LCIA Test Bed: using health technology to improve the effectiveness and cost effectiveness of care for older people with long-term conditions living at home

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@LCIATestBed www.lciatestbed.org.uk
The Lancashire and Cumbria Innovation Alliance (LCIA) was formed in April 2015 out of members of Lancaster University’s Health Hub.

We shared a belief that the use of pioneering digital technology in care could bring important benefits to service users, staff, management and the public at large.

Simon Steven’s stated intention in the NHS Forward View to set up a new ‘test bed’ site for worldwide innovators.
Population of 1.4 m
Size, range and number of organisations collaborating

Lead Innovator: **PHILIPS**
- Philips

*Helped identify other innovators to provide bespoke combinatorial solutions for the programme*

Test Bed Innovators:
- Speakset
- Cambridge Cognition
- uMotif
- Intelesant
- Simple Telehealth
- House of Memories
- Good Things Foundation

Clinical Delivery:
- Fylde Coast Vanguard
- Better Care Together
- Vanguard

Evaluation:
- Lancaster University’s Centre for Aging Research (C4AR)

Governance:
- Lancashire Care NHS Foundation Trust
- Lancaster Health Hub
- The Innovation Agency
Test Bed was delivered initially to Bay Integrated care communities (ICC) and will be rolled out to both Carnforth and Lancaster ICC in the future.

Health and social care professionals working as one team within one system, helping the population to manage long term health conditions.
The Programme

- Over 30 month period between 2016-2018, the LCIA Testbed implemented and evaluated a combination of innovative technologies and practices aimed at supporting older people (aged 55+) with long-term conditions (LTCs) to remain well in the community, avoiding unnecessary hospital admissions.

- The combination of technologies each patient received was dependent on their level of risk and their primary LTC.
<table>
<thead>
<tr>
<th>Cohort</th>
<th>Age</th>
<th>Alert</th>
<th>Conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cohort 1</td>
<td>&gt;55</td>
<td>&gt;25%</td>
<td>COPD, Heart Failure</td>
</tr>
<tr>
<td>Cohort 2</td>
<td>&gt;55</td>
<td>&gt;10-25%</td>
<td>COPD, Heart Failure</td>
</tr>
<tr>
<td>Cohort 3</td>
<td>&gt;55</td>
<td>&lt;10%</td>
<td>COPD, HF, Diabetes, CHD, Hypertension</td>
</tr>
<tr>
<td>Cohort 4</td>
<td></td>
<td></td>
<td>Mild Dementia MMSE 20-26</td>
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Innovators
Technology
What did we achieve?

Progress against milestones (March 2018):

Number of households with monitoring systems installed:

- 79% installed
- 100% installed

- 740 households installed
- 941 households installed
Challenges

- Size, range and number of organisations collaborating
- 2 vanguards with 2 different models of care
- 3 clinical commissioning groups
- Procurement and commissioning
- Number of competing initiatives
- Learning as you go - action learning
- Managing the tensions between evaluation & recruitment
- Recruitment to the 4 Cohorts
- Varied interpretation of risk
- Recruitment of Clinical Staff: Availability / Lack of & Time taken
- Governance
- Operating Systems i.e. IT
- Engagement (professionals and the public)
The Lancashire Way

- Commitment to high quality care
- Willingness to collaborate and work together
- Listen and communicate with all involved
- Dog with a bone approach – never give up
- Solution focused – Creation of COGs (1 per Vanguard area)
- Exploring possibilities and ‘what if?’
- Ability to ask powerful questions and challenge historical thinking
- Identify and explore ‘the best of now’ and build on this to maximise the delivery of high quality care to patients at the right time in the right place every time
- Many forward-thinking projects ongoing in the county such as;
  - Whyndyke Garden Village (Healthy New Towns)
  - Digital Health Village
  - Working with one of the UK’s Top 10 Universities, Lancaster University
The Lancaster Evaluation: members of the team include:

- Prof. Christine Milligan (Principal Investigator);
- Dr Ceu Mateus (Co-I: Health Economics);
- Dr Tom Palmer (Co-I: Medical Statistics);
- Dr Mandy Dixon (Lancaster Health Hub);
- Dr Sandra Varey (Senior Research Associate: Phase 2);
- Ms Alejandra Hernandez (Senior Research Associate: Phase 1).
Evaluation - Core and Secondary Outcome Measures

Core Outcome:

Reduction in in-patient admissions.

