Can domotics and health technologies enable older people with long-term conditions to stay in their own homes for longer? A view from the LCIA Test Bed.

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The Partnership

• **Delivery:** NHS: Fylde Coast Vanguard, Better Care Together Vanguard (North Lancs) Lead by Heather Tierney-Moore LCFT;

• **Evaluation:** Lancaster University: Christine Milligan (Lead) Ceu Mateus, Tom Palmer, Alejandra Hernandez, Sandra Varey;

• **Technical Innovators:** Philips Healthcare (Lead), Speakset, Cambridge Cognition, uMotif, Intelesant, Simple Telehealth, House of Memories, Good Things Foundation.
The context:

- Around 15 million people in the UK live with LTCs - disproportionately experienced by those aged 60+ and from the lowest socio-economic groups (app. 60% of over 65s);
- LTCs include health issues such as chronic obstructive pulmonary disease (COPD), dementia, diabetes and heart failure;
- People with LTCs account for around 50% of all GP appointments, 64% of all hospital outpatient appointments and < 70% all in-patient bed days;
- The Kings Fund (2019) estimates treatment and care of those with LTCs in UK accounts for £7 of every £10 of total H&SC expenditure.
- Why Lancs? LE in Lancs 18 months shorter than rest of UK. Lancs also has 20% more people with 3+ LTCs than the national average.
LCIA Test Bed aim:
• To determine the most effective and cost-effective ways of supporting frail older people with long term conditions (LTCs) to remain well in the community and avoid unnecessary hospital admissions

Test Bed objectives:
To use a combinatorial range of technologies and services to:
• better support frail older people, living with LTCs
• improve patient activation and the ability of older people with a range of LTCs to better manage their own healthcare at home
• improve health awareness and outcomes for older people with LTCs
• reduce healthcare system utilisation and increase productivity within the healthcare workforce
# Combinatorial Health Technologies by Cohort

<table>
<thead>
<tr>
<th>Innovator partners</th>
<th>Product name</th>
<th>Product type</th>
<th>Target group</th>
<th>Cohort 1</th>
<th>Cohort 2</th>
<th>Cohort 3</th>
<th>Cohort 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Philips Health Systems</td>
<td>Motiva patient tablets</td>
<td>Device</td>
<td>Chronic disease management</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
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<td></td>
<td>Motiva clinical user interface</td>
<td>Device</td>
<td></td>
<td>Yes</td>
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<tr>
<td></td>
<td>TV set-top boxes</td>
<td>Software</td>
<td></td>
<td>Yes</td>
<td></td>
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<tr>
<td></td>
<td>Motiva call scripts, reviews and reporting tools</td>
<td>Service</td>
<td></td>
<td>Yes</td>
<td></td>
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<td></td>
<td>Health Watch</td>
<td>Device</td>
<td></td>
<td>Yes</td>
<td></td>
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<tr>
<td>2. Umotif</td>
<td>Patient mobile app</td>
<td>App</td>
<td>LTCs – vital signs capture</td>
<td>Yes</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Clinical engagement tool</td>
<td>Software</td>
<td></td>
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<td>3. NHS Simple</td>
<td>Flo – messaging system</td>
<td>Software</td>
<td>LTCs – functional ability</td>
<td>Yes</td>
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<tr>
<td>4. Intelesant</td>
<td>COPD management appl</td>
<td>App</td>
<td>N/A – Community care; video consultation</td>
<td>Yes</td>
<td></td>
<td></td>
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<tr>
<td>5. *Speakset</td>
<td>Webcam and set-top box</td>
<td>Software</td>
<td></td>
<td>Yes</td>
<td></td>
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<tr>
<td>6. *Cambridge Cognition</td>
<td>Mobile Cantab</td>
<td>App (cognition assessment)</td>
<td>Dementia (early onset)</td>
<td>Yes</td>
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<tr>
<td>7. Good Things Foundation</td>
<td>Digital adoption support</td>
<td>Service</td>
<td>N/A – Digital inclusion</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>8. *House of Memories</td>
<td>Reminiscence Therapy</td>
<td>App</td>
<td>Dementia</td>
<td>Yes</td>
<td></td>
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</tbody>
</table>
Patients with LTCs recruited within 4 Cohorts

