Lancashire & Cumbria Innovation Alliance

Dear Colleagues,

It gives me great pleasure to share the Lancashire and Cumbria Innovation Alliance Test Bed service Review for the extended wave 1.5 programme.

The review compliments the Final Evaluation Report for a Targeted Supported Self-Care Programme from Wave 1[1] and is based on business as usual model of delivery.

There are some excellent findings to report including:

- It is especially pleasing to note that the pre-intervention level of hospital admissions is 1.64 per patient. Due to the intervention, this declines 0.44, to 1.2 per patient. This is a reduction of 27%. This is in line with the recently published Retrospective observational study of the impact on emergency admission of telehealth at scale delivered in community care in Liverpool, UK[2].
- 82.6% of Patients on chronic obstructive pulmonary disease care plans and 88% of patients on a generic care plan felt more able to manage condition to reduce the need to see doctor or nurse.
- The average PAM score of the Test Bed population (74 patients) who started at activation level 1 increased from 43.08 to 46.05 (mean difference 2.97). This is a 1.74 mean difference increase from phase 1 of Test Bed.(Each point increase in PAM score correlates to a 2% decrease in hospitalisation and 2% increase in medication adherence").

The learning from the NHS England Test Bed programme has proved to be invaluable to Healthy Lancashire and South Cumbria Integrated Care System and the former Test Bed Team are now supporting the ICS with the delivery of a Digital Discharge project and the Technology Enabled Care at Scale programme.

The partners in the LCIA Test Bed are too many to name individually. On behalf of the team, I would like to thank you all for your expertise, time and support without which the programme would not have achieved the excellent level of success.

Kind Regards,

Janet Davies, Programme Manager
LCIA Test Bed

[1]Source: *Final Evaluation Report for a Targeted Supported Self-Care Programme from Wave 1, Centre for Ageing Research, Lancaster University*

[2]Source: Retrospective observational study of the impact on emergency admission of telehealth at scale delivered in community care in Liverpool, UK, Philips Research Cambridge, NHS Liverpool Clinical Commissioning Group, Health Technology (Telehealth) Liverpool Community Health NHS Trust

August 2019

LCIA WAVE 1.5 FINDINGS

NHS England Test Beds Programme

Lancashire and Cumbria Innovation Alliance (LCIA) was one of NHS England's Digital Test Beds, and operated between Spring 2016 and Summer 2018 (Wave 1) and from Autumn 2018 to Spring 2019 (Wave 1.5).

Frontier Economics and NatCen Social Research, on behalf of NHS England, provided support to LCIA to investigate and report on the impact of the wave 1.5 programme.

This note summarises our results at a high level, and signposts to further information.

Findings

We found some statistically significant **reductions in secondary care activity**:

- Inpatient activity (APC) reduced by almost **0.5 admissions per patient per year** (annualised)
- Outpatient activity reduced by just over **2 appointments per patient per year** (annualised)

These reductions could lead to **cost savings**, or additional secondary care capacity, which we estimate could be valued at:

- Around **£460 per patient per year** for inpatient activity
- Around **£262 per patient per year** for outpatient activity

We note that these cost savings do not include any potential cost savings from reductions in primary or community care activity.

The **cost of the interventions** implemented by LCIA – or what the cost would be for another area to implement – is not straightforward to establish. However we believe the following estimate provide a reasonable guide to a would-be commissioner:

- Approximately **£190 – £725,** depending on the level of patient need, technology used, and whether any existing (e.g. patients') devices can be utilised.

We emphasise that the costs incurred in another area could vary from these figures depending upon the approach and technologies chosen, and the scale of roll-out (which is necessary to achieve economies of scale).

We investigated the **enablers for effective implementation**, and this highlighted the importance of:

- A clear strategy with support and strong leadership.
- Sufficient time and resource to plan, implement and monitor effectively.
- A robust evidence base to justify intervention, and then to establish its impact.
- Joined-up and flexible oversight, contractual and commissioning structures, and support for Information Governance.
- Stakeholder engagement and support from patients, clinicians, commissioners and providers.

Further information

This summary note is based upon three documents:

- Frontier Economics, LCIA: Analysis of Wave 1.5 Secondary Care Activity
- Frontier Economics, LCIA: Analysis of Wave 1.5 Programme Costs
- NatCen Social Research, LCIA Barriers and Enablers to Successful Commissioning

These documents are available at https://www.lancashirecare.nhs.uk/lcia-testbed-service-review

General information about LCIA and the Test Beds Programme is available from:

- NHS England Test Beds Programme website

https://www.england.nhs.uk/ourwork/innovation/test-beds/

- LCIA Test Bed website

https://www.lciatestbed.org.uk/

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August 2019

NHSE TEST BEDS WAVE 1.5

LCIA: Analysis of Programme Costs

This note outlines the costs associated with running the Test Bed wave 1.5 programme at Fylde Coast and Morecambe Bay. Different models were used at each site for implementation. Cost information for the dementia cohort is separate. Estimates for costs for each technology are also provided, although these were not incurred in the Test Beds wave 1.5 programme. We note that we expect costs to be much lower if the programme was provided at scale.

KEY FINDINGS

Within Morecambe Bay, the programme was delivered using additional costs. Within Fylde Coast, the programme was delivered by redeploying existing resources ('business as usual' costs). Technology costs were not incurred for Wave 1.5, but we provide indicative estimates and ranges for what technology costs could have been.

The figure below outlines estimated annual per patient costs.

Figure 1 Breakdown of per patient per year costs

Programme area		Additional or BAU costs	Annual per patient cost
Morecambe Bay		Additional	£190-225
	AF screening	Additional	£10
Fylde Coast		BAU	£340, with a range of £8-£686. See description in Fylde Coast section below
Dementia		Additional	£120 (expected treatment cost)
Test Bed technology		Additional	£0-500. Costs depend on the technology and whether devices are needed. See the *Costs per Test Bed technology* section.

Source: Overall Cost Analysis -210219; The Bay – Costs for HF; Discussions with clinical team

Note: Morecambe Bay costs based on 1000 patients

This suggests an overall per patient cost of around **£190 – £725,** depending on location and technology. Technology costs vary widely, as this should be tailored to patient needs, and also because patients' own devices can sometimes be used. Costs depend critically upon delivering at scale (e.g. 1,000+ patients), and therefore it is important to consider the expected number of patients when considering a similar programme elsewhere.

We note that the level of patient need can have a very significant impact upon the level of monitoring and technology required.

Figure 2 Pyramid of patient need

Source: NHS England (2018), Report of the Review of the Quality and Outcomes Framework in England

In any population of patients there is a range of patient need, which can be considered a pyramid (see inset). There are relatively few 'highest need' people and increasingly more 'lower need' people as you move down toward the whole population.

Discussions with the LCIA Programme Team and with technology providers suggest that the level of monitoring and technology required may be almost zero for those with lowest need, but much higher for those with highest need – hence our wide range for suggested costs of £190 - £725.

A would-be commissioner should be aware of these considerations and think carefully about the needs of its target population.

MORECAMBE BAY, FYLDE COAST AND DEMENTIA COSTS

Morecambe Bay: delivered using additional resources

Morecambe Bay chose to implement the wave 1.5 Test Bed Programme using additional costs (i.e. in addition to existing staff and resources). The additional annual costs for monitoring each patient are **£190-225**, based on staff costs for 1,000 patients[1]:

- one GP: one day per week to identify suitable patients
- two nurses: one day per week (split into two sessions) to monitor the alerts, respond and escalate where appropriate; and
- one operational manager time: full time for recruiting, enrolling and managing the process

Overhead costs include an office based within a GP surgery and administration.

These fixed costs mean that as more patients are covered, the per patient cost will fall, reflecting economies of scale which could be achieved with a larger roll-out.[2]

[1] Source: *Overall Cost Analysis -210219 and discussions with LCIA Programme Team*

[2] Source: *The Bay – Costs for HF*

Atrial Fibrillation screening

Some patients entered the Test Bed programme through atrial fibrillation (AF) screening. Patients were screened through flu clinics, in a Primary Care setting.

298 patients took part in the screening. The average cost per patient screened was **£10**, based upon the total training and screening costs below.

Figure 3 Training and delivery costs

	Unit	Cost
Training (5 hours)	Total cost	£1,217
AF screening	Total cost	£1,634

Source: The Bay – Costs for HF; AF clinic costs

Test Bed technology costs for these patients are the same as for other heart failure patients, although a small number of Careportals were used in the trial. We have not included the Careportal costs as they are outside of the Test Bed programme.

Fylde Coast: business as usual costs

For Fylde Coast we describe what resources would need to be redeployed (or additionally funded) to implement, as Fylde Coast has decided to fund the programme through efficiency and capacity savings, with costs already incurred through providing usual care for this cohort. The clinical team estimate that the annual patient cost under business as usual could potentially be within the range of **£8 – £686**, dependant on whether additional technology is required to meet patient needs, with a midpoint of around **£340**. In contrast to Morecambe Bay, these costs may not fall per patient as more patients are included as Fylde Coast does not have similar fixed costs to the hub monitoring system.

In discussions with the local CCG, we have outlined what the programme looks like. It is delivered through two teams. Currently the case load for each team from the programme is very low. However, it is anticipated that in the medium-term (2-3 years) up to 30% of the caseload could be supported with the test bed approach. In the long-term this could be higher but it is difficult to predict both changes in technology which could influence increased activity, and increasing public acceptance and expectation of technology-enabled health in the future.

Rapid response

- **Patient acceptance criteria**
  - Over 18 years of age
  - Must require hospital level of care, i.e. the patient would otherwise require hospital admission.
  - Must be medically stable.
  - Rapid response is a two-week pathway of support
  - Discharge is usually to district nurses or community matrons
- **Composition of the team:** it is a multi-disciplinary team, consisting of:
  - nurses at bands 5 and 6;
  - therapists (physiotherapists and occupational therapists) at band 6 and 7;

- support works at band 4 support workers (HCA-type role); and
- social workers.

