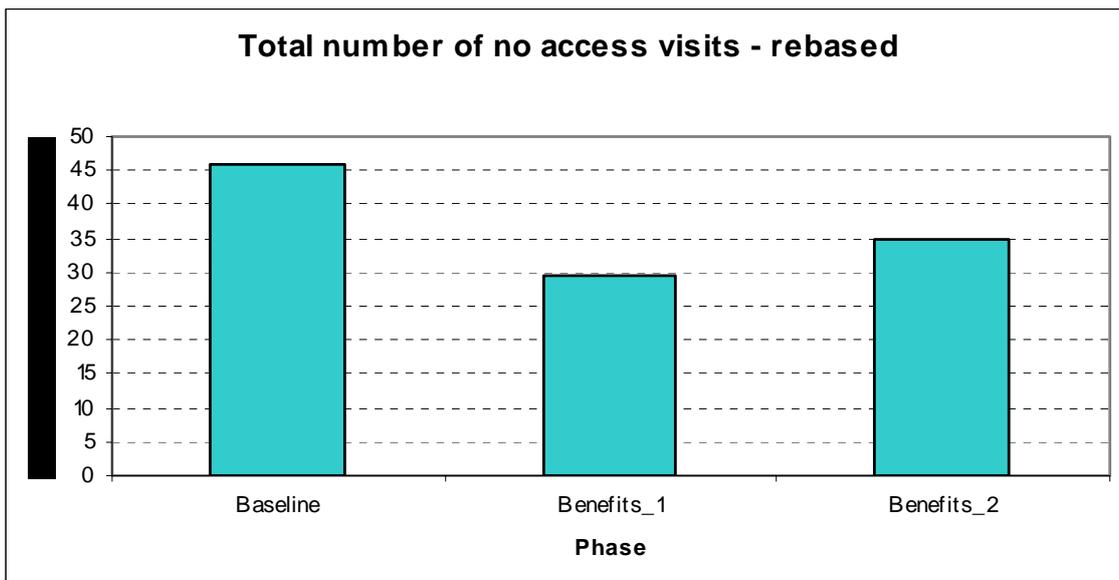


Figure 98 – No access visits

This is thought to be particularly linked to the increased availability of contact details for patients at the time of the visit.

Duplication of data:

The recordings taken in the second benefits collection period show a total increase in data duplication of 119.4 percentage points from the baseline measurement.

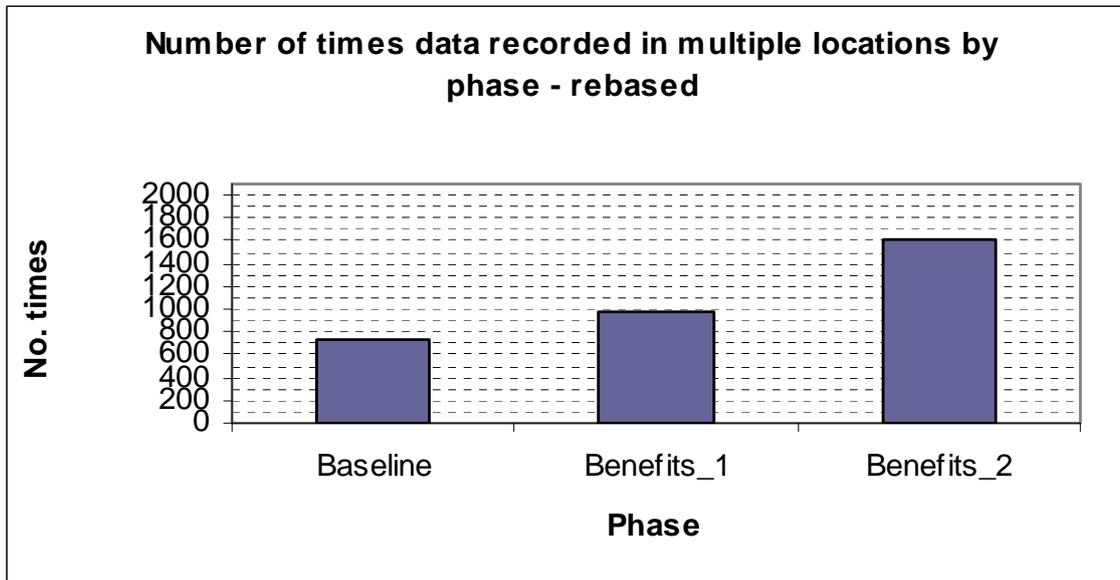


Figure 99 – Duplication of data

The Project team report the benefits collection period may have coincided with review of the use of the clinical system, and staff, may have mistaken the duplication as being due to the device rather than the review.

This was found to be the case for the COPD service, where duplication was shown to have increased by a huge amount.

Staff also reported to the project team that by the time they reached benefits 2, they considered the completion of the Benefits tool itself a duplication of data collection and this would have been included in the duplication figures, causing the data to be affected.

This was augmented by some services also recording more complete clinical data in SystemOne as they increased the functionality within the application.

The breakdown by Service shown below reveals huge variations across Services:

Duplication of data	Baseline	Benefits 1	Benefits 2	Change
Health Visiting	2.5	0.6	1.7	- 32.0%
District Nursing	4.6	8.8	8.4	+ 82.6%
End of Life	0	0	0	0%
COPD	2.5	-	7.1	+ 184%

Table 86 – Data duplication by service

As already stated it is felt the duplication is likely to be a reflection on where each Service was at in the electronic record review process, rather than a true reflection of the impact of having a mobile device.

Summary of Metric findings

- Both contacts and contact durations have seen marked increases
- Whilst the increase in journeys is comparable to contact, journey times are significantly less.
- No access visits are reduced considerably.

Subjective findings

The items discussed in this section are those findings which were made based upon the subjective comments noted at the pilot site by the MHWP team or reported in the free text comments on the data returns sheets.

Work-life balance: Clinicians were pleased that the device offered the ability to work from home and to access their email from wherever a network signal was available. Clinicians can now start and end their shifts by logging on to the device at home as well as using bases other than their own designated office to stop off and update work, Clinicians at South West Essex found the devices particularly useful for accessing email on the move and for on-line training. Having remote access to such resources allows tasks such as training to be fitted into their working day whenever it was convenient for them, rather than having to block time out for it specifically.

Clinical information: Access to clinical information at the point of care was a big bonus to clinicians at South West Essex, who felt that this improved access would have a positive effect on patient safety.

Reduced estates: Use of the devices, even the relatively small number during the pilot, has freed up the office desktops and eased the pressure on existing resources. The project team reported that unused and spare equipment freed up through the introduction of mobile working has been redeployed to more suitable locations such as schools.

Service continuity: During periods of adverse weather, clinicians at South West Essex felt that using the devices allowed them to continue to operate their services remotely. Users with devices were able to set up work at home, answering emails, accessing patient records and making phone calls and avoid the need for potentially hazardous journeys into the base office. Clinical service managers could also oversee the reallocation of caseloads and prioritise visits without the need to travel to the base location

Decreased travel: Staff at South West Essex perceived that there should be a decrease in unnecessary journeys made, with services such as the Heart Failure and Respiratory teams agreeing to meet once a week for knowledge transfer and peer support rather than travelling to the office every day. The metric data recorded for the organisation showed that journeys had increased but contacts had also increased

Efficiency and productivity: The clinicians' experiences suggested to them that the device allows more productive use of time and greater efficiency particularly around the use of 'dead time' between appointments or opportunistic visiting. The metrics returned from South West Essex do indicate a significant increase in the number of contacts clinicians were able to undertake in their working day, going from a daily average of 4.7 at baseline to 8.3 contacts per clinician per day by the second benefits collection period. Clinicians also felt that they were able to use the 'electronic task' functionality built into the clinical system to respond more quickly to referrals and requests.

Data compliance: Compliance of data activity recording increased to 100% within 'end of life' services after the implementation of the devices.

Educational advantages: The devices were reported to be useful to clinicians for educational purposes as well as clinical processes. Clinicians were able to use the device to review training and educational material either during core hours or at home in their own time.

Data entry: Patient information can be recorded contemporaneously with patient care, and written up in full at a time that is the most appropriate. Not only does this help to meet professional guidelines for data entry, it also saves expense on resources for administrative tasks such as retrospective data entry. An organisational restructure had seen some administrative roles reduced, and the devices have given clinicians the ability to record data in a more timely and appropriate fashion. This has reduced the impact on the loss of administrative assistance.

In their own words

The following are examples of direct quotes from clinicians and patients throughout the project, with 8 patient comments and over 50 clinician comments

Clinician comments

Pre-deployment

- “I have to drive to the Health Centre every day to record data onto SystemOne as the Laptop, Web and Walk and VPN I am currently using does not allow me access to the internet as it does not get signal in my school. I am also required to share this laptop, VPN and Web and Walk with another colleague; therefore sometimes I have to visit the Health centre to gain access to a computer.”
- “Attended half day training day at the hospice. If I was to have the technology I would not have had to return to the office as I would have been able to do the notes in the car.”
- “Had to go back to office to order equipment urgently. Technology would have allowed me to do this on the move.”
- “Was sat outside no access visit waiting for client to return, could have been inputting data into SystemOne from previous visit.”
- “Would have benefited from being able to use computer at drop in session at Children's Centre.”

Post-deployment

- “The device is now an invaluable part of my working life. It has made working easier and more efficient.”
- “Useful device, although does disconnect in use.”
- “I was able to complete the patient's notes from in my car in between visits rather than returning to the office which reduced the amount of journeys I needed to make.”
- “Still have connectivity issues. On many days have had to reconnect to the VPN several times.”
- “Mobile working has allowed me to be more efficient and keep data more up to date. It saves time as you do not have to keep going back and forth to the office.”
- “I am using the computer either at home or the office. I find this the easiest way to work.”
- “Positive use of equipment in community.”
- “Had to work from home today due to the bad weather conditions, kept losing connection then had no connectivity for a couple of hours.”
- “No connection at one patient's house. Not used in others as time consuming.”
- “Was able to write records in car while waiting to see if client returned at no access visit and to avoid return to base when closer to next visit.”
- “Not in own base due to adverse weather, used lap top in other NHS premises, useful as able to connect to e-mails etc.”
- “Allowed me time to complete notes away from office which is very busy.”
- “Went out straight to patient then home at end of day. Able to complete paperwork mobile working.”

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- “Mobile working device saved me 30mins travel time at least as I did not have to return to the office. This enabled me to complete my work load within the time limit of my working day.”
- “I was able to write my notes from the hospice before attending a meeting instead of going back to the office to write them.”
- “I had to attend a meeting in the morning near my home address. The Toughbook allowed me to work from home in the morning rather than travelling 30 mins to work then back another 40 mins to a meeting.”
- “No community visits carried out today as I had to participate in teaching at local hospice then attend a meeting. Having the Toughbook with me allowed me to access patient’s records when I received phone calls during the day.”
- “One of my visits was much shorter than expected as the patient was too unwell to be seen. I was able to sit in my car to work as I had another appointment in the safe area. This prevented me from returning to the office to kill time.”
- “The last visit I did was late in the day, I was therefore able to go straight home to write the notes and order the equipment from my Toughbook.”
- “Was able to look up patient phone number as I had to cancel a visit as stuck at social services in safeguarding meetings.”
- “Able to write report for ICPCC as did not have time during working week ready for attendance at conference 07/02/11, AM.”
- “The ability to answer a patient’s questions on their care by consulting the record in the home is invaluable”

Service user comments

Post-deployment

- “Many clients have asked why we have not had the device sooner.”
- “I was able to connect to the internet whilst in a patient’s home to show her a picture of the equipment that I planned to order as she had concerns. The patient was extremely pleased to be able to see what the equipment looked like before agreeing to it.”
- “All patients have been very positive towards mobile working and they were surprised that it has taken so long to start.”
- Client commented: “Very practical.”

Service Changes Seen

- Ability to comply with targets eg Palliative access
- Improved record keeping
- Team meeting schedules changed
- Working patterns changed
- Improved clinical safety

Conclusions

Impressions and achievements

The project team noted that it was important to secure directorate buy-in at the start of the pilot. This investment has given them a useable solution with the opportunity to build a business case to expand mobile working into other services in the future.

The Project Team state that the interpretation of the data shows that the MHWP is bringing great benefits to their business.

Comparative analysis using Management Information at South West Essex has shown:

- Mobile working has shown a demonstrable impact on increasing the number of patient contacts recorded (a 6% rise).
- Specialist nursing teams in particular have demonstrated significant increases in the number of recorded patient contacts since the introduction of mobile devices (46.7% for Paediatric Speech and Language and 49% for End of Life Occupational Therapy Services).
- Clinical travel time has reduced by 17% since the introduction of mobile working and workforce transformation.
- Expenditure on travel has dropped by 32% since the introduction of mobile working and workforce transformation.

Lessons learned – what would we do differently?

A better understanding around the sharing of electronic records across services would be highly advantageous for future projects, as this has implications on the availability of the integrated record.

The project team admitted that they would use a standard gold build in the future rather than opting to manage their own. The bespoke gold build used at South West Essex caused much of the delay in deployment of the devices and this could have been avoided.

Understanding service transformation and business change is a necessity rather than an optional extra. This is recognised by the Project Team at South West Essex and in future deployments transformational change would be considered hand in hand with mobile deployments

A clinical lead resource to bridge the gap between the technical and the clinical is desirable to support the project and is beneficial to the service leads and the transformational team.