Secondary Outcomes:

a) Identify benefits to patients and patient outcomes to include: improved quality of life; increased service satisfaction; enhanced knowledge, skills and confidence; enhanced patient activation;

b) Assess the cost implications associated with the intervention (for Cohorts 1 and 2);

d) Assess the impact of the intervention on the workforce;

e) Identify how the intervention might be constructed as a model to be scaled up for adoption and spread.
Evaluation Design – 2 phase mixed method

Phase 1

- Bespoke survey including range of validated measures; survey applied at baseline; mid-point (12 weeks) and end point (24 weeks);
- Matched control (3:1) drawing on data from the NHS North of England CSU for primary outcomes with Cohorts 1 & 2.

Phase 2

- Two phase observational interviews with sample of patients from each cohort (N= 139 with 75 participants)
- Staff diaries (21 people completing) & and action learning meetings (N=5 with 23 people);
- Focus groups – staff (N=16); plus interviews with key staff (N=4);
- Deliberative panels and ranking activity (N=2; 27 key stakeholders)
- Lessons learned activity (4 Focus groups; 5 interviews)
- Logic model &. implementation process (ongoing iteration drawing on action learning, lessons learned & 12 interviews with 10 key stakeholders).
Evaluation: Phase 2 Design

- Two phase observational interviews with sample of patients from each cohort (N= 139 with 75 participants);
- Staff diaries (completed by 21 people) and action learning meetings (N= 5 with 23 people involved including staff and innovators);
- Focus groups – staff (N=16) plus N=4 interviews with key staff;
- Deliberative panels and ranking activity (N=2; 27 key stakeholders);
- Lessons learned activity (4 Focus groups; 5 interviews)
- Logic model and implementation process model (ongoing iteration + 12 interviews with 10 key stakeholders.)
Patient profile

- **Ethnicity**: 98% of all participants were white (61% retired white males)
- **Marital status**: around 58% of participants were married or living in civil partnerships, followed by widowed (20%), divorced (14%) and single participants (8%)
- **Most lived with spouse, partner or family member & had access to internet BUT 32% of participants in cohort 1 lived alone and 34% in cohort 2**
- **84% of all participants were retired**
In Cohort 1, the increase in participant’s confidence in using the health technology increased over the course of the intervention. The increase was statistically significant;

- Participant’s confidence in using health technology also increased in Cohort 2 (Flo messaging service) although this change was not statistically significant.
Analysis of data from the 308 participants who completed the TB programme revealed little change in overall health and wellbeing based on the following validated measures:

- EQ-5D-5L
- Warwick-Edinburgh Mental Wellbeing Scale (WEMWBs)
- De Jong Gierveld Loneliness Scale

BUT, patient activation for those with the lowest level of activation improved over the period of the intervention for all cohorts using:

- Patient Activation Measure (PAM13)
Mean Use of Health and Social Care Services at baseline, 12 weeks, and 24 weeks of intervention

- Overall, the data revealed little difference in the mean use of hospital services in the Test Bed population.

- There was a slight increase in the use of day hospital services and a decrease in the use of outpatient appointments.
Phase 1 conclusions: matched control group

- Compared to the matched control, patients in Cohort 1 showed cost savings in all three measures of secondary care (A&E visits; Outpatient appointments, hospital admissions)
  - Total cost savings for cohort 1 were approximately £116 per patient
  - BUT the cost of the Test Bed intervention exceeded costs savings in secondary care use in cohort 1 by approx. £1,370 per patient

Compared to the matched control group, patients in Cohort 2 showed cost savings in two of the three measures of secondary care, outpatient appointments & hospital admissions) with small increase (£5 per patient) for A&E visits.
  - Total cost savings for cohort 2 were approximately £133 per patient
  - BUT for Cohort 2, the cost of the Test Bed intervention exceeded the cost savings by approx. £175 per patient
Phase 2: Patients and Carers: Using the Test Bed technologies

- Overall, patients’ experiences of using the Test Bed technologies were positive;
- Many patients needed the support of a family member or friend when using the technology;
- The majority of patients across all cohorts were confident in using the technologies after an initial induction period and this confidence increased over time.
• Family carer: Once you get in a routine, it’s a breeze really.

• Patient: Yeah. I have my inhalers after breakfast.

• Family carer: Yeah, we have breakfast...

• Patient: and then we do this [use the Test Bed technologies].