- **Patient referrals received:** we review this metric because the model for Rapid Response and Test Beds is to support people who enter onto the team's caseload. The team's purpose is to reactively support people to stay at home rather than go to hospital, or get them out of hospital sooner, through active support to avoid or stabilise exacerbations. The Test Bed programme supports this.

Figure 4 Patient referrals received in 2018

Team	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
COPD Hospital@ Home	41	46	35	34	42	28	24	31	23	30	37	53	**424**
Rapid Response	51	26	45	47	46	45	75	65	65	70	72	46	**653**
Rapid Response Plus	136	94	93	79	109	100	91	81	93	105	97	104	**1182**
Total	**228**	**166**	**173**	**160**	**197**	**173**	**190**	**177**	**181**	**205**	**206**	**203**	**2259**

Source: Fylde Coast Rapid Response team activity for Test Bed Analysis

Community matrons

There are eight teams across Fylde Coast. The data below is for one team (Kirkham) and can be used to approximate for the others.

- **Acceptance criteria**
  - Over 18 years of age
  - Identified as needing support to improve health and wellbeing (this is usually linked to a long-term condition or similar specific health need)
- **Team make-up:** teams at band 7 nurses, supported by band 5 nurses. Community matrons also form part of our neighbourhood care teams, which are a broader multi-disciplinary team that wraps around the patient. E.g. when patient is on a community matron caseload they are also have access to support from other professions including wellbeing workers and therapists.
- **Active caseload:** The community matron team are a proactive team with a cohort of patients that they build a relationship with over an extended period of time, in order to support their ongoing needs. The test bed approach supports gathering information to inform self-management and empowerment approaches.

Figure 5 Active caseload for a community matrons team, 2018

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Per team	15	15	16	17	22	27	28	28	32	37	39	37
Across all teams	120	120	128	136	176	216	224	224	256	296	312	296

Source: Kirkham Community Matrons activity for Test Bed Analysis

Dementia

Memory Assessment Services (MAS) aim to deliver fast and timely diagnoses of dementia. Anyone can be referred by their GP or other hospital specialist because of concerns. The team includes nurses, doctors, occupational therapists, psychologists and support workers.

The expected treatment cost per patient is **£120**, which is the average monitoring cost and expected cost of titration. We estimate the expected cost of titration by using the percentage of patients who commenced titration as the likelihood for each referred patient to commence titration. This is slightly different than the upfront costs provided in the other sections, as not all referred patients require titration treatment. This is the average across the CCGs.

The Fylde Coast MAS covers two CCGs, and Morecambe Bay and Lancaster MAS covers one CCG. Annual costs for Fylde Coast Test Bed involvement are £59,130, which gives a cost per patient referred of £24. Annual costs for Morecambe Bay are £19,260, which gives a cost per patient referred of £26. There is oversight across both geographical areas at a cost of £24,075 which is £8 per patient referred. The average cost per referred patient across both areas is £32.

The MAS teams for Test Bed wave 1.5 are outlined in the table below.

Figure 6 MAS teams

Location	Staff	WTE
Whole area	Band 7 Occupational Therapist	0.5
Fylde Coast	Band 3 HCSW	2
	Band 6 Nurse	0.3
Lancaster and Morecambe Bay	Band 7 Advanced Nurse Clinician	0.4

Source: Discussions with clinical team

Recent interviews with staff report that they review and report patients on the Docobo system twice a week, which takes an average of an hour per week.

From April 2018 – February 2019, the average wait from referral to diagnosis was 113 days. Dementia diagnoses were 63% of all diagnoses and 20% of referrals were not accepted in the same period.

Figure 7 Referrals, April 2018 – March 2019

	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar
Morecambe and Lancaster	71	69	53	68	70	53	51	67	51	66	50	61
Blackpool, Fylde and Wyre	169	183	192	212	227	151	261	228	191	238	195	202

Source: Discussions with clinical team

During this time there were also 90 patients in total who commenced titration, which is approximately 3% of all referred patients[3]. Total titration annual costs are £279,776[4], which is £3,109 per patient commencing treatment and £88 in expectation for each patient. The majority of these costs were in Fylde Coast MAS was £248,763 of this cost, which is 89% of the total titration costs.

COSTS PER TEST BED TECHNOLOGY

Figure 8 below summaries estimates of the cost per patient that could be incurred, noting that most technologies have fixed costs and so the per patient costs are heavily dependent on the number of patients using them.

Figure 8 Estimates of Test Bed wave 1.5 (hypothetical) technology costs per patient

Technology	Technology description	Annual per patient cost	Note
Docobo https://www.docobo.co.uk/index.html	Provides a range of telehealth solutions for different patients' needs. It simulates clinical monitoring and peripheral devices can be linked to the monitoring system.	£0 - £500	Indicative range of costs for different patient needs.
Simple (Florence) https://www.getflorence.co.uk/	Provides monitoring vital sign tracking and text reminders.	£54 - £867	Depends on patient pathway. Including one-off training costs for first year.
Cambridge CANTAB https://www.cambridgecognition.com/cantab/	Software providing cognitive testing	£8	One mobile licence for a GP practice. Assume two training sessions. Assume tablet purchase price from Docobo cost data.
Speakset http://www.speakset.com/	Converts domestic TV into video calling systems	£300	Assumes the Speakset is used by two patients each year.
Intelesant https://howz.com/	COPD monitoring app	£13	Assumes two days of additional support each year.

Source: The Bay – Costs for HF; Discussions with clinical team

[3] It was not possible to disaggregate titration patient numbers by location.

[4] Assumes advanced Nurse Clinician in Blackpool is Band 6 and that Specialist Doctor and Consultant Psychiatrist are Band 8b. All salaries use band averages.

Docobo

Costs per patient will vary significantly, depending on which devices and peripherals are needed over what period of time. We provide ranges for devices and for peripherals and usage below, in conjunction with advice from Docobo.

The typical intervention model is for new patients to be monitored frequently through Docobo for four to six months, and then stepped down to a less frequently monitored level and encouraged to use their own devices. Patients in deprived areas may require financial support to access devices and peripherals.

Docobo can be scaled up for more patients or to more intensively monitor patients. It is a flexible system and matches equipment to both the clinical need of the patient and their ability to use technology.

Devices

There are three device options for using Docobo and patients/clinicians choose their preferred option . Patients can use tablets, smartphones or Careportals. One of these may be provided by the NHS or the patient may have their own device. The cost range is £0 to £336 (if a patient already has their own device, the cost to the NHS is zero), assuming that a patient would rent a device for a year.

There were no hardware costs in Wave 1.5 as equipment had been paid for previously. The following figures outline what hardware costs could have been.

Figure 9 Costs for devices

Device	Rental price (annual)	Purchase price
Careportal ®	£336	£850
Tablet (Samsung)	£204	£316
Smartphone	£144	£100

Source: The Bay – Costs for HF

Rented devices have minimum term lengths of two or three years. The annual price if you buy the device will depend on how long it will last for.

Docobo note that it is possible to use cheaper tablets than the recommended Samsung, such as Asus which retail around £100, but this may impact support costs and effectiveness with video quality and mobile signal.

Careportals were not used in Wave 1.5, apart from in the AF screening. Careportals are a Class IIa medical device and it can used by multiple patients. For example, 20 patients can use a Careportal simultaneously in a care home. It has a built in ECG, heart rate, heart rate variation, BIOZ and accurate breathing rate. It is designed for over 65s to use as the technology is very simple. It is often used in care homes. Standalone peripherals are required based on patient needs.

Peripherals and usage

The exact technology and peripherals required is very specific to the patient and their clinician's views and preferences. For instance, a COPD patient may need an oximeter and a blood pressure meter, with frequent monitoring five days per week. This is very different to a diabetes patient who uses the Docobo app to log readings of vitals and symptomatic questions once a week.

Different patients need different peripherals (blood pressure, oximeters, scales and thermometers), and these can be either manual or Bluetooth. The choice to use manual or Bluetooth devices is clinical, although Docobo note that manual devices may encourage self-management and motivation from patients. Costs further vary on whether peripherals are rented or bought.

Usage also varies greatly by patient needs. Usage can be as frequent as multiple times a day, and monthly packages exist as well. Some patients may use private internet access and others may require data.

Other costs such as installation and verification vary across locations and packages.

Per patient values vary greatly and range from around £45 to £350 per year. As these costs depend on the peripherals and usage needed by each patient, the per patient cost will not necessarily decrease with more patients using the technology.

Simple (Florence)

This is a text reminder service and monitoring service. In LCIA this was procured across three neighbourhoods at a cost of £28,680 which provided 45,000 messages.

The number of messages used, and therefore the number of patients this can apply to, varies depending on the care plan or pathway as below[5]:

- the Carers pathway which includes 70 messages, can cover 643 patients per year;
- the HF pathway which includes 364 messages, can cover 123 patients per year; and
- the COPD pathway which includes 1,136 messages, can cover 40 patients per year

Training costs are a one-off £6,000 for the first year[6].

The per patient costs are in the table below, including what the costs are per patient after the training costs are recovered in year 1.

Figure 10 Per patient costs per year, by pathway

Pathways	Patient numbers	Year 1 cost per patient	Year 2 cost per patient
Carers	643	£54	£45
Heart failure	123	£282	£233
COPD	40	£867	£717

Source: *LCIA protocols*

Note: *Includes the optional Community Membership*

All costs will vary and would decline as more patients use the technology, subject to some potential need to purchase additional messages. Additionally, the use of messages is not restricted to one pathway and can be mixed and matched to meet patient healthcare needs.