Future plans for mobile working

- Changes are in progress for a whole-service deployment to district nurses with the aim of moving toward paperless record keeping within the service.
- The leadership team has requested a benefits matrix for the project, to demonstrate the outcomes of the pilot and how these have matched up to the original objectives.

NHS Stoke on Trent



Introduction

The application to be included in the project was made by the Head of IT, on behalf of NHS Stoke on Trent.

The Trust use a local legacy clinical solution called CHiPS alongside iPM, and had already engaged in deployment of mobile solutions. This enabled them to be clear about their requirements and expectations of this project.

Initial Objectives

The following are the key objectives for the project as outlined by the organisation in the response to the MHWP invitation:

- Improve clinical interventions
- Improve data quality
- Reduce travel, leading to reduced carbon footprint
- Contemporaneous update of patient records
- Reduce estate costs, including mileage and office space
- Improve information governance
- Increase patient contacts
- Reduce management costs due to reduced admin and data entry staff

About the Project

Project Team

The local Project team consisted of:

- Project lead;
- Business change resource (10 days' consultancy);
- Clinical lead;
- Technical support (provided by the project lead, with additional support available to the project on request).

At a Glance

Stoke	
Number of devices	25
Geography	50% urban, 50% rural
Clinical systems used	iPM and CHIPS
Non-EPR requirements	GP records through EMIS web, Online BNF, Map of Medicine (decision support software), Internet Intranet, Microsoft Office applications (including Outlook), Summary Care Record (phased in after go-live), Shared drives, PACS (picture archiving system for display of images e.g. x-rays) and blood results
SIM provider	BT Mobile
Pilot go-live date	November 16 th , 2010

Table 87 – At a Glance: Stoke

Service	Number of Users	Percentage of Service
District Nursing	8	9%
Community Matrons	4	40%
Palliative Care	4	67%
Intermediate Care	3	3%
Children's Services	4	7%
Out of Hours District Nurses	2	4%
Total	25	

Table 88 – At a Glance: Services involved

Project Methodology

The Stoke pilot was run as a follow-up to a previous mobile solutions project, which was run in order to prove that mobile technology could perform in community clinical practice. The local governance for the MHWP pilot was undertaken via the project board, which reports to the organisation's IM&T Director.

Documentation produced includes the following:

- Project Status Report,
- Change Management consultancy report.

Change Management, Skills Analysis and Support

Change management was recognised as a historically weak area locally, and therefore a business case was written and approved to fund an external business change management consultancy to provide guidance on the impact of the pilot. The output of the completion of the initial tasks from the change management work was presented in the form of a report to the project board around Christmas 2010.

Staff were able to make local changes to their working practices to maximise the benefits from use of the devices, and these changes were then captured and documented by the change management consultancy.

IT skills analysis was not formally undertaken as part of the project, but was informally appraised instead, as part of the baseline data collection. IT skills were found to be highly variable across the user base, with technical training and support required throughout the duration of the pilot and beyond.

The recommended first line support for users was divided dependent upon the type of issues encountered. Problems related to operation of the the mobile device were reported to the project lead, who liaised with BT as required. Any other IT issues were channelled via the local IT helpdesk (run by the Heath Informatics Service, which covers 4 local PCTs) as per normal procedure.

Implementation Technical Detail

Information for this section has been collated from technical information provided by BT during the implementation phase as well as from direct discussions with the site project team.

Gold Build – At a Glance

Stoke opted to accept the standard TCS configurable Gold Build, plus the following items:

- Sophos licence username and password
- 2e2 SafeBoot installer

Technical Issues

Pre-deployment

This section documents any technical issues that arose for the pilot site during the pre-deployment phase.

Initially, the Stoke on Trent project team intended to pursue the use of a bespoke gold build, as they were unhappy with the software used in the standard build. This introduced some delays following kick-off of the pilot pre-deployment work, as no headway could be made in agreeing a course of action for the gold build. Eventually it was agreed that Stoke would adopt the standard build with some modifications. Discussions around the exact modifications to be made and some delays in submitting required user information to proceed with gold build preparations held the go-live back further.

The device builds were amended to alter the system standby settings depending on whether the device was operating on batteries or plugged in. The settings were amended so that laptops did not power down when the lid was closed, remaining online (and therefore maintaining any network connections) and saving clinicians time spent logging in and out between clients.

Delays pushed back the required user training, and the Stoke on Trent pilot implementation went live on November 16th, 2010.

Post-deployment

A total of 18 issues were raised during the project period to the BT helpdesk, including:

- 15 issues relating to the device:
 - 4 settings/configuration issues;
 - 5 MobileXpress;
 - 5 VPN issues;
 - 1 communications failure issues.
- 3 issues related to the Windows Operating System:
 - 2 application not responding;
 - 1 information required.

General issues

Gold build issues: The project team found it challenging to work with IT support to get the pilot gold build and infrastructure right. Part of the problem was the organisation's IT department needed to look at the project in a 'different' way to usual deployments as it was not a typical 'in-house' technical deployment and there was some reluctance to relinquish control over certain aspects such as the gold build.

Connectivity: Certain building types and geographical areas provoked connectivity issues with the devices.

Study Findings

Metrics

The following section provides a summary of the metric analysis, collated from the spreadsheets returned to the MHWP team.

The table below gives an indication of the level of returns submitted by the 25 staff taking part at the Stoke on Trent pilot site. As discussed earlier in the report, not all returns could be used in the analysis.

Returns: overview

Returns	Percentage of users returning data
Baseline data	100%
Mileage month 1	96%
Mileage month 2	80%
Benefits month 1	100%
Benefits month 2	100%
Average return rate	95%

Table 89 – Rate of returns: Stoke

Metrics: overview

Clinicians	No. in project	Baseline Returns	Benefits 1 returns	Benefits 2 returns
District Nursing (inc Out of hours DN)	9	9	9	9
Community Matrons	4	4	4	4
Palliative Care (inc Oncology OOH)	5	5	5	4
Children's Services	4	4	3	3
Intermediate Care	3	3	3	2
Total	25	25	24	22

Table 90 – Overview of Returns used in analysis

Days data	Baseline	Benefits 1	Benefits 2	Totals
District Nursing (inc Out of hours DN)	314	242	234	790
Community Matrons	140	106	109	355
Palliative Care (inc Oncology OOH)	175	141	104	420
Children’s Services	140	83	78	301
Intermediate Care	114	82	52	248
Total	883	654	577	2114

Table 91 – Overview of Number of Days of data returned

Data Usage

The image below, generated from data usage statistics collected by BT, gives a visual indication of the data usage at the Stoke on Trent site as clinicians take up and learn how to use the devices. The data indicates there was only a small drop-off between training and deployment, suggesting that users immediately started to use the devices, and usage continues to increase.

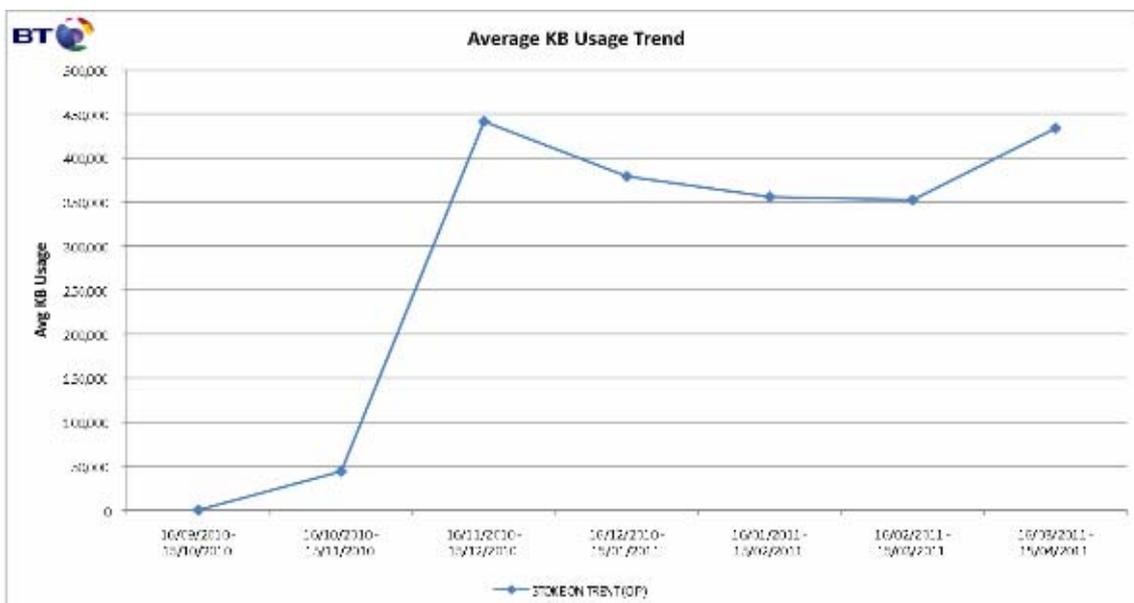


Figure 100 – Data usage trend

Contacts:

During the entire data recording phase, staff at the Stoke site recorded a total of **9135** contacts.

The number of contacts per day for each clinician increased by **15.2** percentage points from Baseline to Benefits 2:

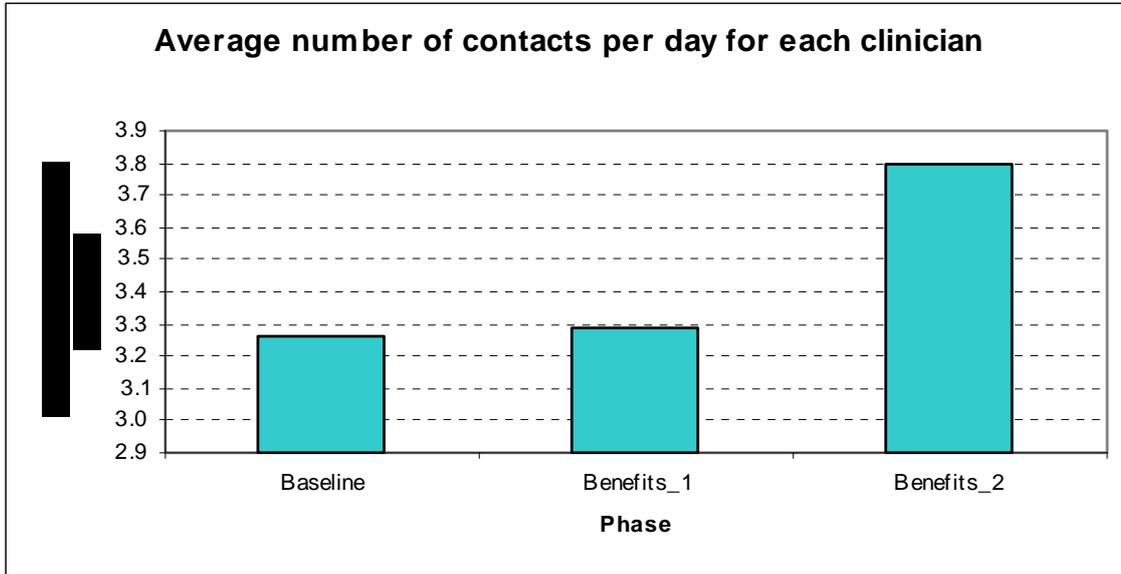


Figure 101 – Average contacts per clinician, per day

Subjective reports suggest this finding is an accurate reflection of the project.

Contacts were broken down by duration, and the results across each duration can be seen on the following chart:

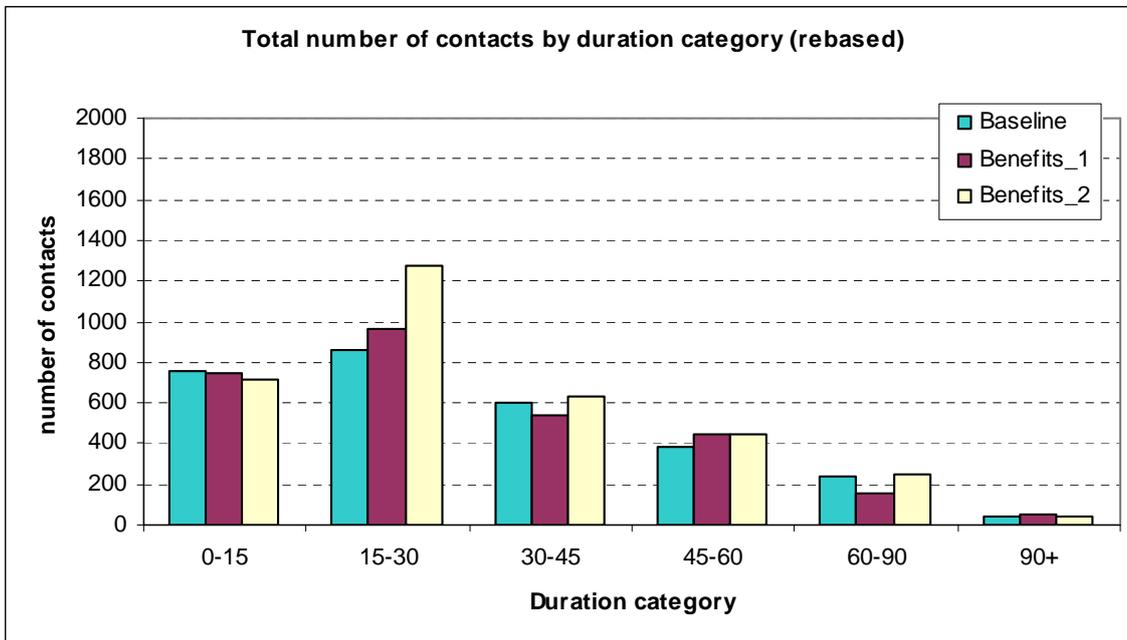


Figure 102 – Total contacts by duration

An increase across all durations can be seen, except the shortest duration category (0-15mins). The shorter visits may take slightly longer due to having the device, but subjective comments would indicate this is due to having increased access to information making the visit more effective rather than the device causing the visit to be longer due to data input.