Cohort 1
- Age >55
- >25%
- COPD, Heart Failure

Cohort 2
- Age >55
- >10-25%
- COPD, Heart Failure, Diabetes

Cohort 3
- Age >55
- <10%
- COPD, HF, Diabetes, CHD, Hypertension

Cohort 4
- Mild Dementia MMSE 20-26
Patient profile

- Average age – 71.6 years
- More men than women – 61% v 39%
- Lack of ethnic diversity (98% white British – reflects ethnic make-up of area – 99% of over 55s defined as white in last census)
- 57% participants had completed secondary education; 40% completed higher education
- 58% patients lived with partner/spouse; 38% lived alone; 4% lived with other close family member. However, only 7% of cohort 4 lived alone
- Most patients (80%) had access to the internet prior to recruitment (though this was not an exclusionary factor)
# Methodological approach

## Two Phase mixed methods evaluation

<table>
<thead>
<tr>
<th>Method</th>
<th>Participants</th>
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<tbody>
<tr>
<td><strong>Phase 1</strong></td>
<td></td>
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<tr>
<td>Survey (baseline, mid &amp; end point)</td>
<td>All patients participating in the Test Bed (317 completed all 3 surveys)</td>
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<tr>
<td>Control data</td>
<td>3:1 drawing on CSU data (N=951 cases)</td>
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<tr>
<td><strong>Phase 2</strong></td>
<td></td>
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<tr>
<td>Repeat observational Interviews</td>
<td>Patients* (N=67 x 2)</td>
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<tr>
<td>Staff diaries</td>
<td>N/A</td>
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<tr>
<td>Action learning meetings</td>
<td>N/A</td>
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<tr>
<td>Focus groups</td>
<td>N/A</td>
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<tr>
<td>Deliberative panels</td>
<td>Y</td>
</tr>
<tr>
<td>Ranking activity (N=27)</td>
<td>Y</td>
</tr>
<tr>
<td>Lessons learned activity</td>
<td>N/A</td>
</tr>
<tr>
<td>Logic model</td>
<td>Y</td>
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</tbody>
</table>
When I arrived, A1-01’s [paid] carer was just leaving after her morning visit to help her to wash and dress (someone comes each morning). A1-01 was in bed for the interview and I sat in her wheelchair next to the bed. A1-01 has COPD and was on oxygen, along with an air purifier operating in the hallway. A1-01 also has diabetes and MS, and is unable to use her right arm as a result of the MS. ...

A1-01 has: the tablet; BP meter; and pulse oximeter. When being signed up, they [patient and family carer] were told about a thermometer and heart rate monitor along with other things, but haven’t received this.

The technology lives on the shelf in A1-01’s room. Before it arrived, A1-01 and her son were concerned about where to put it all – and then a small bag turned up!
COPD Patient: [The app is] *stopping me going to the doctor’s.*

Interviewer: *Okay. Do you think you’d have had more appointments if you hadn’t had the app?*

Patient: *I think I would have ended up going back to the doctor’s because, like I say, I’d have left it too late again [to take rescue medication for a chest infection]. Whereas now, with this [app], it warned me that I really needed to start [the medication]. So for me it’s a signal: just get your antibiotics started and your Prednisolone. And, like I said, I think that’s... that’s why my recovery wasn’t as long, because I started in good time [...] And it was all down to this [app]. Whereas I would have left it and left it and left it and I’ve ended up being nearly on my knees, going into the doctor’s.*

Interviewer: *So you actually managed to manage your chest infection and get better without seeing a GP?*

Patient: *Yes.*

(B2-07 Interview 1)
It’s like having a doctor check you over every morning.

Well, it’s reassuring, isn’t it? You know that somebody’s watching it and if they spot something that you… if they saw something that wasn’t right, they’d ring you […] especially when you’ve had… all my family – every one of ’em – have all had high blood pressure.

And

L  It just… it just let me know that everything was all right and anything that I wanted to do I could do it, apart from go up a fell [hill]. (chuckles) Not that we’ve got any fells here, but I used to.