(A1-01 Interview 1)
## Health-related confidence

<table>
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<tr>
<th>Cohort</th>
<th>Increase in health-related confidence?</th>
<th>Reason</th>
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<tbody>
<tr>
<td>1</td>
<td>Yes – vast majority of patients participating in Phase 2</td>
<td>Increase in patient/carer reassurance – as a result of being monitored through the technology. Monitoring of data by healthcare staff was highly valued. Patients and carers were also actively monitoring themselves.</td>
</tr>
<tr>
<td>2</td>
<td>Yes – vast majority of patients participating in Phase 2</td>
<td>Increase in knowledge and skills. Better able to self-manage their health. Majority of patients in this cohort have COPD (95%; n=19). The Test Bed helped patients to learn about COPD</td>
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## Health-related confidence

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<td>3</td>
<td>No</td>
<td>Very different to Cohorts 1 and 2. Participants younger, many in paid employment, did not consider themselves to have LTC; Patients in this group also confident in managing their health at the outset.</td>
</tr>
<tr>
<td>4</td>
<td>Some – but carers, rather than patients</td>
<td>Carers feeling reassured that the patient was being monitored. This helped to alleviate some of the uncertainty and anxiety about the future.</td>
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</table>
It’s like having a doctor check you over every morning.

(A1-03 Interview 1)
Ways in which Cohort 2 patients learned to better manage COPD

<table>
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<th>Correct use of inhalers</th>
<th>Respiration techniques and tips</th>
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<tbody>
<tr>
<td>Identifying early signs of an exacerbation</td>
<td>Importance of looking after oneself</td>
</tr>
<tr>
<td>Motivation – for example to move more often and walk more steps</td>
<td>Using learning from pulmonary rehabilitation classes (over 40% of Cohort 2 participants attend these classes, with others being referred as a result of the Test Bed)</td>
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Training and support:

Good training, induction and ongoing support for patients and carers is essential for the successful implementation of Test Bed technologies.

[The Red Alert colleague] *gave me a crib list that he’d written out himself and it went through it as you do it, and that simplified it a lot [...] it’s so easy... he’d written a very simple instruction.* (B1-06 Interview 1)
Healthcare system utilisation

As a result of the Test Bed, some patients:
• needed fewer appointments
• reduced their medication intake

Reasons for this include:
• increased confidence regarding health condition
• better self-management of health conditions
As a result of the Test Bed, some patients:
• increased their use of healthcare services and medication intake

Reasons for this include:
• increased engagement regarding health condition
• identification of previously undiagnosed conditions
• the need for alternative or additional medication

Note: short-term increases in service use are likely to be offset by longer-term cost-savings, but this was not verifiable within the time-span of the Test Bed programme
Family carers

• The Test Bed technology was often the responsibility of the family carer;
• Many patients said they could not have participated in the programme without the support of a family member of carer.

‘My husband] struggles with time [...] One of our daughters bought him that clock and he’ll look at that and then he’ll forget what time it was so, when I come in, it’s ‘Where’ve you been? Where’ve you been?’ you know, and ‘You don’t have to be this long.’ And so I tend not to go out so much. But the kids keep saying, ‘You’ve got to go out because you’ve got to build up yourself to look after Dad.’ [...] I feel better if someone’s here.’ (Carer-01 Interview 1)
Family carers

• The family carer has a pivotal role; they are key to negotiating the many ongoing changes
• Technologies need to address the needs of the family carer
• It is important that family carers are closely involved in decision-making regarding the implementation of combinatorial health technologies to support patients with dementia, as well as other long-term conditions
Key Messages

• The TB demonstrated a strong level of patient engagement and benefit for self-management of care and patient activation amongst patients and carers using the Test Bed technologies;

• An unexpected finding points to the potential role of Test Bed technologies in early detection of previously undiagnosed health conditions. Future cost savings?

• Whilst protected time is needed for staff to deliver the Test Bed successfully, it enabled them to have more contact & connections with their patients. Many welcomed the added diversity the programme brought to their role.

• Patients want combinatorial technologies that can be tailored to individual needs or personalised to their own lifestyles;

• BUT the costs of the Test Bed intervention exceeded any cost savings in secondary care for both Cohorts 1 and 2 although this was considerably lower for Cohort 2. If cost is the key measure, combinatorial technologies may be more effective when targeted at those patients with lower levels of risk (10-24%).