Duration of face to face contact with patients

The site recorded a **16.1** percentage point increase in the number of minutes spent with patients.

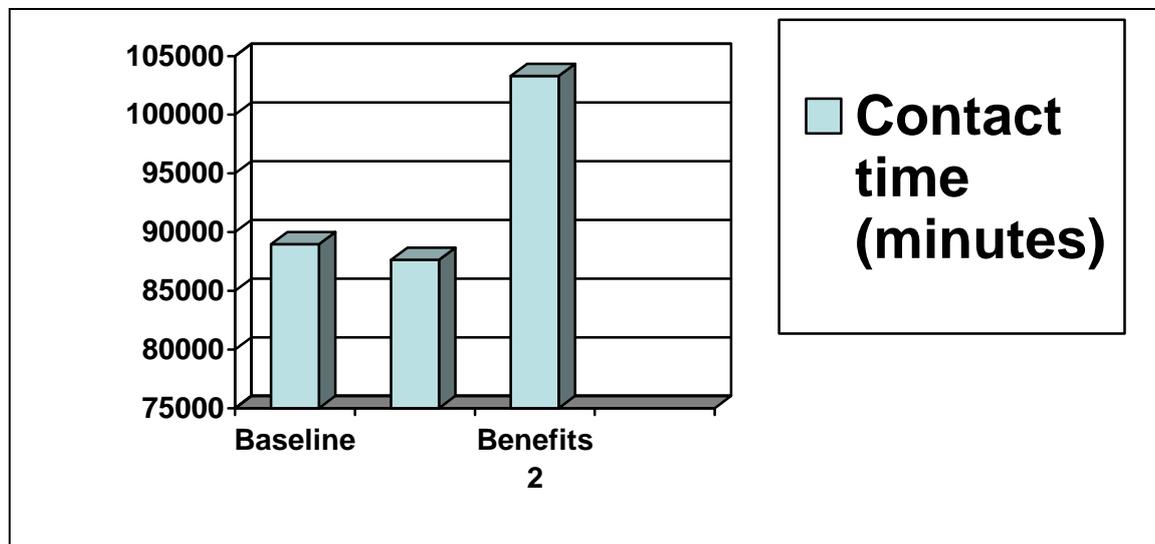


Figure 103 – Contact time (in minutes)

The increase in the amount of time spent with patients reflects the increase in number of contacts, along with the slight overall increase seen in contact durations.

When broken down into the individual services, the metrics for contacts indicate that four of the services recorded increased contacts from Baseline to Benefits 2, and significant variation across Services is seen:

Average contacts per day	Baseline	Benefits 1	Benefits 2	Change
District Nursing (inc Out of hours DN)	3.7	4.0	4.2	+ 13.5%
Community Matrons	3.3	3.6	4.5	+ 36.4%
Palliative Care (inc Oncology OOH)	1.9	1.4	1.6	- 15.8%
Children’s Services	4.5	4.3	5.0	+ 11.1
Intermediate Care	2.4	3.1	2.8	+ 16.7%

Table 92 – Contacts by service

The variations can be explained by the Service types and the ways of working involved – it could be anticipated that a Palliative Care clinician may reduce the number of contacts, yet is

likely to increase the duration of contact, due to improved access to information at the point of care. The subjective data suggests that the Community Matrons can work in isolation, and provision of a mobile device can enable much more efficient working that then allows improved productivity.

It should also be noted that this site does not use a full electronic clinical record, yet has still realised improved activity levels.

Journeys:

During the entire data recording phase, staff at the Stoke site recorded a total of **8470** journeys.

The number of journeys per day for each clinician increased by **28.6** percentage points over the course of the pilot.

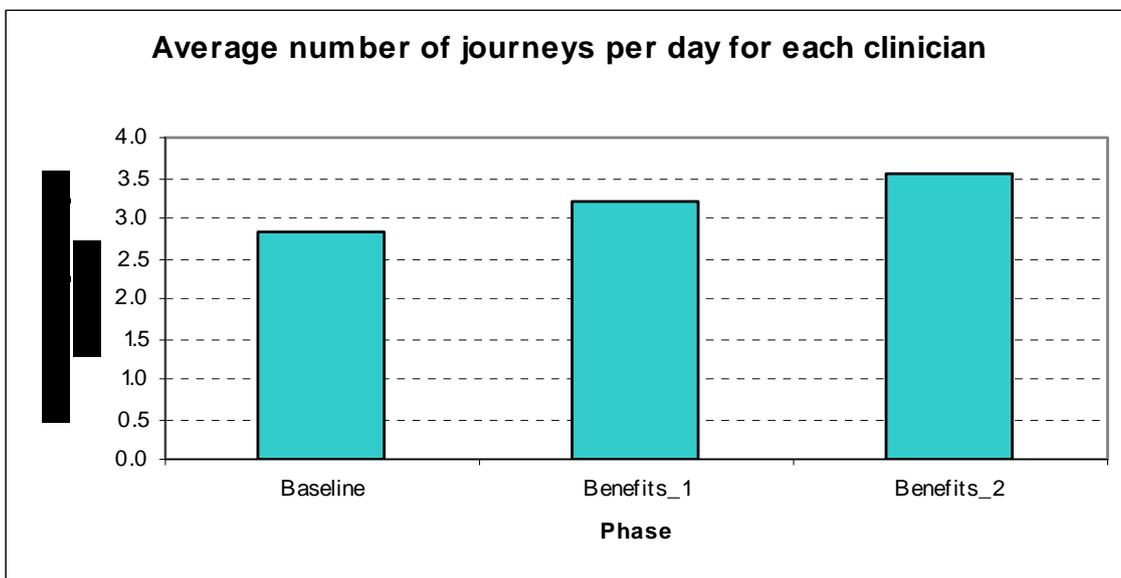


Figure 104 – Average journeys per clinician, per day

The number of journeys increased by nearly double the increase in contacts.

This indicates a large amount of journeys are not related to direct clinical care, however it was not possible to make this distinction in the metric analysis.

Journeys were also broken down into durations, and the results are shown in the following chart:

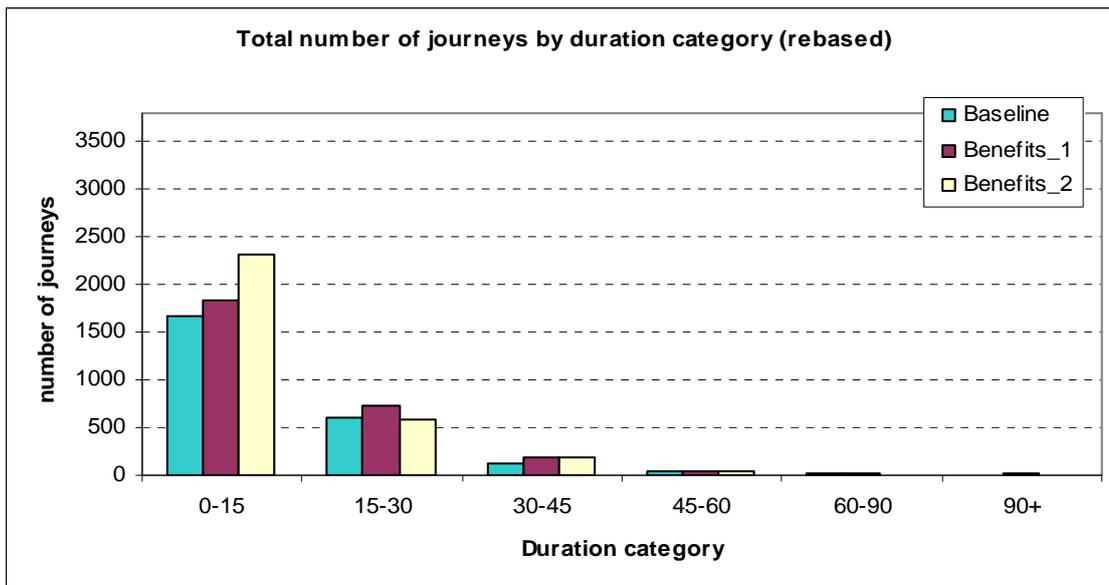


Figure 105 – Total journeys by duration

The graph shows that the biggest increase in journeys is in the duration category 0-15mins. There is also a small increase in the duration category 30-45mins.

Clinicians recorded that on average the minutes they spent travelling increased by **16.6** percentage points.

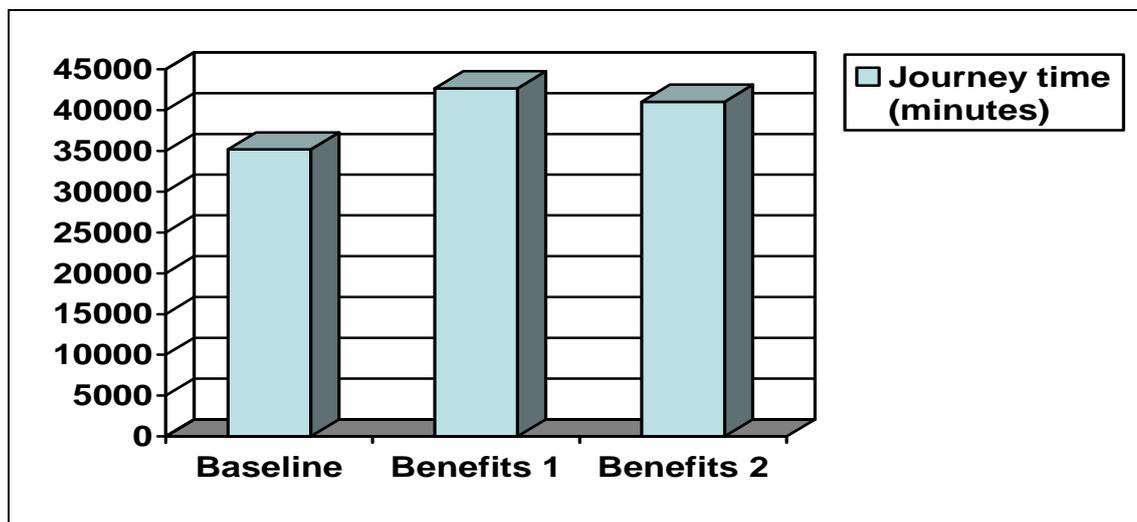


Figure 106 – Journey time (in minutes)

Although time spent on journeys has increased, it has not increased to the same extent that number of journeys has. This reflects the larger increase in journeys of short duration, and a general drop in the longer journeys. This could reflect a greater degree of planning in daily schedule/route due to having the mobile device.

When broken down into the individual services, the metrics for journeys indicate that all services increased numbers of journeys per day over the pilot duration:

Average journeys per day	Baseline	Benefits 1	Benefits 2	Change
District Nursing (inc Out of hours DN)	3.8	4.3	4.6	+ 21.1%
Community Matrons	3.0	3.0	3.6	+ 20.0%
Palliative Care (inc Oncology OOH)	1.9	2.3	2.2	+ 15.8%
Children's Services	1.8	1.9	2.4	+ 33.3%
Intermediate Care	2.4	3.1	3.2	+ 33.3%

Table 93 – Journeys by service

The Services vary by how much their journeys increase in relation to their travel, and will reflect how each Service uses the device differently. The data for the Community Matrons shows that it is possible to improve productivity and find time efficiencies by reducing the comparative increase in travel.

Mileage:

Mileage	#1	#2	Change
All staff (16 returns)	3645.9	2855.9	- 21.7%

Table 94 – Mileage

Mileage claimed for the site over the same period (taken from a sample of 16 clinicians who returned mileage data) indicated that mileage had decreased by **21.7%**.

The project team are not aware of any factors that may have caused the mileage to fall whilst the number of journeys have increased, however it may represent a reduction in mileage for travel to/from base, which is reported in the subjective findings.

Referrals:

In total, **1569** referrals were made over the Benefits period. Clinicians at Stoke estimated that due to having access to the devices, they saved **226** potential referrals. This equates to a **12.6% saving** of referrals.

Admissions:

In total, **15** admissions were made over the Benefits period. Clinicians at Stoke estimated that due to having access to the devices, they saved **12** potential admissions. This equates to a **44.4% saving** of admissions.

No access visits:

No access visits decreased by **9.3** percentage points from the baseline measurement to the second benefits measurement period.