[5] Patient numbers based on number of messages in LCIA protocols

[6] Training costs are a one off, therefore not required in subsequent years

Additional costs for peripherals may be needed as well.

Cambridge Cognition

The annual cost of a CANTAB mobile licence is £750 per year for a NHS GP practice. This allows for unlimited use and requires the practice to have a tablet for use.

The additional cost for training staff (after an individual as received the train-the-trainer training included in the cost) is £77 per session[7].

The number of patients that use CANTAB will depend on the GP practice and its demographics. The average is 147 patients, with a per patient cost of £8[8][9]. These are fixed costs and the per patient costs will decline as more patients use the technology.

Speakset

The cost is £600 per Speakset per year, which includes technical support. Speakset can be used by more than one patient if moved between homes. The clinical team estimates that it is reasonable to assume it can be used by two patients a year.

The per patient per year cost is therefore £300[10]. While the cost of a Speakset is fixed, it is not feasible for one set to be used by many patients in a year.

Intelesant

The cost was £5,000 per CCG per year which gives unlimited use for the *How are you today* app[11]. The day rate for additional support was £450.

During Wave 1.5, five patients from Morecambe Bay used the service. However, in theory any patient with a COPD diagnosis could use this service. We provide cost figures below assuming that 5% of eligible patients used the service.

Figure 11 COPD patient numbers and costs per year

CCG	Population with COPD	COPD population if 5% use service	Cost per patient (5% of population)
Morecambe Bay	7,818	391	£15
Fylde Coast & Blackpool	10,520	526	£11
Total	18,338	917	**£13**

Source: *Costs and patient numbers from Overall Cost Analysis 210119 and discussions with clinical teams.*

Note: *Cost includes two days of additional support*

These costs are fixed and the per patient costs will decline as more patients use the technology.

7 Assumes 2.5 hour session including prep time. Assumes one session needed.

8 Samsung tablet purchase price from Docobo data used for the cost of a tablet for the GP practice.

9 Costs and patient numbers from *Overall Cost Analysis 210119* and discussions with clinical teams.

10 Costs and patient numbers from *Overall Cost Analysis 210119* and discussions with clinical teams.

11 Intelesant has since been superseded by HOWZ, which is a smart home system in conjunction with EDF energy to help elderly people live in their own homes.

August 2019

NHSE TEST BEDS WAVE 1.5

LCIA: Analysis of Secondary Care Activity

This note outlines the results of the secondary care analysis and gives an indication of the potential benefits, noting that these figures vary greatly across patients.

Key findings

We find that there are some statistically significant reductions in secondary care activity but most reductions are not statistically significant at the 5% level.

There are statistically significant results for reductions in admitted patient care (APC) and outpatient attendances (OP). Data for a control group suggests that activity might have been expected to increase over the period, without the intervention, which gives greater confidence in these reductions. For all patients together, we find

- APC falls by almost 0.5 per patient per year
- OP falls by just over 2 per patient per year

We have calculated an illustrative potential cost saving associated with these activity reductions of around **£460 for APCs** and **£262 for OPs**.

Activity data results

The data is based on 136 patients, who were part of the Test Bed Wave 1.5 programme and had at least one secondary care activity during the data collection period (August 2017 – March 2019).[1]

All activities for all patients (not split by diagnosis) show a reduction in activity during the Test Bed Wave 1.5 period except for average LOS. However, only APC and OP are statistically significant.

When activity is split by primary diagnosis, we find that APC and OP reductions are statistically significant for heart failure and COPD patients but not for generic, dementia and jointly diagnosed heart failure and COPD patients.

While most activities show a decrease during Wave 1.5, they are not statistically significant and are therefore not robust results. We do not present benefits of these.

The results are presented in the following table, highlighted for green when there is a t-test with a p-value of less than 5%. Sample sizes are provided in the annex.

[1] Some analysis of activity by diagnosis group is not possible because of very small sample sizes (fewer than three patients).

Figure 1 Annualised activity per patient, by diagnosis

Diagnosis	Activity	Before	During	T-test p-value	Change between before and during
All diagnoses	Admitted Patient Care (APC)	1.64	1.20	0.04	-0.44
	Average LOS	2.02	2.14	0.57	0.11
	Outpatient (OP) days	6.80	4.70	0.00	-2.10
	AE attendances	0.65	0.64	0.93	-0.02
	NWAS 111 calls	0.68	0.60	0.68	-0.08
COPD	Admitted Patient Care (APC)	1.42	0.66	0.00	-0.76
	Average LOS	1.96	1.63	0.61	-0.33
	Outpatient (OP) days	7.67	4.26	0.00	-3.42
	AE attendances	0.84	0.63	0.50	-0.21
	NWAS 111 calls	0.64	0.27	0.10	-0.37
Heart failure	Admitted Patient Care (APC)	1.41	0.63	0.00	-0.78
	Average LOS	2.85	5.23	0.75	2.38
	Outpatient (OP) days	7.07	4.40	0.00	-2.67
	AE attendances	0.68	0.68	1.00	0.00
	NWAS 111 calls	1.01	0.79	0.53	-0.22
Generic	Admitted Patient Care (APC)	2.02	2.40	0.57	0.38
	Average LOS	1.50	0.25	0.34	-1.25
	Outpatient (OP) days	5.50	5.25	0.84	-0.25
	AE attendances	0.45	0.61	0.75	0.16
	NWAS 111 calls	0.46	0.95	0.38	0.49
Heart failure and COPD	Admitted Patient Care (APC)	0.85	0.00		-0.85
	Average LOS	6.92	0.00		-6.92
	Outpatient (OP) days	1.71	6.12		4.41
	AE attendances	0.00	0.00		0.00
	NWAS 111 calls	0.00	0.00		0.00
Dementia	Admitted Patient Care (APC)	2.90	2.86	0.97	-0.04
	Average LOS	0.19	1.29	0.39	1.10
	Outpatient (OP) days	6.42	6.56	0.97	0.13
	AE attendances	0.31	0.61	0.74	0.29
	NWAS 111 calls	0.00	0.00		0.00

Source: CSU data; Frontier analysis; blanks where the sample size is below 3; t-test is a two-tailed paired test

We note that the result for OP activity is statistically significant at 0.1%, meaning that the probability of observing this result by chance is extremely low.

We do not distinguish between APCs which were day cases and which were overnight(s) stays. The data used is aggregated at the monthly level per patient and where there are months with multiple APCs and total LOS greater than 1, we do not know if all APCs had an overnight or if some were day cases. Where day cases are known, (total LOS is 0 when APC is greater than 0), this is around two thirds of APCs and it looks as though this has decreased slightly in the during period. However, the statistical test on this reduction is not significant and it is unlikely to be an accurate reflection of day cases due to the monthly aggregation.

Control group activity data

We analyse the results of a control group to see if we could have reasonably expected activity to go up, down or stay constant for Test Bed patients over this time.

We find that the control data shows an increase in activity over this same time period.

The control group patients are patients from the same CSU but are not part of the Test Bed programme, who also have heart failure or COPD. There are 9,385 patients in the control group. It was not possible to do a direct matching of control patients to Test Bed patients. The results should be interpreted as indicative in comparison to the Test Bed results.

Most of the results for the control group are statistically significant and all show increases in activity. These are shown in the following table, with green highlight for p-values less than 5% and yellow where the associated change is negative (ie there was an increase in the during period).

Figure 2 Annualised activity per patient in the control group, by diagnosis

Diagnosis	Activity	Before	During	T-test p-value	Change between before and during
All	APC (discharge)	0.93	1.10	0.00	0.16
	OP	4.12	4.25	0.02	0.13
	AE	5.61	5.99	0.00	0.38
Heart failure	APC (discharge)	1.14	1.24	0.13	0.10
	OP	5.01	5.08	0.52	0.07
	AE	6.79	7.10	0.04	0.31
COPD	APC (discharge)	0.85	1.03	0.00	0.19
	OP	3.75	3.90	0.01	0.16
	AE	5.11	5.52	0.00	0.41

Source: CSU data; Frontier analysis; t-test is a two-tailed paired test

We note that the before levels of activity in the control group are lower compared to the Test Bed cohort, other than for AE, indicating that the control group is slightly more healthy.

Indicative benefits

The table below uses reference costs as an indicative estimation for the benefits of statistically significant reductions for APC and OP for all patients in the Test Bed cohort[2]. We do not look at potential benefits by diagnosis as we do not have the information to match for specific healthcare resource group activity. These high-level reference costs do not vary by the diagnosis or the patient or the reason for the APC or OP.

Figure 3 Annualised indicative benefit (per patient)

Activity		Benefit
APC	£	460
OP	£	263
Total	**£**	**723**

Source: 2017/18 reference costs (NHSI); Frontier analysis

We calculate this using assumed cost to treat from NHS reference costs.

The assumed cost for treating APC is £1,302. This is a weighted average of non-elective admissions and day cases, where day cases are 65%. This is broadly reflective of what we see across periods for the known day cases in the data.

The assumed cost for treating an OP attendance is £160.

Data limitations

It is important to note a number of limitations to the analysis:

- The treatment group contains a relatively small number of observations. While our analysis of statistical significance accounts for this, it may mean that the results from a larger roll-out would be different.
- The analysis combines data from implementation in two adjacent geographical areas, with a different operational model. Due to the sample sizes available, it was not possible to separate the analysis for these areas.
- The time period over which impact was observed was relatively short. Over a longer period it might be that the impacts would be smaller (as the intervention effect 'wears off') or possibly larger (due to health improvements taking longer to translate into activity impacts).