I  It’s just that reassurance…

L  Yeah.
Patient: “And he [GP] said to me, he said, ‘Did I get palpitations again?’ and I said, ‘Well, no, not really... just this fluttery feeling.’ And I got it the other night but it didn’t sort of settle and I thought: Oh is it... my heart’s not going too fast again, is it? And I was a bit uneasy about it, so I got the little oxy thing that was on my bedside table and checked my pulse and that and it was fine. And I went to sleep after that. (chuckles)
I: Has having the technology helped you learn more about your condition, do you think?

R: Yes. Definitely. Yeah, you do... you do... you’re learning all t’time.

I: And what sort of things, would you say?

R: Well, what it is, what it does... exercise you need, which is... I picked one up from one of the videos. This bloke says, ‘I would never be seen dead pushing a supermarket trolley. But now I’ve got this condition, I push my wife out of t’way and I use the supermarket trolley to lean on. And I do that all t’time.

I: And I know that you said last time that... well, you’d worry that you’d get breathless in public... so you’d avoid going to, say, a supermarket?

R: Yeah. Mm.

I: But having watched those videos, does it make you feel better that you think: Well, actually I can do that?

R: Er, well, we’ve been round... we’ve been supermarkets, yeah.
I: What’s different for you now, six months on, would you say, (R)? I know you’re sorting of suggesting that you’ve learnt a lot from using the technology... you’ve found it really helpful, so what is the difference between now and then?

R: ...I can turn round and I know when something’s happening and I can eliminate it, you know, by just saying, ‘Right, sit down for five minutes.’ Yeah? ‘Don’t keep pushing at it.’ Walking in town... we were in town t’other day, I’d have sat down more but unfortunately it were pouring down. So I said, ‘Right, we’re going in a café,’ and we sat down in there. It’s a big place is town when there’s no seats.

I: Yeah.

R: And when it’s raining, there’s no seats. So we sat down in (Bank1); we sat down in (Bank2), and then we sat down in t’café... but the videos tell me, ‘When you feel it coming on, sit down.’

I: Would you... did... before you took part in this and watched those videos, would you have avoided going into town and walking around?

R: Yeah, yeah. I’m going into town more now, aren’t I? [to carer]

P: Yeah, you used to say, ‘You go and I’ll stop at home’ and I... yeah.
It gave me peace of mind in a sense in most things. Like you took your weight, if it was pretty normal, I thought: that’s all right, because usually if you’ve got some-... there’s something wrong, your weight goes down a bit, doesn’t it? Or my blood pressure as well. It’s ju-... yeah, it’s just... it’s a back-up, isn’t it? It’s like a back-up on your health. It’s like having a doctor check you over every morning.

So you obviously got a lot of reassurance from, you know, doing those readings each morning.

Yeah. I’ll show you something... I’ll just go and get it ... and this is a result of... because of having that equipment.

Oh, so this is what you carried on after?

Yeah.

So what made you start recording like this?

Because it’s stemming really from that thing that I said about it being like a... you’re being checked over every morning, but I’m doing it myself instead of the equipment.

(A1-03 Interview 1)
Concluding Comments

Contrary to often held view re the ability of older people to manage health technologies, our data demonstrate that with appropriate support, older people across all age cohorts can not only successfully manage these technologies, but the technologies can actively support changed health behaviours. However, the most frail will need support from a family carer.

CHTs facilitated virtual networks of care, enabling busy GPs to undertake ‘virtual home visits’ with patients; patients felt a sense of security in the knowledge that their condition was being monitored by clinicians who would take action should it be necessary.

Monitoring is not a one-way street. CHTs enabled patients to better understand, monitor and manage their own health conditions at home, and in doing so, were reducing pressure on primary care settings & enhancing their own confidence to engage with the wider community.

Within Testbed, the data illustrate that the autonomous, responsibilised subject idealised by neo-liberal theory, is in fact enmeshed in a variety of interdependencies that stretch from the family to the community, the state and beyond. These interdependencies are also manifest through changing spaces of care – from the home to the virtual – that are designed to shift care away from public spaces of delivery.