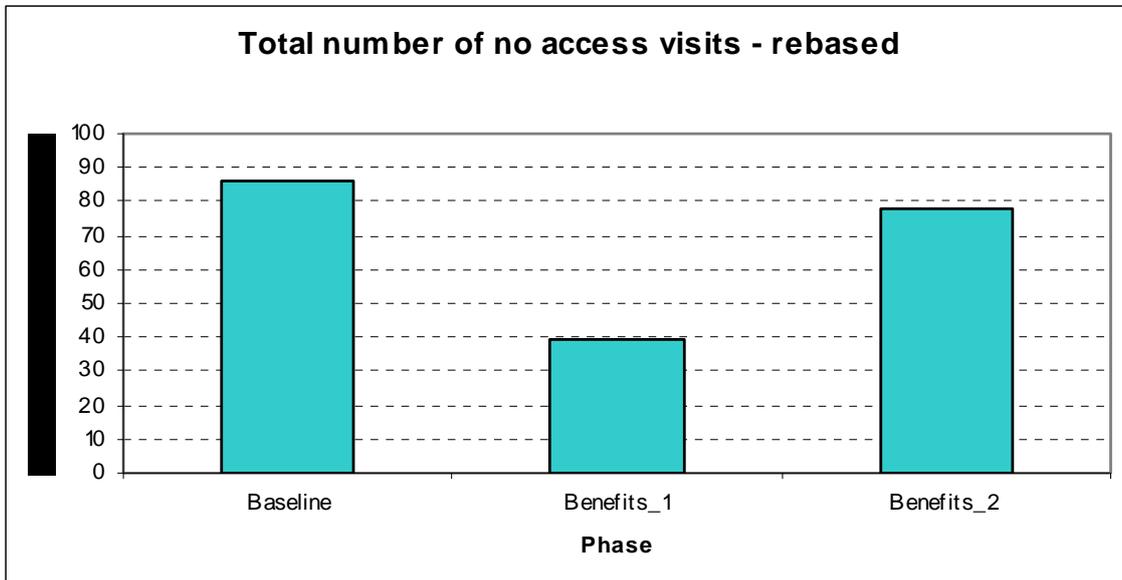


Figure 107 – No access visits

This is likely to be due to improved access to information at the visit e.g. telephone contact numbers, key-safe numbers, appointment information.

Duplication of data:

The recordings taken in the second benefits collection period show an increase in duplication of data of **33.3** percentage points from the baseline measurement.

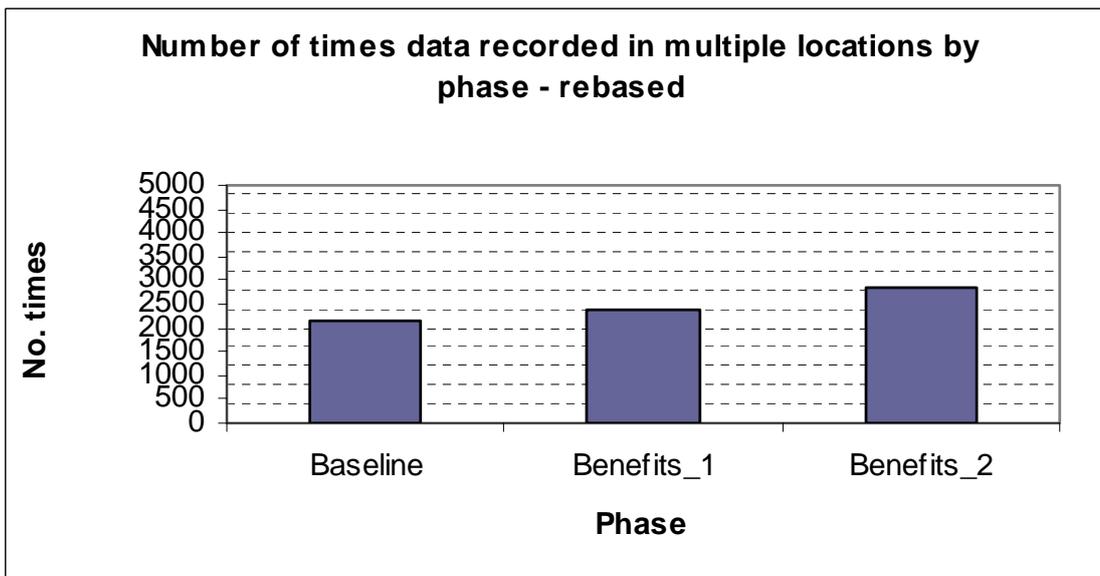


Figure 108 – Duplication of data

This is likely to be because of the absence of an electronic clinical record and the limited number of devices deployed limiting the changes that could be implemented.

Duplication of data	Baseline	Benefits 1	Benefits 2	Change
District Nursing (inc Out of hours DN)	3.1	3.4	3.7	+ 19.4%
Community Matrons	3.0	4.4	5.2	+ 73.3%
Palliative Care (inc Oncology OOH)	1.7	1.8	2.4	+ 41.2%
Children's Services	2.0	1.4	2.2	+ 10.0%
Intermediate Care	1.4	1.2	0.3	- 78.6%

Table 95 – Data duplication by service

The breakdown by Service shows a large variation in the change in duplication of data, and the reduction seen in Intermediate Care warrants further investigation to see if they are working very differently to other Services.

Summary of Metric findings

- There are significant variations across Services.
- The data shows increases in productivity can be achieved.
- Savings are possible in both Referrals and Admissions, with significant savings shown in the latter
- Reductions in no access visits have been shown
- The absence of an electronic clinical record severely limits the ability to achieve reductions in duplication.

Subjective findings

The items discussed in this section are those findings which were made based upon the subjective comments noted at the pilot site by the MHWP team, or reported in the free text comments on the data returns spreadsheets.

Fit for purpose: The mobile devices deployed for the MHWP pilots are a far better fit for purpose and have vastly improved connectivity compared with devices used in previous projects. They are easily transportable and require much less effort to learn how to use effectively.

Clinical information: Access to clinical information at the point of care was a huge benefit to clinicians at Stoke, who felt that this improved clinical care at the point of contact, as well as being beneficial even when they were operating from their base office, as access to computers is often limited.

IT Literacy: Staff felt that the project had raised their IT literacy skills where previously they had not been very IT focussed. Speed of access to applications helped engage users quickly and help them get accustomed to the new device.

Data entry: The devices allow patient information to be updated during episodes of care (such as in the patient's home or at vaccination clinics) rather than carrying out data entry administration retrospectively (or sending it to data clerks). This encourages best practice around the timeliness of record updates, and improves data quality.

Time management and efficiency: Clinicians noted that they felt they were able to work much more efficiently across a large geographical area, no longer wasting time travelling backwards and forwards to their base locations to retrieve information or update records with vital information throughout the day. This combined with the improved access to the local messaging system (Potteries Way) allowed for improvements in daily planning and scheduling. The devices seemed to promote more effective time management in general.

Shift work: Using the device helps significantly with clinicians working late shifts. Because they are now able to access records from any location (network reception permitting) staff can work from home instead of having to waste time trying to find a safe or quiet location, or to worry about being locked in or out of their base location.

Out of hours and lone working: Having the device has improved conditions for clinicians working alone outside of normal office hours. Up-to-date patient details are available at short notice through the device, and clinicians can go into a patient's home fully apprised of any risks that have been noted by previous visitors.

Patient record: The Stoke project team are aware that far greater benefits could be realised with the availability of an electronic patient record. However even without an EPR clinicians participating in the MHWP pilots have already seen peripheral benefits to their working processes and continue to identify further changes that would be of benefit to their services.

Varied applications: Service users have used the devices in different ways and subsequently have experienced varied benefits. Users who have short, defined patient contacts may not find

using the device at point of contact as beneficial as users who have longer, assessment type contacts. These differences can be detected and accounted for at the start of a project with good business change management.

Whole-service transformation: Clinicians and project team alike felt that the devices made life easier but benefits would be less constrained if the whole team had the mobile technology. Working with only a small percentage of teams having access to the devices was not conducive to wholesale changes in working practice as old methods of working must still be observed for team members without access to the new technology.

Improved Clinical safety: Having up to date clinical information at the point of care allowed Clinicians to make more informed decisions, whereas previously they may have had to work without this verified information, and rely on what the patient told them.

In their own words

The following are examples of direct quotes from clinicians and patients throughout the project taken from the 20 patients comments and over 100 clinician comments that were received.

Clinician comments

Pre-deployment

- “Case conference again today; electronic recording would have been beneficial.”
- “Complaints about the amount of written work in the home.”

Post-deployment

- “Was able to get results and prescribe treatment immediately.”
- “Device not taken into patient's home - either inappropriate or can't get connection.”
- “System easy to log onto and quick to close to ensure confidentiality.”
- “Completed on line training much better than attending taught sessions.”
- “Admin day was able to work without having to drive round to find base able to send letters for printing and collection later.”
- “Able to work from home using all systems successfully using Toughbook - very impressed as inclement weather has limited my ability to travel across PCT.”
- “Able to access hospital discharge summaries without having to contact GP surgery for information.”
- “Able to access x-ray results with laptop and feed back results to patients.”
- “Really good to access messages and information in severe snow- enabling triage of patients effectively and reducing visits to a minimum in order to promote staff safety.”
- “The laptop allowed me to share clinical data with a patient in their own home- this promoted a seamless service - excellent quality of care.”
- “I was away from the office for most of the day today for training and was able to on one occasion respond in a timely manner to relay information to a practice nurse who wished to refer a patient due to having access to the N drive and my service documentation.”
- “Away from base working today and found the Toughbook useful in been able to access urgent emails that needed prompt action.”
- “Had to give a PowerPoint presentation in school today, but staff could not get their computer to read the disc that had the presentation saved on it. Because I had the laptop with me I was able to access the presentation on the N Drive - invaluable today!!”
- “Snowy conditions again, great for checking on school closures in the morning before starting out to work so I didn't have a wasted journey to those schools.”
- “Social worker commented positively on the technology as I was able to access information for her immediately at a meeting rather than going back to the office and ringing her back later.”
- “End of term today and finishing for Christmas, which usually leads to me getting very stressed as I try to get up-to-date with e-mails, CHIPs input, expenses, etc. However having the laptop has removed many of those pressures as I am able to complete any outstanding tasks without being in the office.”

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- “Icy conditions able to plan route to minimise driving in poor conditions. Able to monitor patient remotely using tele-health on lap top.”
- “Provided information for a colleague regarding continence assessment I was able to show her the products online to illustrate this made instruction far easier.”
- “Due to the health centre closing at 8pm unable to access office computer so was able to complete referrals from home.”
- “Quick response to patient’s query on hospital letters and results.”
- “Spent afternoon at nurse-led clinic with only one PC which was in use by the clerical support worker. Was able to use lap-top in between clients - more efficient use of time.”
- “Does enhance patient contact if network providing an adequate service. On occasion network disconnects frequently, particularly with adverse weather or in the afternoon.”
- “I easily accessed patients admission details to check the ward number. I was then able to contact the ward to have an update and leave my contact details to facilitate as earlier discharge as possible.”
- “Tried to use the laptop in my care today to find the battery was flat. It would be useful to have an in car charger.”
- “I needed to refer a patient who was v unwell ASAP to a respiratory consultant. I was able to get all the info chest x-ray results, clinic letter info on my laptop before referring. They usually ask for many details I don’t have, but I was well prepared. It avoided an admission.”
- “Able to check nursing observations on telehealth prior to visiting. Also checked messages 1st thing before visiting able to plan route more effectively.”
- “Able to visit a young person at home that is unable to attend school due to health and safety issues. Completed Health Action Plan on laptop preventing additional visits that may have distressed the person.”
- “Was able to check hospital appoint as patient has mislaid letter.”

Service user comments

Post-deployment

- “Both [clients] said they thought the equipment was ‘smart’.”
- “[Clients] pleased they could receive results from blood tests.”
- “Patient commented on the laptop being the 'way forward' for community services.”
- “One patient liked the fact that I could show him his details on line.”
- “Patient appreciated that I could show him the type of prosthesis he had and how it would look on plain x-ray.”
- “Used device to access health promotion information for pupils relating to dental hygiene.”
- “Patient liked I could access hospital records to check medication from discharge from secondary care.”
- “One patient asked why we have paper records when we have a laptop.”
- “Relative recognised benefits for assessment for MDT and felt it made nurse role more efficient.”
- Client commented: “[The device is] making a more streamlined service.”

Service Changes Seen

- Improved choice offered to patients
- Changes to working patterns
- Improvement in clinical data available
- Improved clinical data leading to improved decision making
- Increased patient facing contacts
- Improved efficiencies in travel and contact times
- Staff considering how technology can improve working practices and the potential for further improvements
- Using Google to overcome communication difficulties with people using different languages (an unexpected benefit)

Conclusions

Impressions and achievements

The project team and clinicians at Stoke felt that the pilot had been a big success. The reasons for their positive feelings centred around the mobile devices being fit for purpose, thereby proving the concept of mobile working from a technical perspective. Users felt that there was a good emphasis on ongoing project support for users, with one-to-one training and support available for users at all times.

The Stoke pilot proved that mobile working is not only achievable, it can offer significant and ongoing benefits, both cash-releasing and non cash-releasing. It has increased the awareness of the possibilities of mobile working and started people – managerial, technical and clinical alike – thinking about changes that could be made in future.

With all the benefits stated by the users, plus those discernible to managers, this project has created great enthusiasm in the organisation for the project and use of the devices. This represents a huge turnaround locally and will hopefully influence people positively for future endeavours. The pilot has greatly improved relationships amongst all the people involved, particularly the different departments that have had to work together.

In addition to local enthusiasm, the MHWP pilot at Stoke has also raised the profile of mobile working within neighbouring trusts and across the SHA.

Lessons learned – what would we do differently?

The project has encountered some difficulties, but has provided a large, but beneficial learning curve for those involved. Future projects would build upon the progress made during this pilot, with all parties more familiar with the requirements for a successful implementation.