Data description

There were 136 patients in Wave 1.5 who had an activity either in the before or during period, across Morecambe Bay and Fylde. These patients were all enrolled in the Test Bed programme. We are unable to specify which patients were involved in Wave 1, but we know approximately 45 patients in Wave 1.5 in Morecambe Bay were in Wave 1 as well. We are unable to split patients across Morecambe Bay and Fylde Coast.

The data period is August 2017 – March 2019: the before period was the year August 2017 – July 2018 and the during period for the Wave 1.5 programme was

[2] We do not calculate any benefits for the control group

August 2018 – March 2019. There is no after period for comparison as no patients were stepped down or dropped out.

The data was provided by the NHS Midlands and Lancashire Commissioning Support Unit (CSU), with diagnoses and start dates provided by the LCIA team. The data was pseudonymised before it was shared with us. The CSU also provided the control group data, which covers the same data period and includes primary diagnoses for heart failure and COPD.

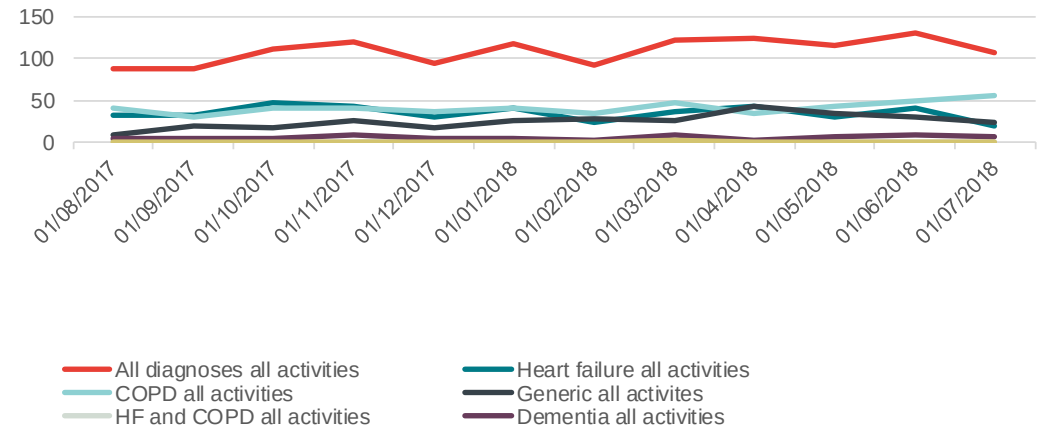
Methodology

The data was annualised from the eight month period Wave 1.5 period (August 2018 – March 2019). Patients have different start dates and annualization takes this into account. The full year of before data does not show any obvious cyclical patterns, although it is noisy.

For the purposes of comparing annual per patient averages, a patient is included in the before and during averages if they had at least one activity at any point in the data period. This captures patients who have an activity in only one or in both before and during periods and excludes patients who never had this type of activity. All patients were exposed to the "treatment" of the Test Bed programme.

The graph below shows activity data over time, without any clear patterns.

Figure 4 Test Bed activity by diagnosis



Source: CSU data; Frontier analysis;

Per patient (annualised) averages were compared for the before and during periods in order to see if there was a difference and of what size. These changes were tested for significance using a two-tailed, paired t-test. The minimum sample size to report the statistic is 3, which excludes some activities when analysed on a diagnosis basis. We use a statistical significance level of 5%.

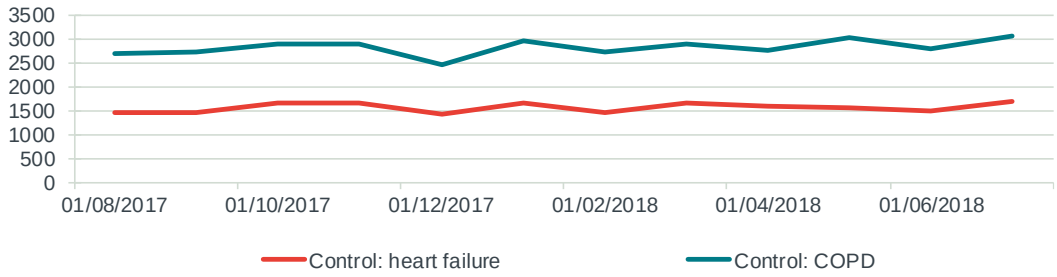
We do not present changes in day cases for APCs. This is because our data is monthly and therefore groups day cases and multiple day APCs together. By reviewing APCs with no length of stay, we can conservatively say that day cases are around 65% of the APCs across the whole data period.

The average LOS is calculated by taking the total LOS in the period and dividing it by the total number of APCs.

Control group

The data covered the same period as the Test Bed data, described above. We checked the data for evidence of seasonality or trends and did not see such evidence. We note that the data does not show seasonality, as is also the case for the Test Bed data. The activity data is presented below.

Figure 5 Control group activity by diagnosis



Source: CSU data; Frontier analysis;

Control patients were provided for COPD and heart failure: we did not have patients with a primary diagnosis of dementia or "generic" Test Bed diagnosis. As we did not know patient characteristics of the Test Bed patients (such as age and gender), we did not feel that the datasets were matched closely enough to conduct a difference-in-difference analysis. Nevertheless, we find it useful to be able to compare between the two as an indication for trends.

We used the same method of two-tailed, paired t-tests to test changes in the before and during periods for the control group.

ANNEX A SAMPLE SIZES

Figure 6 Test bed sample sizes

Diagnosis	Activity	Sample size
All diagnoses	Admitted Patient Care (APC)	84
	Average LOS	84
	Outpatient (OP) days	116
	AE attendances	62
	NWAS 111 calls	54
COPD	Admitted Patient Care (APC)	26
	Average LOS	26
	Outpatient (OP) days	41
	AE attendances	21
	NWAS 111 calls	18
Heart failure	Admitted Patient Care (APC)	32
	Average LOS	23
	Outpatient (OP) days	39
	AE attendances	26
	NWAS 111 calls	24
Generic	Admitted Patient Care (APC)	19
	Average LOS	19
	Outpatient (OP) days	28
	AE attendances	12
	NWAS 111 calls	12
Heart failure and COPD	Admitted Patient Care (APC)	1
	Average LOS	1
	Outpatient (OP) days	1
	AE attendances	0
	NWAS 111 calls	0
Dementia	Admitted Patient Care (APC)	6
	Average LOS	6
	Outpatient (OP) days	7
	AE attendances	3
	NWAS 111 calls	0

Source: CSU data; Frontier analysis

Figure 7 Annualised activity per patient in the control group, by diagnosis

Diagnosis	Activity	Sample size
All	APC (discharge)	4,692
	OP	7,516
	AE	7,965
Heart failure	APC (discharge)	1,632
	OP	2,398
	AE	2,505
COPD	APC (discharge)	3,060
	OP	5,118
	AE	5,460

Source: CSU data; Frontier analysis

Innovative Collaborations

The barriers and enablers to successful commissioning:

Lancashire and Cumbria Innovation Alliance

NatCen
Social Research that works for society

Authors: Karen Windle, Amelia Benson, Tom Barber and Bethany Thompson
Date: 19/06/2019
Prepared for: Lancashire and Cumbria Innovation Alliance and NHS England

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Contents

1 Executive summary

Background

- The Test Bed Programme, funded by NHS England and the Office of Life Science, supports innovative local collaborations between NHS and health-tech companies to test combinations of new technologies alongside system (e.g. care pathway) re-design in real-world settings.
- Lancashire and Cumbria Innovation Alliance (LCIA) were one of two sites that successfully applied for (and received) further funding to extend their Wave 1 programme; exploring the process and impact of scaling up the different interventions as a business as usual model.
- A Deliberative Workshop was undertaken to explore issues and challenges in designing, implementing and commissioning innovative programmes as well as to identity possible solutions.
- Whilst a range of representatives from across LCIA attended the workshop, generating crucial understanding as to those elements necessary to commission and roll-forward innovative programmes; these reported insights are from a single Test Bed site.

Key components required for effective commissioning and procurement

- An initial component to commissioning innovation was an assessment of patient needs, service demands and current practice.
- Clinical involvement was perceived as essential to developing innovative pathways and identifying areas of potential difficulty in the roll-out process.
- A ‘landscape assessment’ should be carried out alongside the programme to identity previously commissioned innovations and the lessons learned from those processes.
- The development of a robust evidence-base throughout the assessment was essential.
- Innovator involvement was a crucial component in the commissioning process. A full co-production model needed to be embedded in any roll-out or commissioning.
- There was a need for any procurement process to be flexible owing to the innovative nature of the interventions.
- The existing commissioning process needed to be refined to support the ‘scaling-up’ and roll-out of innovative collaborative technology.

Key enablers in the commissioning and procurement process

- Champions of the innovative project / programme were perceived as essential throughout the commissioning process.
- It is important to align the innovative programme with those existing and robust decision-making bodies, policies and practices emerging from the Integrated Care System (ICS).
- Effective operational plans should be harnessed to act as enablers in moving the programme from early piloting, to implementation and final roll-out.
- A shared vision of values, goals and objectives was fundamental in achieving effective commissioning.

- Whilst robust evidence was perceived as essential in the commissioning and procurement of innovative collaborations, the type and extent of data required by commissioners to move the programme forward was, at times, unclear.
- Participants identified that guidance from commissioners as to the format and content of submitted evidence necessary to underpin any business case commissioning is essential.