Future plans for mobile working

- Mobile working now has a high profile in the local health community, and this pilot has been instrumental in triggering a larger project.
- Mobile working has been brought into the Stoke IM&T arena, with a project planned that will bring all the mobile work streams across the 4 local PCTs together for review, and plan the way forward for this area.
- The project manager from the mobile working project will lead this work and a new director of finance has joined the project board to help drive the work forwards.

NHS Tower Hamlets



Introduction

The application to be included in the project was made by Tower Hamlets Community Health Services, who had adopted EMIS Web as an Integrated Primary Care Clinical Information System. The organisation had piloted a number of mobile devices previously, with a limited amount of success.

Initial Objectives

The following are the key objectives for the project as outlined by the organisation in the response to the MHWP invitation:

- Avoidance of duplication of assessment
- Access to decision support and clinical guidelines
- Increase home visits
- Better co ordination of care
- Effective monitoring of vulnerable children
- Opportunistic immunisations
- Improved data accuracy
- Improved clinical outcomes with the availability of clinical information and online guidance

About the Project

Project Team

The local Project team consisted of:

- Project Lead
- Business change lead (role expected to be filled by clinical team managers; no specific time set aside);
- Clinical lead (role expected to be filled by clinical team managers; no specific time set aside);
- Technical lead.

At a Glance

Tower Hamlets	
• Number of devices	• 20
• Geography	• 100% urban
• Clinical systems used	• EMIS Web
• Non-EPR requirements	<ul style="list-style-type: none"> • Email, Microsoft Office applications, Trust network, • Map of Medicine, Clinical Protocols, Cerner PAS System, Local drives, Acute EPR notes
• SIM provider	BT Mobile
• Pilot go-live date	• October 22 nd , 2010

Table 96 – At a Glance: Tower Hamlets

Service	Number of Users	Percentage of Service
Pulmonary Rehabilitation	9	100%
Heart Failure	3	75%
Community Respiratory Team	6	86%
CASH	1	3.2%
Paediatric OT	1	5%
Total	20	

Table 97 – At a Glance: Services involved

Project Methodology

The Tower Hamlets pilot was run as a project intended to build on the accessibility of the integrated web-based care record. There was clear sponsorship and leadership from the service leads for staff participating in this project and from the associate director of business development and performance who reported progress to the PCT board.

Documentation produced by the project team and seen by the CIP liaison includes the following:

- Staff Audit produced by a member of the Pulmonary Rehab Team, which was undertaken as project whilst the clinician was on rotation.
- Presentation of the project (internally)

Change Management, Skills Analysis and Support

Process mapping had been undertaken for the implementation of EMIS Web implementation but was not undertaken for this pilot. Instead, the staff were supported by their clinical service leads in making changes to their working practices to maximise the benefits from the devices. These changes were not documented as part of this pilot but were fed back to the MHWP.

IT Skills analysis was not undertaken as participating staff already used Trust laptops to access IT systems. Training specific to the use of the new mobile device however was given to all participants.

IT support was provided by the PCT to the Community Health Services, although it was perceived that there was some resistance in assisting the Informatics Team with the project.

IT support was reactive to issues but not proactively engaged, possibly due to reorganizational issues within their own Organisation.

Although the PCT hosts the local helpdesk, staff already have three different numbers to call depending upon the issue they wished to report. This was the existing procedure, before the introduction of mobile technology added a fourth option for reporting issues (the BT Helpdesk). The recommended first line support for mobile issues for users was to contact the BT helpdesk, though this meant that the project team had no visibility of issues which were arising. It was suggested that the project team manage the issues on behalf of this small core team of clinicians, to allow them to have continuity in care whilst issues could be resolved.

Implementation Technical Detail

Information for this section has been collated from technical information provided by BT during the implementation phase as well as from direct discussions with the site project team.

Gold Build – At a Glance

Tower Hamlets opted to accept the standard TCS configurable Gold Build, plus the following items:

- IE Homepage.
- Sophos licence username and password.
- 2e2 SafeBoot installer.
- Tower Hamlets installed EMIS Web on the built machines.

Technical Issues

Pre-deployment

This section documents any technical issues that arose for the pilot site during the pre-deployment phase.

Tower Hamlets experienced a relatively trouble-free pre-deployment phase, with minor delays resulting from orders for licences taking longer than necessary, an issue with Safeboot which affected all sites and a delay to user training resulting from trainer sick-leave.

Tower Hamlets pilot site went live on October 22nd, 2010.

Post-deployment

A total of 30 issues were raised during the project period to the BT helpdesk, including:

- 29 issues relating to the device:
 - 12 MobileXpress;
 - 14 VPN issues;
 - 1 Safeboot;
 - 1 hard-drive error;
 - 1 communications failure issues.
- 1 issue related to the Windows Operating System;
 - 1 application not responding.

General issues

Tower Hamlets experienced some delays due to problems with the encryption software on the mobile devices, but otherwise their technical deployment was straightforward.

Some users experienced issues with connectivity, which caused visits to take longer than necessary.

Configuration of device setting meant device timed out too quickly – this should have been reported to and addressed by local helpdesk resources.

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A communication was sent to all sites with instructions on how to change configurations if necessary.

There were some frustrations with the BT helpdesk, with one user reporting a wait of four days to get a call back regarding a simple N3 token reset. The issue was eventually resolved satisfactorily.

Study Findings

Metrics

The following section provides a summary of the metric analysis, collated from the spreadsheets returned to the MHWP team.

The table below gives an indication of the level of returns submitted by the 20 staff taking part at the Tower Hamlets pilot site. As discussed earlier in the report not all the returns could be used in the analysis.

Returns: overview

Returns	Percentage of users returning data
Baseline data	70%
Mileage month 1	90%
Mileage month 2	90%
Benefits month 1	65%
Benefits month 2	10%
Average return rate	65%

Table 98 – Rate of returns: Tower Hamlets

Metrics: overview

Clinicians	Number in project	Baseline returns	Benefits 1 returns	Benefits 2 returns
CASH	1	1	1	0
Respiratory Services*	15	11	10	1
Heart Failure	3	2	2	0
Paediatric OT	1	0	0	0
Total	20	14	13	1

*Includes Pulmonary Rehab Service and Community Respiratory Team

Table 99 – Overview of Returns used in analysis

Note: Due to the limited number of returns for Benefits 2, although the graphs show all 3 data collection periods, all comparisons stated are between Baseline and Benefits 1.

Days data	Baseline	Benefits 1	Benefits 2	Totals
CASH	15	32	0	47
Respiratory Services*	150	123	8	281
Heart Failure	41	44	0	85
Paediatric OT	0	0	0	0
Total	206	199	8	413

Table 100 – Overview of Number of Days of data returned

Data Usage

The image below, generated from data usage statistics collected by BT, gives a visual indication of the data usage at the Tower Hamlets clinicians take up and learn how to use the devices. The graph indicates a clear spike in activity correlating to training, followed by an extended gradual drop, which levels off after deployment

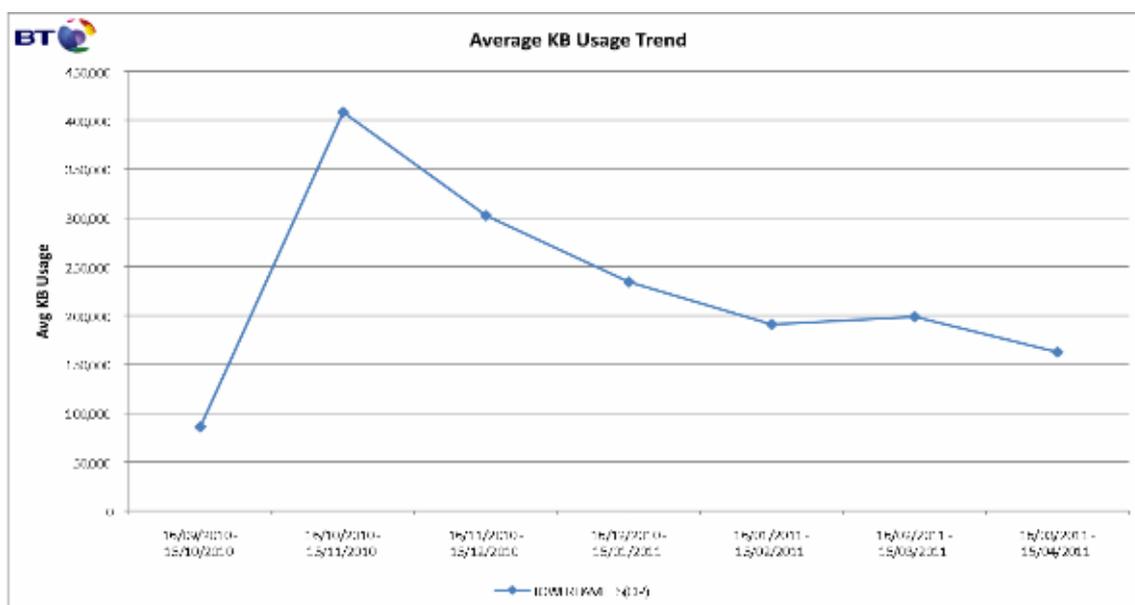


Figure 109 – Data usage trend

Contacts:

During the entire data recording phase, staff at the Tower Hamlets site recorded a total of **1581** contacts.

The number of contacts per day for each clinician rose by **14.8** percentage points from Baseline to Benefits 1.

A local Audit within the project indicated that the administration of the clinics had improved significantly due to the availability of clinical application on the device, this introduced the opportunity for the clinicians to include a home visit prior to and following the clinic session. That had created 4 hours per clinician per week to spend on home visits.

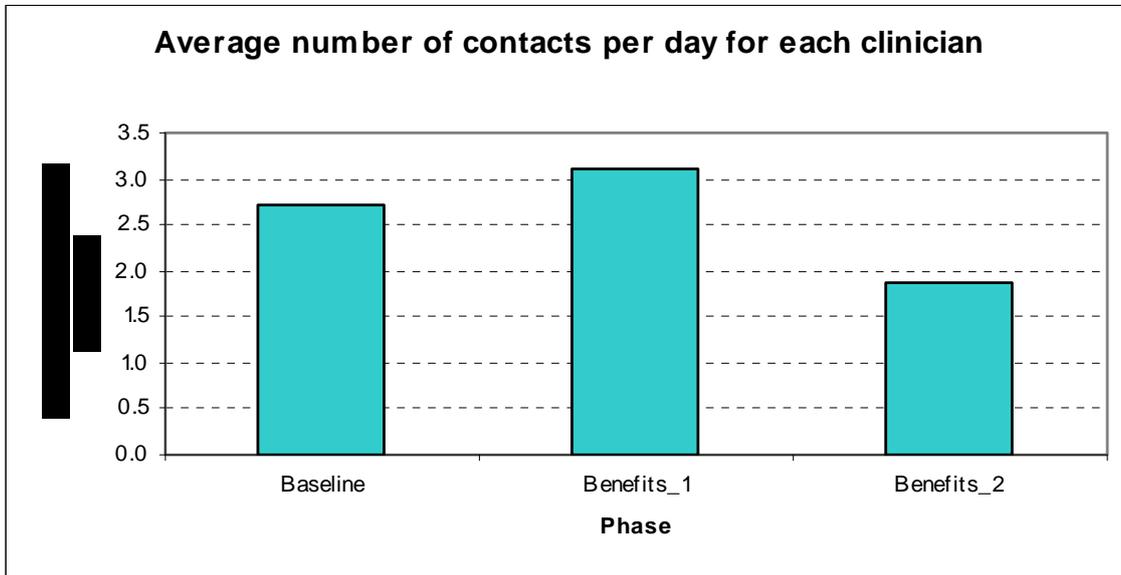


Figure 110 – Average contacts per clinician, per day

Contacts were broken down into durations, and the results are shown in the following chart

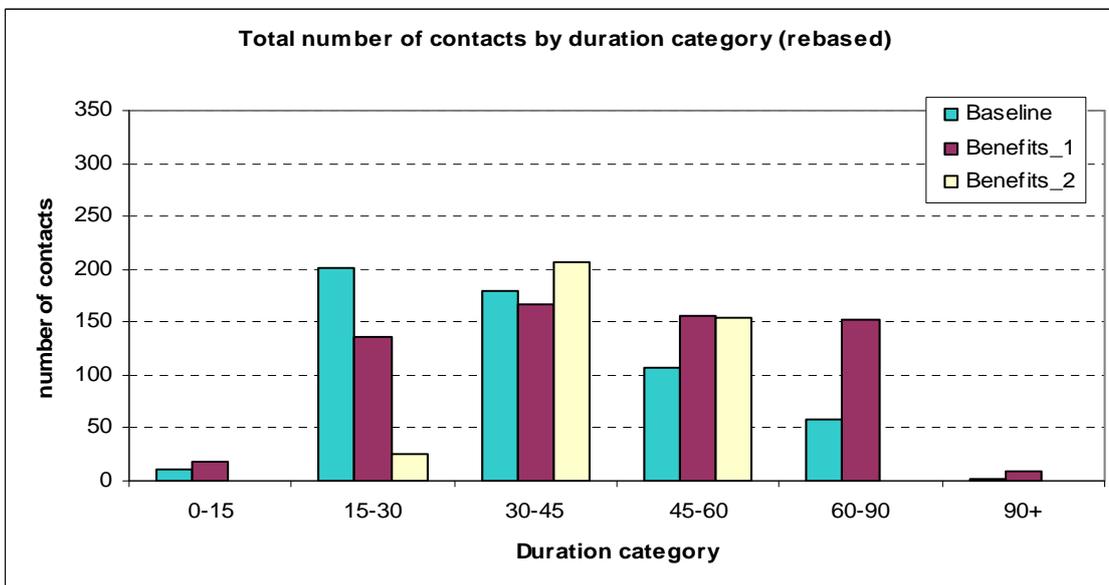


Figure 111 – Total contacts by duration

The graph shows variation in the contact duration profile across the categories, with an increase in the shortest duration contacts (0-15min), and also the longer durations (45-60min, 60-90min and over 90min), but a fall in the mid length contacts (15-30min and 30-45min).

Duration of face to face contact with patients

The site recorded a **39.2** percentage point increase in the number of minutes spent with patients.

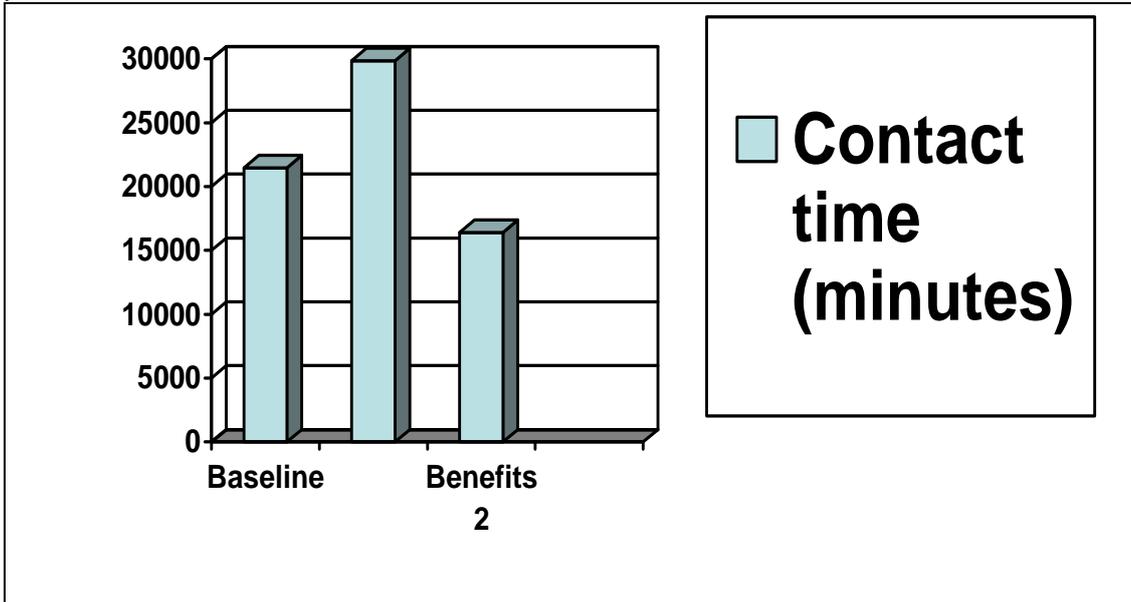


Figure 112 – Contact time (in minutes)

This reflects the increase in the total contacts, and also the significant increases in the longer contact durations.

When broken down into the individual services, the metrics for contacts indicate that all services recorded increased contacts from Baseline to Benefits 1, and variation across Services is seen:

Average contacts per day	Baseline	Benefits 1	Benefits 2	Change
CASH	1.6	1.7	-	+ 6.3%
Respiratory Services*	2.7	3.1	1.9	+ 14.8%
Heart Failure	3.2	4.0	-	+ 25.0%

Table 101 – Contacts by service

Note: No benefits data for Paediatric OT

* Only data for 1 person

Journeys:

During the entire data recording phase, staff at the Tower Hamlets site recorded a total of **1832** journeys.

The number of journeys per day for each clinician increase by **2.4** percentage points over the course of the pilot.

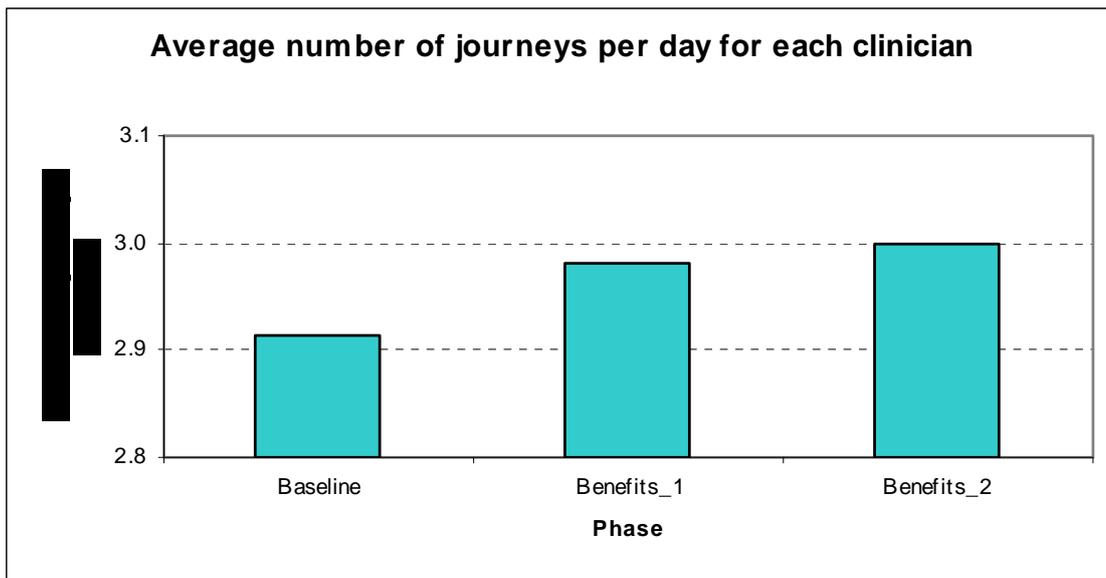


Figure 113 – Average journeys per clinician, per day

Although number of journeys show a slight increase, this is not as much as the increase in contacts, but it is recognised that visiting may be in localities and can be on foot in these areas

Journeys were also broken down into durations, and the results are shown in the following chart:

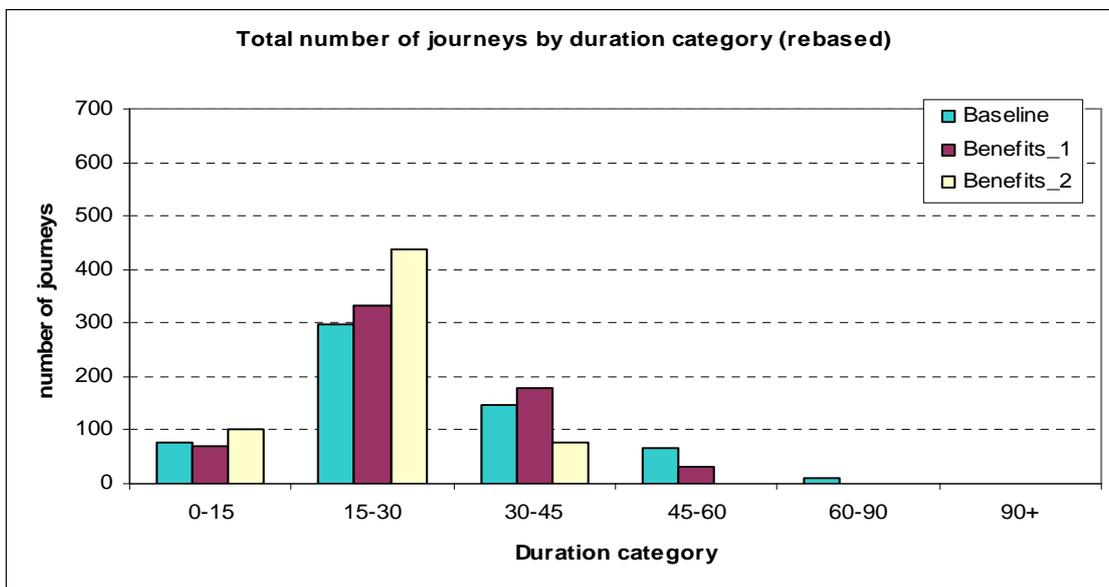


Figure 114 – Total journeys by duration

There is a difference in number of journeys across the journey profile, with a slight drop in the shortest journeys (0-15min), an increase in mid length journeys (15-30min and 30-45min), then a fall across all the longer journeys.

Clinicians recorded that on average the minutes they spent travelling decreased by 4.1 percentage points.

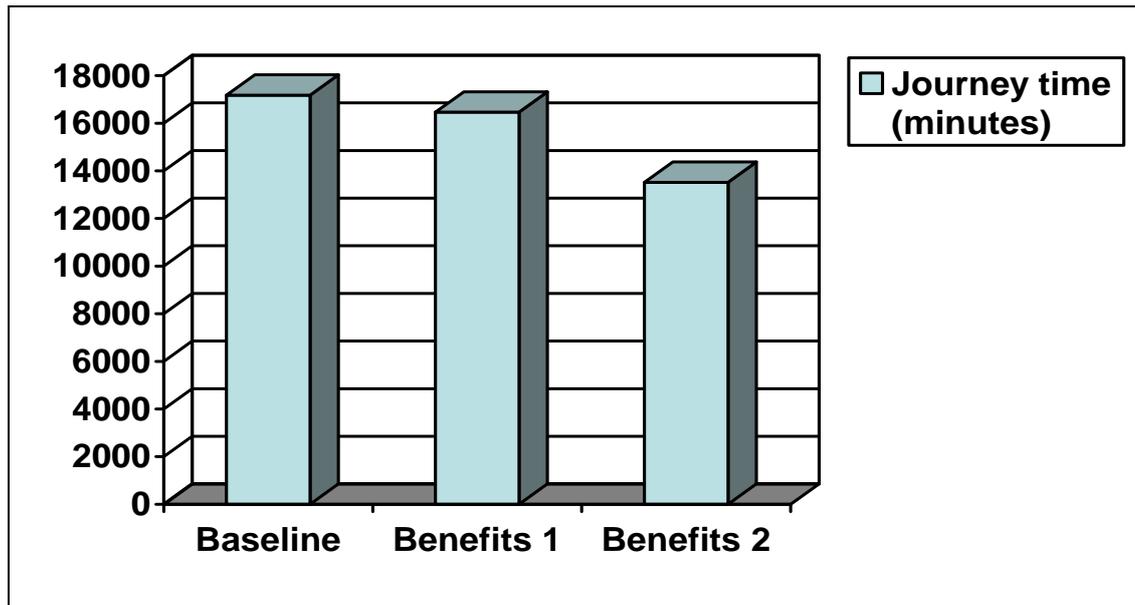


Figure 115 – Journey time (in minutes)

This reflects the changes seen in the journey profile, so that despite there being an overall slight increase in the number of journeys made, due to the reduction in the longer journey durations, an overall fall in time spent on journeys has been seen.

When broken down into the individual services, the metrics for journeys indicate that one service decreased numbers of journeys per day over the pilot duration.

Average journeys per day	Baseline	Benefits 1	Benefits 2	Change
CASH	2.7	2.2	-	- 18.5%
Respiratory Services*	2.7	2.7	3.0	0%
Heart Failure	3.7	4.4	-	+ 18.9%

Table 102 – Journeys by service

Significant variation in number of journeys across services can be seen.

Mileage:

Mileage	#1	#2	Change
All staff (6 returns)	587	606	+ 3.2%

Table 103 – Mileage

Mileage claimed for the site over the same period (taken from a sample of 6 clinicians who returned mileage data) indicated that mileage had increased by 3.2 percent.

The data is based on very small returns and may not be representative.

There were significant difficulties in obtaining either mileage or travel related expense information due to the limited submission of this information within the London area. It is expected that this will be the case across any London based organisation as the majority of the workforce use public transport and do not record mileage.

Referrals:

In total, **11** referrals were made over the Benefits period. Clinicians at Tower Hamlets estimated that due to having access to the devices, they saved **29** potential referrals. This equates to a **72.5% saving** of referrals.

Admissions:

In total, **no** admissions were made over the Benefits period. Clinicians at Tower Hamlets estimated that due to having access to the devices, they saved **7** potential admissions. This equates to a **100% saving** of admissions.

No access visits:

No access visits increased by **3.6** percentage points from the baseline measurement to the First benefits measurement period. As half of the participants undertook mainly clinic based activity a larger gain in these areas would not have been expected.