Key barriers and solutions in the commissioning and procurement process

- Participants reported that that an extension to the project life-cycle - allowing further time to pilot and implement the complex interventions - was essential if the innovation was to be ready for roll-out at the end of the funding phase.
- To mitigate this, participants suggested that a small team of senior staff could be appointed to act as a 'roll-out team'. This would make the project more agile and ensure that further 'agile' and early iterations of the innovation could be undertaken as each innovation is embedded across the health and social care system.
- It was recognised by participants that working across different organisations as well as in partnership with innovative technological organisations, resulted, in a range of disparate information governance systems and regulations. This lack of system alignment was one of the barriers to introducing and establishing innovative ideas
- If commissioning to 'business as usual' (BAU[1]) was to be achieved, participants felt it was necessary to recognise the different organisational priorities. Developing and valuing partnerships with the range of frontline staff, ensured commissioners could fully understand what would work well on the ground.
- Participants felt that national health priorities did not always reflect locally-based needs, which led to a mis-match between where funding was focused and where it was seen to be most needed. National policy levers should be applied (e.g., Integrated Care Systems) to ensure appropriate commissioning.
- Participants perceived that the [usual] one-year funding-cycle in health and social care negated innovative change. It was argued that a robust business case, i.e., one clearly demonstrating effectiveness or cost-effectiveness, could not be delivered in this time frame. Extending the commissioning cycle to three-years would facilitate the procurement and delivery of innovative interventions.

Insights for the future development of Test Beds

- Participants highlighted that future Test Beds are expected to benefit from a need's assessment, targeted to the patient cohorts existing within the Test Bed's geographical areas. This will ensure innovations match population need. The innovations should be developed within a 'co-production' model incorporating the involvement of all stakeholders (including innovators, users and/ or patients).
- Robust, shared information governance arrangements (with single, rather than multiple requirements and regulations) should be established alongside the development and circulation of appropriate, accessible and agreed documentation.
- On-going discussion with commissioners was essential to set and detail those evidence requirements that could underpin future adoption, procurement and commissioning.

[1] In this report, full commissioning refers to commissioning collaborative innovations to BAU following the pilot stage during Test Beds Wave 1 and Wave 1.5.

- The narrative around innovations needed to be refined and aligned with overarching local and national strategic plans; demonstrating the innovations as solutions to existing problems.

What worked well and less well for LCIA

- The overarching programme was structured through a co-production model.
- The clarity of roles, responsibilities, risks, information and financial agreements ensures that further roll-out or wider commissioning of the programmes could be facilitated.
- The challenges in providing robust cost-effectiveness evidence limited early and comprehensive roll-out.

Insights to share with other Test Bed sites

- Participants identified that setting up a dedicated 'roll-out' or 'commissioning group' early in the process would ensure effective innovations could be appropriately sustained, achieving broader roll-out and adoption.
- All innovations put in place should aim to embed a shared vision across the different organisations working together, to ensure consistency across structures, processes, partnerships and interventions.
- Operational programme delivery plans (as well as the discrete innovation plans) should detail how each intervention will be sustained and rolled-out (should they prove effective or cost-effective).
- A narrative should be developed around the different interventions that align with national and local strategies.
- Commissioners should be part of any co-production model, involved in the overarching advisory or steering groups; a core part of delivering the intervention.
- Participants perceived that Chief Executives (of those organisations responsible for delivering the innovation) should put in place an early agreed 'intent to commission' should the innovations be demonstrated as effective and cost-effective. Such early intent could mitigate the loss of any successful programme and/ or institutional memory.

Insights for the wider health and care environment

- Many of the highlighted components, enablers and barriers to commissioning provided by participants have relevance to the wider health and social care environment, enabling further understanding of those structures and processes necessary to underpin 'scalability' or 'roll-out'. Specific insights from participations are given below, to support these innovations to be commissioned on a wider level.
- Participants recommended that if technological programmes are to be successfully scaled up, a longer period of testing is necessary to demonstrate effectiveness and cost-effectiveness of the interventions.
- Participants perceived that where technology innovations are commissioned, any contracts should be for at least two years. This ensured a cost-recovery period for innovation partners, recognising that for many, their initial programme involvement was unfunded.
- It was also felt that, where complex technological collaborations were being developed and tested, the existing yearly contracting and funding cycles should be extended to three years, ensuring outcomes could be demonstrated, governance agreements signed-off and any targeted expansion designed and put in place.

- Existing and future policy ‘levers’ should be used effectively. For many participants, the inception of the Integrated Care Systems was perceived as key to aligning local and national priorities, ensuring that effective (and cost-effective) innovations could be scaled up and commissioned.
- Commissioning for collaborative innovations should be carried out through a centralised procurement process.

2 Introduction

2.1 Background

The Test Beds Programme is funded by NHS England (NHSE) and the Office for Life Sciences (OLS). This programme supports innovative local collaborations between NHS and health-tech companies across the country to test combinations of new technologies alongside system (e.g. care pathway) re-design in real-world settings. This generates learning about which interventions can deliver better outcomes for patients at the same or less cost as existing care; enabling their promotion, adoption and spread across the NHS. The first wave (Wave 1) of the programme ran from Spring 2016 to Summer 2018 with seven Test Beds funded across the country. Wave 1.5 of the programme provided two sites from Wave 1 with an additional 12 months funding (April 2018 – March 2019) to build on their first Wave activity by further developing their innovations and generating more evidence to demonstrate the effectiveness of the interventions and support This funding was designed to improving the effectiveness of the intervention and enabling greater scale and spread across NHS organisations as a business as usual model.

Lancashire and Cumbria Innovation Alliance (LCIA) are one of the two sites that successfully applied for (and received) further funding. LCIA developed and implemented a range of technological innovations to improve support for patients with Chronic Obstructive Pulmonary Disease, heart failure and dementia. Patients are applying a range of technologies that can promote self-activation, improve knowledge (and management) of their condition as well as facilitate remote monitoring. The technologies include, for example: **Docobo Ltd** as the main telehealth provider; a **smart watch** (measuring activity, sleep nutrition and hydration); **domestic video calling** (enabling patients to make and receive video calls with clinical teams); a **COPD monitoring app** (recommending a daily health strategy based on patient's answers to a daily questionnaire); and, **a reminiscence therapy app** (assisting dementia patients to engage with long-term memories).

As part of the Wave 1 and Wave 1.5 Test Bed programme, Frontier Economics and NatCen Social Research were appointed by NHSE as the National Evaluation Partner (NEP). A range of research questions in Wave 1.5 were developed to explore the process and impact of scaling up the different interventions. One central research question was to explore those structures and processes necessary to achieve effective roll-out of the LCIA innovations; delivering take-up across the wider NHS environment. To respond to this question, a Deliberative Workshop was undertaken (see 1.3 below) identifying the following areas:

- The purpose (and need) for commissioning technological innovations alongside changes in patient pathways;
- The issues and challenges in designing and implementing wider commissioning of innovations and interventions, along with possible solutions to these issues and challenges; and
- Reflections on commissioning that could inform future technology commissioning, supporting the Wave 2 Test Bed Sites.

This briefing note summarises outcomes from this single deliberative workshop and identifies those reported conditions that participants perceived necessary to: support the spread of innovation in the NHS; ensure commissioning of those effective and cost-effective interventions; and, deliver sustainability and roll-out.

2.2 Definitions

A range of national and local guidance has been developed to regulate commissioning and procurement, exploring e.g., commissioning for outcomes[2] and service transformation[3]. Whilst competing definitions exist dependent on if the guidance is focused toward the health or care sector, for the purposes of this deliberative workshop, we apply the following definition: **"Commissioning is the process by which health and care services are planned, purchased and monitored"**. The process comprises a range of activities including: assessing needs, planning and procuring services and monitoring quality. This commissioning cycle is repeated typically on an annual basis.

In addition, the process of commissioning is perceived as a dynamic activity, ensuring that services are designed, specified and procured to deliver personalised outcomes. In focusing on personalised outcomes, there is a requirement that the commissioning cycle is co-produced with patients, users and carers in a strategic partnership across health, social care, housing organisations and in collaboration with providers.

2.3 Methodology

A deliberative workshop was held in Lancaster on 4th February 2019. Deliberative Workshops are a form of facilitated group discussions that provide participants with the opportunity to consider an issue in depth, challenge each other's opinions and develop their views to reach an informed position. Representatives from a range of organisations were invited, including individuals from NHS England, local Clinical Commissioning Groups (CCGs), Academic Health Service Networks, the Lancashire and Cumbria Innovation Alliance (LCIA), Lancaster University, technology companies whose products were included in the LCIA Test Bed programme and other relevant LCIA partners. Patients and carers were also invited to attend. Recruitment took place between December 2018 and February 2019, led by the LCIA team with support from NatCen colleagues.

A total of 25 participants attended and were assigned to five groups at the deliberative workshop. The one-day event included three discussion sessions, for which topic guides were created by NatCen in association with colleagues at Frontier, NHS England and LCIA. This collaboration ensured that each session focused on key topics of interest to other Test Beds sites and the wider NHS environment. Each session was audio-recorded (with participant consent) and transcribed. The transcripts were managed and analysed using the framework approach. Data are organised using matrices that not only enable thematic analysis across cases, but also analysis within and between cases, thereby facilitating the development of typologies and allowing explanatory analysis to be undertaken.[4] This analysis has formed the basis for this briefing note.

2.4 Limitations of this report

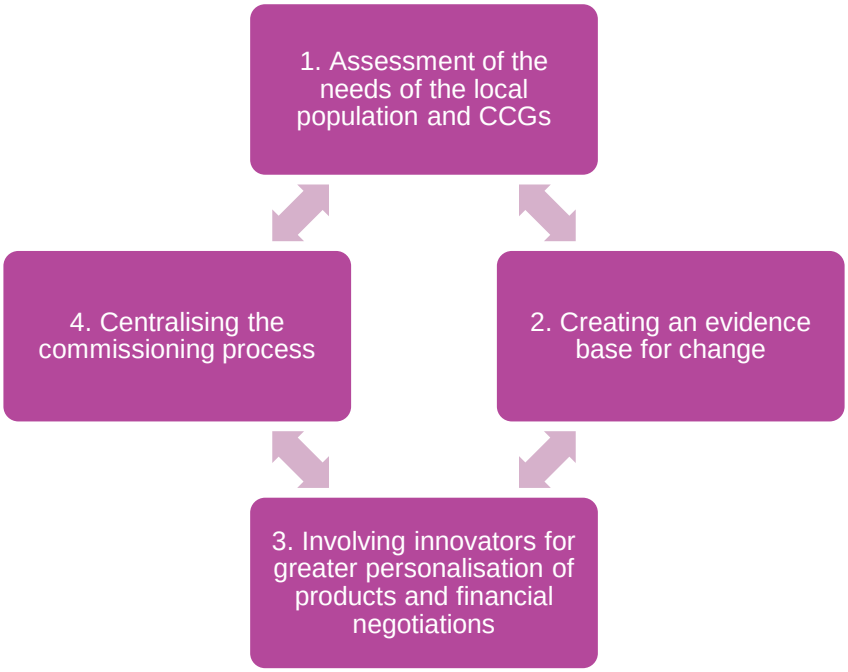
A range of insights were able to be drawn from the deliberative workshop from the contributions by those 'expert' participants and user representatives that attended. However, this was a single workshop in a specific locality. Whilst many of the points made and discussed are transferable, some may be site specific.

[2] LGA and NHS Clinical Commissioners (2018) Integrated commissioning for better outcomes. London, Local Government Association. Available at: https://www.england.nhs.uk/wp-content/uploads/2014/03/serv-trans-guide.pdf (Accessed, 29.04.19)
[3] NHS England (2014) Commissioning for Effective Service Transformation. Available at:
[4] Ritchie, J., Lewis, J., Nichols, C.M. and Ormston, R. (2014) Qualitative research in practice. 2nd edition. London: Sage.

3 Key components of the commissioning and procuring process

Participants were asked to discuss each step involved in the commissioning and procuring process for innovative collaborations. Overall, participants reported four overarching elements of the commissioning and procurement process (see figure 1 below). This section provides insight into each of those components necessary to deliver an effective commissioning and procurement process.

Figure 1: Components of the commissioning and procurement process.



3.1 Assessing need

Participants reported that any initial component to commissioning innovation was an assessment of patient needs, service demand and current practices. The first step in this process was the **identification of local needs;** working with local health providers and CCGs to understand the demographics and clinical need in each area. This ensured early identification and targeting of demand for any innovation prior to commissioning. Additional assessment of local needs emerged through **public and patient involvement**. Recognised as a mandatory component in commissioning (taking place at the start of the commissioning cycle), open discussion with patient and public involvement groups was perceived to encourage transparency in the process and provide decision making support to programme teams.

> *'It's so good because they just ask the best questions because they have no political - it's not political awareness. They just [think] … this is the question that needs to be asked, so they ask it and it's brilliant'.* (BTS1)

Clinical involvement was similarly seen as essential. Whilst innovative technological collaborations often involve changing or adapting care pathways, existing quality and

clinical standards must be maintained. Engaging clinicians is critical in developing innovative pathways and identifying areas of potential difficulty in the roll-out process:

> *'It's important to have, for example, clinicians involved right at the beginning of a project because they can see how something's going to map out and how it might or might not work in practice'.* (TBS1)

Additionally, participants noted there was a sense that change can, at times, be *'automatically'* resisted (TBS1) by clinical staff. Involving stakeholders at the start of any process encourages a sense of ownership, ensures appropriate implementation and, embeds quality improvement in any future commissioning process.

Finally, **an innovation landscape assessment** should be carried out to identify previously commissioned innovations and the lessons learned from those processes; whether commissioned by other CCGs or, from national programmes. Owing to their country-wide perspective, this assessment should be conducted alongside the Academic Health Science Networks (AHSNs). Participants perceived that working with the AHSN helped to place local innovation in the context of other programmes, mitigating duplication or overlap in the development of technological innovations.

A shared theme that emerged across the group discussions was the importance of using '**in-house' talent and existing knowledge.** Commissioning and procuring innovative collaborations should make the best use of staff and innovators that work with or alongside the NHS to avoid "**reinventing the wheel**".

3.2 Developing an evidence base

The importance of **developing a robust evidence base** during and following these assessments was highlighted. Participants recognised the necessity of including data from a range of different sources to establish local needs and demographics, (e.g. Hospital Episode Statistics Quality Outcomes Framework, National Institute of Health and Clinical Excellence guidelines, Medicines and Healthcare products Regulatory Agency). In addition, they recognised that developing this early evidence base throughout the assessment process would support identification as to whether selected and implemented innovations demonstrated 'value for money':

> *'It's not necessarily meaning getting the cheapest option; it's more getting the best out of what you can - what money you have'.* (DIS1)

Participants felt that an important element for inclusion in any needs assessment and/ or future assessment of effectiveness was patient quality of life. However, individuals found it challenging to identify those measures that could be applied.

3.3 Involving innovators

Participants noted that **innovator involvement** was a crucial component in the commissioning process. Involving innovators throughout the development, implementation and scaling up process ensured the adopted devices could be appropriately personalised. This benefited local service providers and users by addressing their specific needs during the design phase. This process was described by one participant as a "*full coproduction model*" (ABS1).

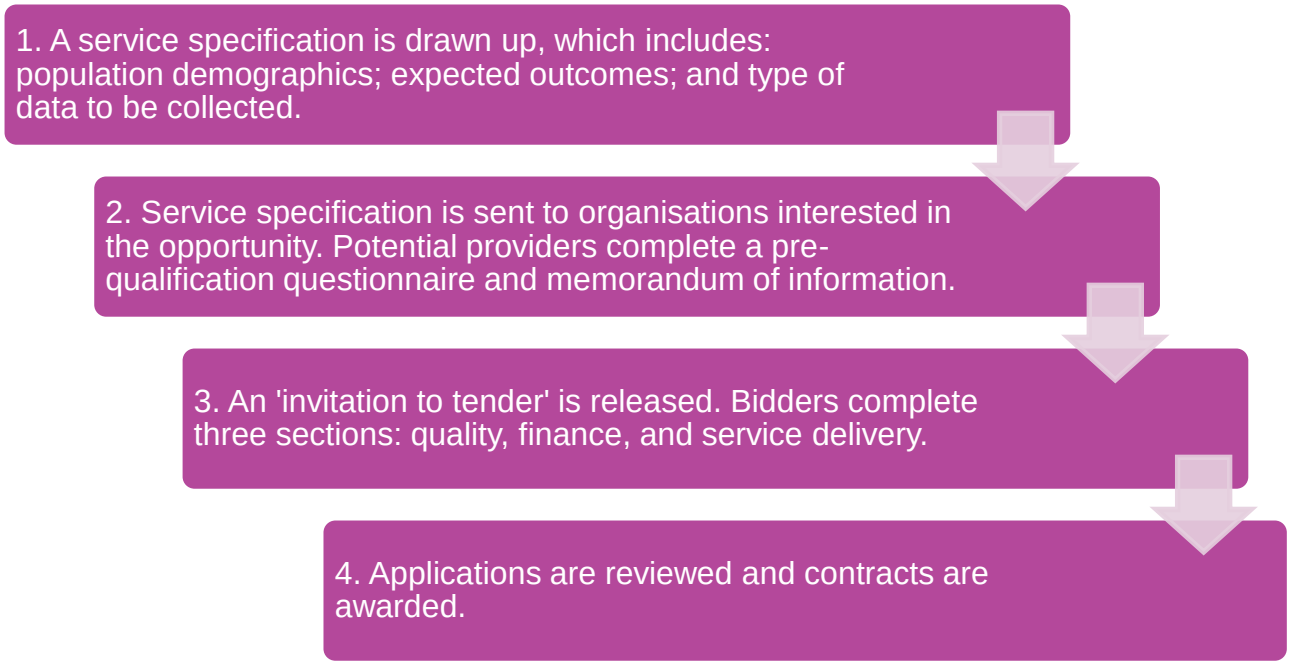
In addition, including the innovators at an early stage helped to **identify the type of commissioning model** that could be applied[5]. Participants noted that this was a major component in the commissioning process, as commissioners determined whether equipment and technology should be leased or purchased. Involving innovators at an early stage, prior to determining the contracts, could be beneficial in the negotiating process and lead to better rates or discounts for CCGs and or NHS trusts. However, a caveat was the need to have 'information governance' and data-sharing established prior to their involvement (see 4.2, below).

3.4 Process components

3.4.1 The tendering process

Participants provided a useful overview of those documents that form a key component in the tendering process, (see Figure 2, below). This process can take between six and nine months to complete. In addition, it was identified that EU regulations defined those who could be invited to tender for contracts. This process takes place on an annual or bi-annual basis owing to the time involved for the commissioners.

Figure 2: Key documents that form the tendering process



While these tendering documents (and which organisations can tender) act as a key facet of the commissioning process, it was suggested that **a centralised framework agreement** would be an effective way to speed up this process. Framework agreements enable organisations to promote their services to multiple parts of the NHS without having to individually tender for each opportunity. For example, GPs are able to contract organisations which are part of the GP Systems of Choice framework agreement for IT services without requiring the organisations to submit a full tender. Under such a similar framework, innovators could bid to be part of this centralised system, which would reduce the time taken for individual CCGs to tender for services.

[5] Whilst it is recognised that the commissioner may 'purchase' the service, with the service provider then responsible for procuring the technology; this separation of responsibility was either not widely known by participants or, local commissioning processes were structured differently.

3.4.2 Support and leadership

Participants recognised a need for **flexibility** in any procurement process. While many of the components described above take place at the start of the commissioning and procurement process, flexibility in the timing of the components was essential owing to the 'innovative' nature of the collaborations. That is, the content, structure and process of any innovation may change during the roll-out process.