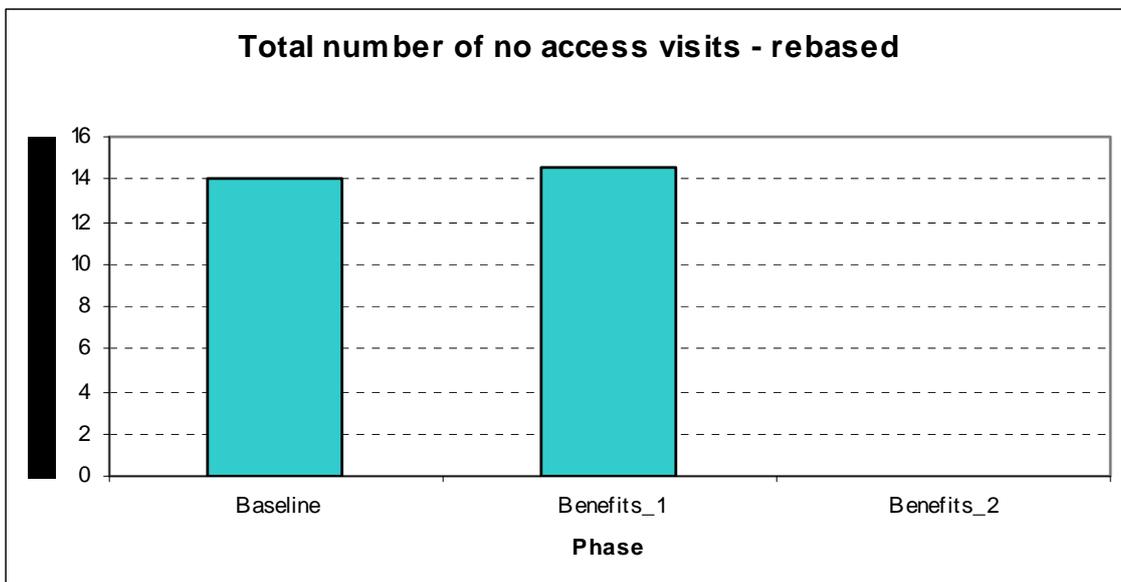


Figure 116 – No access visits

Although the percentage figures show an increase, the numbers involved are so low, this is not of any significance at all

Duplication of data:

The recordings taken in the first benefits collection period show a reduction in data duplication of **63.3** percentage points from the baseline measurement.

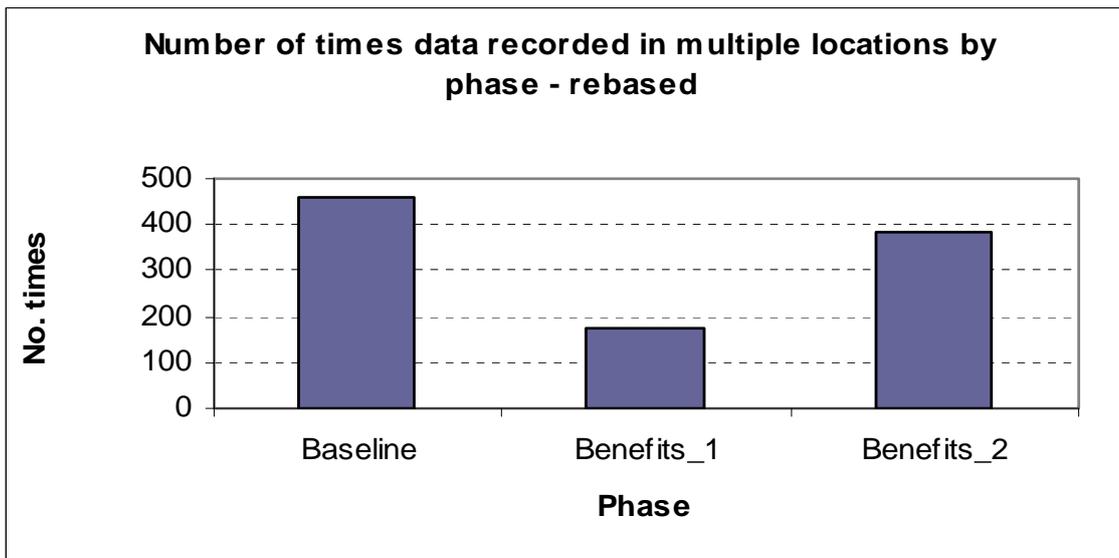


Figure 117 – Duplication of data

The breakdown by Service shown below reveals huge variations across Services, although all services show a reduction.

This is likely to be as a direct result of having all of the data capture areas available within the clinical application on the device, along with the ability to transfer data on interventions electronically.

Duplication of data	Baseline	Benefits 1	Benefits 2	Change
CASH	4.1	1.7	-	- 58.5%
Respiratory Services*	1.7	0.2	1.9	- 88.2%
Heart Failure	3.3	1.9	-	- 42.4%

Table 104 – Data duplication by service

Summary of Metric findings

- Contact and duration of contacts increased
- Data duplication can be reduced
- A huge saving in the numbers of avoided referrals were seen , and potential admissions were avoided.

Subjective findings

The items discussed in this section are those findings which were made based upon the subjective comments noted at the pilot site by the MHWP team, or reported in the free text comments on the data returns sheets

Information: The devices have changed the way staff at Tower Hamlets access information. For example clinicians now have the ability to access pathology results and medications to allow clinical decision making for patients with complex needs at the point of care, whereas previously they would have had to return to base to call up the information needed and make their assessments.

Interaction with GPs: Staff now have more access to historical information when they need it, and the Respiratory Team reports that they are now securely emailing all GPs with their interventions. This involved every GP surgery identifying a single point for the information to be shared with the surgery, but has proved very successful with both the team and the GP practices.

Data capture: The MHWP pilot has demonstrated that data capture can be made quick and easy for clinicians on the go, and that conforming to the requirements of contemporaneous record keeping is not an impossible goal. Previously it was known that users had great difficulty with contemporaneous recording of data.

Paper light working: The mobile devices have begun to help the organisation avoid the physical cost and inconvenience of transferring paper records to clinic locations. In the past, sometimes 30 sets of physical notes may have been transported to and from clinics for use, whereas now patient data can be accessed securely through the mobile devices. This also improves the security of data. The Respiratory Team now uses templates on the clinical record to reduce paper recording. The devices expedite the capture of information for clinical audit and improve the quality and timeliness of reporting.

Efficiency: Staff report that they now have the ability to visit discharged patients much sooner and provide the right levels of support and intervention to avoid unnecessary readmissions, though a change in working process. Staff are now contacting their base location prior to returning and if any patients who have been discharged in the previous 24 hours require intervention a visit is planned before returning to base where appropriate.

Clinicians report much less 'dead time' periods in between patient appointment. Previously during 'did not attend' appointment slots at clinics when previously they would not have been able to pick up on extra administrative tasks or opportunistic visits, staff can now use this unanticipated time productively.

Clinic sessions are conducted with greater efficiency, allowing extra patient contacts to be made before or after the session. The Respiratory Team lead reported a significant personal increase in monthly caseload, an indication of increased capacity. In addition, potential time savings of approximately 4 hours per week per physiotherapist in the Cardiac rehab team have been estimated by clinicians. This equates to two patient visits per week per clinician (by internal audit measurements).

Clinical application: Clinicians felt that they had a greater ability to exploit the use of the clinical application to its full potential with the mobile devices. The increased use has encouraged development of additional forms for data collection and has increased the pressure on the Trust to ensure sharing of the clinical application.

Connectivity: Staff at Tower Hamlets felt that the connectivity offered by the MHWP devices was far more reliable than in previous projects.

Use of resources: Clinicians reported that they had been able to use video and audio media copied on to the devices for rehabilitation classes, increasing the potential effectiveness of such sessions. In addition, staffs are happily using the internet to help inform patient decisions on choosing equipment in their homes.

In their own words

The following are examples of direct quotes from clinicians and patients throughout the project with 20 patient comments and over 75 clinician comments

Clinician comments

Pre-deployment

- “Access to database would have helped making clinical decision.”
- “Entire initial assessment done on paper and needed to be captured on EMIS in the office. Recording took another 1.5 hours.”
- ““Was required to read hospital system for results of outpatient letters and request medication list from GP prior to visiting patient. Had I had this information I would have not needed to spend 30min prior to leaving for the visit doing this.”
- “I had to do at least 1.5 hrs of prep time before leaving for my 4 visits today. This included preparing paper files (no admin support) checking EPR systems to ensure pt were at home, and collating acute and primary care records.”
- “Our conversation with this client was time consuming and frustrating as he was reporting activity from other clinicians that was in conflict with the information that we had. It would have been useful to have been able to show him past physiotherapy reports.”
- “I would have been able to type up my referral to dietician and palliative care throughout the consult in our letter templates; instead I had to return to base to do this.”
- “Trips to the island take about 45-60 mins by bus hence the time travelling. Once back at the office I spent 1.5 hrs trying to ascertain other peoples involvement, when I should have been able to see it clearly if using a shared electronic record.”
- “I have spent 30 minutes prior to this mans visit checking acute care records for feedback from his chest physician and ringing up oxygen providers. This could have been done in his home.”
- “Returned to office in between this visit and my next meeting to make phone calls; if info had have been available I could have been more efficient and done this at pt home. I then made phone calls, but did not have time to enter notes in before leaving the office.”
- “Pre discharge visit with carer of frail elderly gentleman. Had to return to office to write discharge letter and enter in medical record.”
- “The client is challenging in regards to his reluctance to self-manage - is very demanding on health care system and would be great to sit and show him who is involved in his home.”

Post-deployment

- “Connection problems at one site. Access to different databases means entering 4+ usernames/ passwords which is time-consuming.”
- “Occasional network loss during consultation.”
- “Connectivity great on this joint visit with palliative care colleague. Colleague reported that she was 'envious' that I was able to access acute and community care records during the visit.”

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- “I felt slightly concerned about using the technology in this home as there are risk factors of ETOH and mental health. Patient and their family accepted this and there are no issues to report.”
- “The setup time and log in was long and effortful. Rather challenging communicating with the client and setting up at the same time. Would take time getting use to this!”
- “Once it was up and running most clients were unperturbed by it.”
- “Driving between clients with my Toughbook and my work rucksack allowed for the fluidity of visits.”
- “I was able to confirm client’s next outpatient appointment rather than going back to the office and putting this on my endless list of things to do!”
- “Initially quite challenging trying to input data with interpreter present. Had to make further referrals to other services.”
- “Once the patient saw we both could access his hospital letter that said he was using his BiPAP [ventilation] for 9 hrs, he admitted that he found it hard to use and was really only using it 2 hrs per day. This has improved his health outcomes and his prognosis.”
- “Was able to see that she did not have a recent sputum sample sent to path lab, so no risk of double sending a sample therefore saving costs at pathology.”
- “We have to document in the pt home notes as well as EMIS - only minimal info such as observations and changes in care plan are in the pt home. All assessments are on the Toughbook.”

Service user comments

Post-deployment

- “Comment on first use of laptop. Happy could access blood results.”
- “Both patient and her carer felt that it was a great idea to not have to go back and enter the information when I could do it whilst at their home.”
- “First client felt it very positive that the system could access his hospital records as he was never sure what was there.”
- “Patient thought Toughbook was a more sensible approach rather than 'shuffling around with papers'.”
- “Client felt this less time jotting down information about me should make for more valuable face to face session.”
- “Again client concerned about how much equipment I was carrying. I'm not sure this is a negative though!!!”
- “Client happy I was able to check the system to confirm further information thus helping to reduce anxiety levels.”
- “Never liked the idea of someone writing things down in front of them so welcomed this piece of technology.”
- “One client felt she had to talk less as all info was available.”
- “Distracted by utility and attention not given as appropriate. Client did not mind and said that it will take getting used to.”
- “Patient was impressed that we could see both his health care record with us, and the acute hospital information.”

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- “Likes that I no longer have to ask her for demographic information anymore, just confirm date of birth and address!”
- “Happy see 'that you now can spend more time with us patients, and save yourself the bother of writing my stuff twice!”
- “Patient’s son was very happy that he could see all that had been documented about his dad as his dad has short-term memory loss.

Service Changes Seen

- Improved communication processes with GP’s
- Improved record keeping
- Improved security of clinical records
- Improved service delivery

Conclusions

Impressions and achievements

The lack of defined project structure and changing roles at the onset of the project caused some instability for the Tower Hamlets pilot. With more appropriate planning and process design achieving the benefits with support from business change would have made this process more formal. However, it was stated by a member of the project team with more than 20 years' experience that this was the first mobile working project in the organisation that had ever given rise to clear benefits and changes in working practice.

The services involved in the project were managed very well by the clinical leads / service managers and there were many reported benefits and efficiency gains

The pilot has given IT personnel a better understanding of how to influence clinical behaviour and support the staff through changes. The pilot was felt to have been clinically led, and clinical involvement has allowed issues to be discussed openly and understood.

Some clinicians have admitted to loving mobile working and the improvements they have made to working lives, stating that the devices are 'fantastic', with the potential to be 'one of the NHS most treasured tools'.

'I feel very privileged to be taking part in this project,' stated one staff member, adding that it represented 'a huge shift in community work patterns' that clinicians are ready to embrace.

Lessons learned – what would we do differently?

Planning staff availability for training etc proved to be a challenge and something that would require more attention in future.

More planning around resources generally would be recommended; the MHWP work took place at the same time as upgrades to IT Healthcare Systems which limited availability but there are rarely periods of time where there isn't some other activity that could interfere with implementation. Strong project management can help to balance and mitigate risks around resource availability.

The ability to share information in EMIS will become available in a later release of the software – this would be beneficial to any future mobile implementation.

GP Practices need to individually nominate an email account for community teams to communicate clinical intervention; this should ideally be set up prior to any large-scale mobile implementation.

The timing of mobile deployments is critical. Staff also need to be familiar enough with clinical application that the introduction of new hardware will not overload them and discourage adoption.

Solid IT support is critical for successful mobile solutions implementation. This needs to be secured in advance of deployment activities.

The pilot has demonstrated to project personnel the benefits of being able to positively influence clinical behaviour and help staff overcome reluctance to change in order to realise

benefits to patients. It has proven the value of clinically led projects where issues can be discussed openly and addressed in unison rather than through conflict.

The pilot has also demonstrated that not all teams will reflect efficiencies against the MHWP metrics measurement tools due to the type of work involved and rotational staff in the team.

Analysis of comparative data is not always possible, highlighting the importance of clinical engagement and sharing of anecdotal feedback.

Additionally, London based teams may not be able to demonstrate travel time or travel cost efficiencies due to the use of public transport. The process must be adapted to accommodate many different ways of working in order to understand the benefits of the devices to different types of clinicians.

Some staff still perceives the devices as a barrier to communication. Process change and cultural change take time to accomplish even where clear benefits are visible.

Future plans for mobile working

- It is anticipated that home visits will increase as efficiencies are made during clinics and sectional work. Staff will be able to plan visits prior to or after clinic sessions.
- Process flow analysis activity is planned for whole-service transformation to children's services, as is the use of clinical activity data from within the clinical application (EMIS).

MHWP: Conclusions and Lessons Learned

Key Findings

Productivity:

- After an initial period of training and acceptance, devices can help improve productivity by allowing clinicians to better organise their time.
- Productivity could be maintained for clinicians even around sickness, absence or bad weather, with the devices allowing them to continue working or keeping in touch with colleagues throughout.

Efficiency:

- Clinicians reported that – connectivity issues aside – the devices had the potential to make them more efficient in their working practices by reducing unnecessary travel, reducing paper-trails and freeing up office space for office-based workers.
- Clinicians from most sites reported that the devices had allowed them to avoid a number of referrals, admissions and ‘no access’ visits each day, helping to save money and increase their own working efficiency.

Information:

- Anecdotal evidence collected during the pilots indicated that instant availability of contemporaneous information helped clinicians to make better decisions about care.
- Client records could be updated at the point of care or shortly thereafter, increasing clinician compliance with professional requirements around data entry within 24 hours of a contact.
- Clients on the whole were accepting of the devices, feeling that they were the ‘way forward’ for clinical practice and greatly appreciating the reassurance that could be provided through the information available directly from records or online resources.
- Nurse prescribers reported that the information made available through the devices had increased their confidence in using their prescribing skills, with fully up to date patient records available for consultation on the move.

Challenges:

- The major challenge facing clinicians in the adoption of mobile working is not the learning curve of using the equipment but rather that variability of connection speeds and strengths across the urban and rural areas in which they operate.
- Cultural shift towards using electronic records in the community has already begun, with the vast majority of sites having already deployed some manner of electronic system (whether simple demographics or full clinical record). However the cultural shift towards using mobile devices in face-to-face contacts has only just begun, with clinicians at many MHWP pilot sites reporting that they felt uncomfortable using the device in clients’ houses or that they were ‘inappropriate’ in some situations.

Diversity

The differing results achieved across the MHWP pilot sites illustrate the range of possible changes that can be effected through the adoption of mobile working. The disciplines that fall under the umbrella of Community Services are necessarily diverse, and the adoption of one single type of device or one way of working with that device will not necessarily prove to be the most effective for all service types.

Analysis of the metrics returned from each site begins to provide an insight into the possible benefits to be unlocked for the different service types, and further work through the MHWP – the transformation of full teams of clinicians – promises to reveal further possibilities for the identification of savings and efficiencies through mobile working.

Local Learning

Over the course of the MHWP pilot period, lessons have been learned, and it is crucial for the MHW Project to pass these on to organisations planning mobile deployments in the future. These lessons relate to all sites, regardless of the clinical application in use, the kind of service adopting mobile working or even the type of device selected for deployment. Whilst it is impossible to guarantee a successful deployment, by sharing learning and experiences, it should be possible for organisations to more easily and quickly realise the benefits of mobile working.

The lessons learned are split into two sections, the first of which will address the key lessons applicable to implementing organisations, whilst the second examines how the MHW Project could improve its own approach to the study of mobile working.

Deployment Lessons: Sites

Business Change Management: All sites were strongly encouraged to consider their approach to business change and – where possible – to dedicate a member of their project team to focus on understanding how existing business processes might be changed by the introduction of the devices. Not all sites chose to do so, resulting in varying degrees of project success. Business change is discussed in more detail in the **Change Management** section of the report conclusion.

Clinical Engagement: All sites were encouraged to involve participating clinicians in the planning and running of the project. Many sites designated one or more clinical leads who were responsible for ensuring that the project team and the clinicians were working together and not in isolation. Ideally the clinical lead selected was comfortable both in the use of the device and operating at a project level, acting as the voice of the clinicians in raising concerns, problems and reporting successes. Sites with good clinical representation and leadership tended to be the same sites that also recognised the importance of business change, and this in turn seemed to impact how quickly and how fully the clinicians at a given site adopted the devices, and how useful they found them in their daily routines. Clinician engagement not only helped clinicians understand exactly why they were being given the device, but also reassured them that their voices were valuable in the project, that any changes they might wish to make

to their working practices (start and finish times, for example) would be supported by their organisation.

Ongoing support: For mobile projects to enjoy long-term success it is vital that solid ongoing project support be in place. This includes technical support (to ensure that users are guided through any difficulties with or updates to the device hardware or software as quickly as possible) as well as ongoing project support. Project support is critical to ensuring that users feel engaged and supported in the changes they need to make to their working processes in order to realise the benefits offered by mobile working.

Short and Long Term Planning: Another key piece of learning emerging from the MHW Project is the importance of both short- and long-term planning to the success of mobile deployment. Although this might seem an obvious statement, it was observed at several sites during the MHWP pilots that there is still a tendency with projects involving mobile devices for predominantly technical project teams to assume that the deployment is complete once kit has been successfully distributed to relevant clinicians. The project should remain live beyond deployment to incorporate the documentation of benefits realisation. This process should involve clinical and business change leads with a formal handover for instances where technical, business change and clinical leads are not integrated into a single team. Planning must inform every single stage of a mobile project, from establishing realistic expectations at the project outset, to engaging the right clinical and technical resources, to dealing with support issues or feeding changes back into the organisation (changing HR policies, for example) all the way through to effective recording and management of benefits once the devices have been fully deployed. Only through proper planning and full engagement of key services within the organisation will future mobile implementations avoid the costly disappointments that often result from attempts to purchase mobile solutions 'off the shelf' and the expectation that clinicians will somehow make them work without the proper support of rigorous planning and preparation. Resource planning is essential when many different departments across organisations need to be factored into deployments.

Connectivity: The most commonly recorded complaint about the mobile devices used in the MHWP study was that connectivity was not yet consistent enough for clinicians to rely solely on the device in the field. This is an issue that extends beyond the reach of the MHW Project or individual organisations to solve, and will only improve as mobile network infrastructure evolves in the future. However, because network coverage varies in reliability and strength depending on geographical location and the network service provider chosen, it would certainly benefit organisations to run trials with the different providers where possible, to ascertain in advance which would allow for the best connection stability in their geographical location rather than simply choosing the cheapest deal. These trials should include, not just tests of signal strength, but retrieval of clinical information and entering clinical data within the clinical application to be used. For organisations based across large geographical areas, it may even be necessary to source network provision from more than one service provider, as has occurred during the MHWP trials. The initial inconvenience of such measures is far outweighed by the benefits of improved connectivity for clinicians in the field.

Training: Training in the basic functionality of the mobile device was strongly recommended for all participating clinicians. Just as there has been a tendency with previous clinical mobile projects to neglect the planning that contributes to a successful deployment and the achievement of objectives, there has also been a pattern of devices deployed to clinicians without the proper instruction in its use, resulting in the less technically confident staff failing to adopt mobile working fully into their daily processes. With mobile clinical working, the assumption is often made that because clinicians are familiar with the desktop version of clinical applications, they will easily be able to switch to using a mobile device without the need for further instruction. There is, however, a much higher level of complexity in the use of devices in the clinical domain. The availability of training and support with sessions or supporting products has to be an ongoing feature of projects. Security protocols such as the use of smartcards to access clinical applications and N3 tokens to establish VPN access must be fully understood by users or the device will be rendered useless. Without the confidence to exploit the devices to their full potential, clinicians will come to view the technology as more of a hindrance than an aid, ultimately reducing the value of the investment.

Deployment Lessons: Project

Clinician technical ability The MHWP team devised what it assumed would be a straightforward method for clinicians to record, save and submit the data required for analysis pre- and post-deployment. Many clinicians had never used Excel at all prior to the MHW Project, and a simplified data collection method may have improved the submission of data..

File collection: Collection of the data files from the sites became a complicated task, in part because of the problems encountered with the Excel files. Naming of the files over a large project caused difficulties for the MHWP team, robust naming conventions and easily identifiable file names had to be requested to prevent the team having to re name hundreds of files. Establishing a central web-based 'file drop' point for all participating organisations to submit files as they were received from clinicians would have made data collation and analysis much easier.

Clinician involvement: Closer involvement of the Project team in the project initiation stage may have been beneficial as this would have allowed the MHW Project to gather a complete list of named clinical participants from each site at the outset. This would allow the project to track changes in staff and replacements of vacancies. This becomes extremely important for metric analysis and comparative data. It would also have allowed much simpler tracking of data submission (including mileage),

Change Management

Across all sites, regardless of the existing technical capability of participating clinicians, several interconnected messages were repeatedly received:

- The introduction of new technology such as mobile devices without first gaining the support of clinicians greatly decreases the usefulness of that technology and limits the benefits that can be achieved through its deployment.

- Getting clinicians on board and gaining support for new technology can be easily achieved, as long as they fully understand and are prepared for the changes and benefits that the technology will bring.
- Making sure clinicians feel included and valued in the planning process before they are asked to use the new technology in the field.
- Business change management is essential in gaining the trust and support of clinicians.
- No evidence was uncovered during this study to support the notion that the NHS and its clinicians are 'resistant to change' or modernisation. At the root of any reluctance to adopt any new technology is simply a lack in understanding of the importance of fully engaging the target audience in the project from the outset.

Whilst they were strongly encouraged to do so, not all participating sites chose to pursue a business change focused project approach. Where this was the case, project teams usually cited time constraints as the main barrier to a business change based method of deployment.

The time of clinical staff is always at a premium. The sites taking part in the MHW Project were all working under the very ambitious timescales demanded by the TCS programme within which the project was based, and it is acknowledged that some sites would have liked more time to examine the existing working processes of the clinicians and services taking part before redesigning them as a result of the introduction of the mobile devices.

Some sites undertook process mapping specifically for the MHW Project. Others found a way around time constraints by repurposing recent working process modelling completed for other projects such as clinical system deployment, saving time when looking at business change prior to deploying the mobile devices. One site, which lacked adequate business change resources within its own organisation, achieved success by opting to use consultancy and national lead support to determine the process change required.

Where business change was taken fully into consideration before deployment – at Birmingham, for example – clinicians were involved in the planning stages of the project, helping to propose areas for redesign before the devices were deployed. Changes such as allowing access to internet resources to help provide patient information, and the use of the organisation's online equipment ordering service to check availability and reserve items on the spot came directly from clinicians and could be built into the project plans from the beginning.

Historically there appears to have been a tendency to treat the deployment of mobile technology as a purely technical endeavour. Whilst this may offer some short-term unplanned benefits, this excludes the opportunity to engage staff in the ownership of potential benefits. In order to enable the radical redesign of clinical care, and to deliver long term quality and productivity benefits through the restructuring of service provision, the deployment of mobile technology must happen from the ground up and must be supported.

Further Work

MHWP: Ongoing work

Although the TCS Programme has now drawn to its conclusion, the Mobile Health Worker Project is continuing into 2011/12. The MHWP team is currently working with selected pilot sites from within the existing cohort to implement whole-service transformation; identifying full service teams that would benefit from the deployment of mobile devices to all clinicians.

The MHWP team is working closely with project staff to measure outcomes having taken into account the lessons already learned in this project.

Measurements will continue over a longer period of time and without the pressure of TCS deadlines there will be less constraint upon the amount of preparation and analysis that can be undertaken by site project teams.

A follow-up report detailing this work is planned for 2012, as well as a series of case studies detailing the financial benefits to be gained through the adoption and use of mobile devices in community practice.

Glossary of Terms

3G	3 rd generation mobile communications
AIMTC	Avon IM&T Consortium
ALWCH	Ashton Leigh and Wigan Community Healthcare
BEN	Birmingham East and North
BNF	British National Formulary
BT	British Telecom
CIC	Community Interest Company
CIP	Community Information Project
DART	Disabled Adult Resource Team
eCAF	Electronic Common Assessment Framework
EMIS	Egton Medical Information Systems
EPR	Electronic Patient Record
EQIA	Equality Impact Assessment
GAC	Gemplus Authentication Client
GP	General Practitioner
GPRS	General Packet Radio Service
HIS	Health Information System
IM&T	Information Management and Technology
iPM	iSOFT Patient Management
IT	Information Technology
LAN	Local Area Network
MDT	Multi Disciplinary Team
MHW/P	Mobile Health Worker / Project
MIS	Management Information System
NHS	National Health Service
OOH	Out of Hours
OTP	One-time password
PAS	Patient Administration System
PDF	Portable Document Format
SDSD	Syringe Driver Survey Database
SHA	Strategic Health Authority
SIM card	Subscriber Identity Mobile card
SSL	Secure Sockets Layer
TCS	Transforming Community Services
TSS	Therapy Support Systems
VPN	Virtual Private Network
WLAN	Wireless Local Area Network