> *'You can't set an artificial timetable for something, because things change. It should be organic, it should move with the change'*. (DIS1)

Mindful of this necessarily iterative nature of any roll-out, participants suggested establishing **regular reviews** of commissioning and procurement processes. These reviews would ensure that each stage is appropriate and can support the measurement of effectiveness (and cost-effectiveness) through the collection and application of KPI data. It was also identified that **day-to-day support** in the process was required, e.g., from the relevant Commissioning Support Unit and/ or NHS England. It was also recognised that whilst the CCG held legal responsibility for decision-making in the commissioning and procurement process, participants were clear that **patients, the public, clinicians and innovators should be engaged** with these decisions.

Trust in leadership was a further core concept discussed during the workshop. Front-line staff tasked with delivering the innovation, may be unaware of the stages of commissioning and procurement. Participants highlighted that it was important that those affected by commissioning and procurement decisions should trust the decision-makers. However, such trust needed to work in both directions. That is, while those affected by decisions should trust those making the decisions, the commissioners should also trust providers to determine what tools they perceived as appropriate and which outcome measures should be applied to determine efficacy.

> *'The commissioner shouldn't be worried about what instruments they [the innovation] are using. We can be bold in the design but, ultimately, the decision should sit with the provider because we will monitor them on outcomes'.* (KWS1)

4 Key enablers in the commissioning and procurement process

Participants identified a range of enablers of the commissioning and procurement process for the roll-out of innovative collaborations. Enablers are factors that, by definition, have direct positive effects on the commissioning and procurement process. Enablers are distinct from solutions to barriers, which act as a mitigating influence on obstructive factors. In contrast, enablers exist independently and are 'built in' to any process to support successful implementation. The enablers that participants identified, and the reasons underpinning their effectiveness, are discussed below.

4.1 Staffing, management and stakeholder attributes

Participants identified **staff competence, credibility and influence** as enablers in the commissioning and procurement process. These **'project or programme champions'** are perceived as role models for other members of staff, improving collective work performance:

> *'You've got to have those individuals who have high credibility in the operational and clinical reigns who then can say to the others, 'I can do it, so why can't you do it?'* (KWS2)

Clear management structures were perceived as essential, particularly transparency as to the degree of authority in decision-making held by each member of the team or wider stakeholder group.

Participants highlighted the necessity to ensure the LCIA programme was not perceived as a bolt-on extra to the work of the trust but **aligned with those existing (and robust) decision-making bodies, policies and practices** emerging from the Integrated Care System (ICS).

> *'For anything to happen successfully in health, you need the problem, the policy and the politics to be aligned. If one is out of sync, it doesn't happen'.* (KWS1)

> *So, I think there is something around ICS or sub-ICS axis in terms of their capability to commission change if it's embedded in their strategies'* (KWS2).

4.2 Operational plans

Participants argued that **effective operational plans** could be harnessed to act as enablers in moving the programme from early piloting, to implementation and, finally to roll-out. Participants reported that good operational plans set clear milestones for the achievement of goals whilst accommodating flexibility for change. Deadlines were regarded as reflecting 'negative' language and instead, it was reported that if the operational plans were to be effectively delivered, review dates should be incorporated applying realistic targets:

> *'My other point on that was … when goal setting and target setting … make sure that it is the motivating factor it can be as opposed to the demotivating option where people think, 'Oh I'm not going to start this because I'll never hit it anyway'. (ABS2)*

It was reported that effective operational plans also enable proper oversight of the logistical elements of a project and explicitly allocate resources.

4.3 Shared vision

An additional enabler was a shared vision of both values and goals. It was felt that shared values constitute a fundamental basis for effective collaboration.

> *All of our values are exactly the same, so … I don't have to worry about your values because they're my values, okay, so we share that value base. So what we've got to do is build on that value base and that's where we start … (KWS2)*

Shared values are an effective enabler as they contribute to the establishment of professional relationships and constructive communication; vital to success in the commissioning and procurement process.

> *It's all about conversations and relationships and if you don't get those right … you're going nowhere. (KWS2)*

In addition, it was expressed that aligning goals and common standards with partner organisations led to greater collaborative working and helped staff to work more effectively in moving toward commissioning.

4.4 Local engagement

Discussed as a central component of the process in section 2.1, local engagement was identified as an enabler in the commissioning and procurement process. Engaging with the right groups, including patients, was described as a highly important process in the assessment of local needs. Patient engagement with the innovations was also deemed to be important. Owing to individuals' variation in health, respondents felt that qualitative data and individual stories were necessary to properly understand patient needs. Local engagement was envisioned as an ongoing activity throughout the commissioning and procurement process, rather than a discrete stage:

> *'That engagement should continue to a certain degree throughout the whole process, and it's that continual feedback'.* (TBS2)

Local engagement was perceived by participants as an effective enabler as it enables the appropriate determination of local needs, which in turn, ensures resources can be appropriately targeted and allocated. Furthermore, participants felt that the willingness of patients to use new innovations is vital to their success, which is why (early) patient engagement with new innovations is essential.

4.5 Robust evidence

Finally, it was expressed that the production of **robust evidence** on the impact of an innovation for commissioners can be a key enabler. Participants advised that data should be collected across the timeframe of the programme, ensuring the impact of the innovation could be accurately and comprehensively assessed.

There were different views on the type and extent of data required to move the programme forward to commissioning into BAU. For example:

- Participants argued demonstrating that the programme was cost-effective (i.e., delivering quality care at the same or lower cost than existing treatment), was the priority, whilst recognising the short-term nature of the programme could negate the production of such evidence;

- Others highlighted the importance of qualitative data and using this to develop persuasive 'case-studies', detailing the resulting changes for individual patients (e.g., improved knowledge of their condition, reduction in loneliness or social isolation).

Participants identified that guidance from commissioners as to the format and content of any submitted evidence would be welcome.

> *'So, the evaluation evidence is often research based and provides certain evidence, but the requirements for the commissioners can be a little bit different and actually I think what's probably needed is some guidelines or guidance from the commissioning world as to what evidence is needed'* (KWS2)

Despite this slight confusion, there was an overarching recognition that robust evidence (whether qualitative or quantitative) was essential to demonstrate the positive impact of any innovation, generating a '*business case*' (TBS2) for the commissioning and rollout of that innovation.

5 Key barriers and solutions in the commissioning and procurement process

This section focuses on some of the most commonly identified barriers to successful commissioning and procurement of innovative collaborations, along with the solutions suggested by participants during the deliberative workshop. Barriers are defined as circumstances that prevent communication or progress and, in this context, refers to obstructions that impede the commissioning and procurement of innovative collaborations within the Test Beds programme.

Issue	Barriers	Solutions
Time constraints	• **Time constraints were problematic**, especially when working across organisations. As organisations necessarily work in different ways, participants reported that barriers can emerge when there is limited time to concentrate on modifying structures and processes (e.g., care pathways) to align with programme partners. • Participants felt strongly that **new innovations need to be able to develop with time**; they should not be rigid and must have the capacity to meet the needs of all organisations.	• Prior learning could be shared, the innovations could be appropriately 'championed', and standardised processes for implementation developed; all promoting easy adoption. • A small team of senior staff could be appointed to act as the 'roll-out' team. Their role should incorporate data monitoring (e.g., rates of adoption in partner organisations, differential structure of the organisation). • This would ensure **further 'agile' and early iterations of the innovation could be undertaken** as each intervention is embedded across the health and social care system.
Information governance	• Strict information government regulations were perceived as a barrier to innovation: **governance requirements demanded by health and social care organisations did not necessarily match those of the innovators**. • Passing information across different systems (e.g., from wearable m-health applications to GPs) in health and social care requires a plethora of high-level permissions in health and social care but is seen	• Governance and information governance should be perceived as an on-going task for partnerships between NHS and industry. • Whilst specific agreements may be necessary for any pilot programme, these need to be revisited as the programme moves toward commissioning to BAU, recognising that different organisations have disparate governance regulations and requirements. • A robust action plan will be necessary for any 'roll-out'

Issue	Barriers	Solutions
	as a 'normal part' of any programme by innovators. • This **lack of alignment creates difficulty in designing shared agreements**. • Whilst individual programmes were seen as having strong governance, it was, at times, unclear where the responsibility for holding risk and responsibility lay.	team to manage and embed governance agreements.
Organisational and practice barriers	• Recognising different organisational priorities was essential. • Participants reported that, at times, it became difficult to implement changes if (and when) the strategic and management priorities of the organisation seemingly negated innovative ideas. • **For many strategic managers their focus was necessarily on delivering existing quality services in the context of on-going efficiency savings, leaving little space to develop innovative programmes.** • For staff and clinicians operating at full capacity, adopting new programmes and different ways of working could be challenging; despite the understanding that such programmes could benefit patients. • Health and social care organisations were perceived as operating differently to those 'innovators' (health technology organisations) and identified that guidance from commissioners and a shared language is essential if new services are to be 'rolled-out'.	• Roll-out of services requires community engagement. • Developing and valuing partnerships with frontline staff enables commissioners to understand what works well on the ground. • **An advocacy or community involvement group should be put in place to ensure commissioners are held accountable for driving appropriate changes forward**. This can only work with a shared understanding and attitude towards integrating new developments. • Multi-agency conversations need to take place with those individuals who have the power to make decisions.

Issue	Barriers	Solutions
Political and financial concerns	• **Moving from 'boutique projects' (short-term pilots that disappeared along with the funding) to full commissioning of an intervention was seen as a challenge**. • There was, at times, a dissonance between national health priorities and locally-based need, resulting in a mis-match between where funding was focused and, where it was seen to be necessary. • The procurement process did not always enable the development of innovative programmes or changes in practice. • The procurement process was perceived negatively by some participants, considering it to be over-complicated and separate from strategic development. • Commissioners were perceived as demanding early reporting of hard outcomes (e.g., reduction in unscheduled admissions, GP appointments) if any programme were to be included in future commissioning plans. • **Participants identified that complex programmes (e.g., requiring broad partnerships, iterative development of the technology and, recruitment of patients), limited the possibility of reporting in-year outcomes.** • There was a recognition that the necessity (and reality) to make year-on-year efficiency savings in health and social care, may lead to limited innovation.	• The move to Integrated Care Systems was perceived as a likely 'lever' in ensuring appropriate commissioning to meet local needs. • **Moving from a one-year to a three-year funding cycle for innovative projects would ensure time for outcomes to be demonstrated.** • Commissioners need to be involved at the beginning of any innovative programme to enable appropriate communication as to the structure, process and outcomes of the planned intervention, • **Commissioners need to provide guidance as to the type (and extent) of information needed about the programme and, at which time points, to ensure 'roll-out' of the intervention.** • Getting the right people on board early and being able to demonstrate critical outcomes, should facilitate appropriate change.

6 Recommendations for the future development of Test Beds

The process of the Deliberative Workshop enabled an-in-depth exploration and identification of the core components of the commissioning process, the enablers and the barriers to rolling-out the different interventions and innovations. In addition, stakeholders from across the Lancashire and Cumbria Innovation Alliance (LCIA) identified a range of 'actionable' factors that would move the availability of their locally-based programme to a wider geographical and patient base. This section identifies those core actions as well as identifying 'learning points' for future collaborative health technology innovations.

6.1 What would be necessary to scale-up LCIA

LCIA identified a range of actions that underpinned any 'roll-out' of their innovations, many of which had been embedded in early set-up of their Wave 1 systems and processes. These included, for example:

- Patient, user and community involvement throughout the Wave 1 programme;
- Targeted needs assessments to ensure the innovations were appropriately focused toward patient cohorts and geographical areas;
- A co-production model across their innovations, enabling transparent decisions and development alongside a range of stakeholders, including innovators;
- Robust identification of governance and information sharing documentation;
- Involvement of key decision-makers across health and social care, including commissioners.

However, it was also recognised that a number of additional tasks needed to be carried out if the different innovations were to be 'scaled-up'.

One fundamental action highlighted by participants was the need to discuss (and agree) with commissioners the type and extent of the evidence necessary to demonstrate programme effectiveness; ensuring sustained funding. As we have previously discussed (see 3.5), the compressed time-table available to demonstrate effectiveness of the LCIA interventions led to few findings of cost-effectiveness. Some stakeholders argued that the lack of such evidence had negated the possibility of roll-out.

> *'Talking about the individual innovations, they're never going to be adopted nationally without that cost-benefit analysis'.* (BTS3)

Other participants highlighted that whilst full cost-effectiveness had yet to be demonstrated (owing not least to the purchase, rather than leasing of the equipment for one of the core interventions), there was a need for commissioners to accept a range of data, trusting that further time would ensure cost-effectiveness could be appropriately demonstrated.

> *'You know, from a patient perspective, you ask 90 per cent of our patients, they absolutely love it and they will continue with it all day every day. That's qualitative, and to commissioners and other people, want quantitative'.* (TBS3)

Participants also identified that if effective roll-out was to be achieved, the narrative around the innovations needed to be refined and aligned with overarching local and national strategic plans; demonstrating the innovations as solutions to existing NHS Trust problems.

'The question is always, well, how do we get the trust on board? Well, the trust might not be looking at stroke, but they are looking at reducing length of stay. What we can say, if you support this initiative to reduce strokes, it's going to do those things [reduce lengths of stay] for you'. (BTS3).

In ensuring that the innovations could be perceived as solutions to existing (and future) NHS challenges, there was a concomitant need to ensure the full involvement of strategic and clinical stakeholders. As we have discussed above (see 2.3), LCIA structured their programme in a co-production model ensuring that the set-up and early implementation of the programme could be developed alongside patients, carers, strategic and operational staff as well as clinicians. However, participants identified that involving GPs was challenging, despite their central role in championing innovation across prevention, early intervention and self-management. It was argued that involvement of GPs at an early stage was essential if further commissioning and roll-out was to achieve a wider take-up and application.

6.2 What worked well and less well for LCIA

Participants reported a range of strengths of the LCIA programme as they moved toward wider implementation and roll-out.

As we have discussed throughout, a range of stakeholders were fully involved in the programme; encompassing a co-production model. The type and extent of the public-private partnerships developed was perceived as a model to take forward in any commissioning and 'roll-out' of the programmes.

'There is a bit of a silo culture that needs knocking down because it's massively counterproductive. I think this was a fantastic example of how productive and how quickly [this happened]. That improvement was because of the methods used and how involved everybody was from all sides' (ABS3)

This innovative approach to developing new partnerships, linked with the range and foci of the technological interventions, demanded the design, development and implementation of a range of process documents and governance agreements. The LCIA team were perceived by participants as having overcome *'huge barriers, huge barriers'* (ABS3) to ensure such joint agreements were in place. This clarity of roles, responsibilities, risks, information and financial agreements facilitates further roll-out or wider commissioning of the programmes, replicating these prior structures, processes and agreements.

'Keeping [these agreements] going as a positive forward motion, so people don't have to worry about governance issues, you don't have to worry about oh can we do this, can we do that?' (ABS3).

The challenges faced by LCIA in moving to commissioning and wider roll-out have similarly been highlighted; the difficulty of providing robust cost-effectiveness evidence in the short-time available for implementation.

'Because commissioners aren't going to commission those products, so those innovations… Talking about the individual innovations, they're never going to be adopted nationally without that cost-benefit analysis' (BTS3).

As part the overarching evaluation of Wave 1, LCIA ensured that core data was captured on changes in patient's knowledge of their condition as well as their willingness to engage in their treatment through the 'Patient Activation Measure'

(PAM[6]). Analysis of these data identified that patients had a greater understanding and awareness of their conditions and their general health, better able to manage medications and limit the occurrence of health issues they'd previously experienced. Participants argued that despite this demonstrated qualitative benefit to patients, the lack of accurate and appropriate cost-benefit analysis was a real barrier to rolling-out the innovations across disparate geographical or practice areas.

> *"They try and get them [other CCGs] to commission the products and put them into normal everyday practice. The first obstacle that they came against when they went was a commissioner saying, 'What benefit and value is this adding?' 'How can you demonstrate that there is a cost-benefit to this?' They didn't have any of that so the commissioners immediately were able to turn round and say, 'Well, we're not going to try it. We've got something else that we're looking at'".* (BTS3)

Further data was being collected during the Wave 1.5 pilot to ensure cost-analysis could be incorporated into further service reviews; mitigating this challenge.

6.3 Recommendations to share with other Test Bed sites

Participants identified a range of specific process steps to move the different innovations toward further roll-out and commissioning.

One of the central recommendations was that the Wave 2 Test Bed sites set up a dedicated 'roll-out' or 'commissioning group' early in the process, their remit to ensure the on-going range of tasks are able to serve as appropriate and replicable foundations when future commissioning was achieved (e.g., partnership compacts, governance agreements, landscape assessments and co-production model with innovators). Similarly, any governance should embed a shared vision across the different structures, processes, partnerships and interventions. All partners should be involved early, aware of (and signed-up) to the overall objectives.

> 'If someone's joining at a late stage, they're not going to be as passionate or understanding of what the vision or what the end goal is. They're just going to see what they're going to have to do' (TBS3)

Participants detailed that any operational programme delivery plans (as well as the discrete innovation plans) should also detail the roll-out and commissioning process.

A narrative should be developed around the different interventions that align these with national and local strategies. Ensuring that the innovations can respond to local and national challenges will strengthen any argument for their wider adoption; providing solutions to the range of challenges faced by health and social care.

Delivering robust cost-effective evidence in the short period of time available for set-up and early implementation (two years) was recognised as challenging. Participants highlighted a number of actions that Wave 2 sites could undertake to mitigate this barrier to further commissioning. The first was to work with commissioners from the start of the programme, discussing and identifying the extent and type of data (and outcomes) that would be accepted in demonstrating effectiveness. Participants perceived that agreeing and receiving appropriate early guidance would streamline the roll-out and commissioning process. The second was to ensure that commissioners

[6] PAM is a 13-item scale that assesses patients' knowledge, skills and confidence in self-managing their long-term condition. PAM divides patients into four activation levels, from level 1 (least activated) to level 4 (most activated)

were part of any co-production model, involved in the overarching e.g., advisory or steering groups; a core part of delivering the intervention. Such central involvement would enable on-going negotiation and understanding across all parties of what underpinning effectiveness evidence was required. In addition, such on-going relationships would enable early identification and support in structuring staged roll-out or scale-up of the interventions.

Finally, participants identified that Wave 2 sites may wish to consider working alongside Chief Executive Officers to put in place an overarching agreed 'intent to commission' at the end of any pilot to encourage uptake of innovations which have demonstrated benefits into business as usual.

> *'We should always get into a situation [that] when we agree a bid for a Test Bed, it must be backed up by a commissioned intent at the end of that. So that we don't end up in the situation where it's an orphan'*. (KWS3)

6.4 Recommendations for the wider health care environment

Many of the highlighted components, enablers and barriers to commissioning (provided above), have relevance to the wider health and social care environment, enabling further understanding of those structures and processes necessary to underpin 'scalability' or roll-out'. For example:

- Ensuring a co-production model is applied within programmes will enable full involvement from individuals at all levels including, strategic, operational and clinical staff, patients, carers and users as well as innovators.If such collaboration is absent, further commissioning or roll-out of the programmes will be challenging
- If the innovation or intervention is not aligned with national and local priorities, it is unlikely further funding will be forthcoming.

However, participants highlighted three specific recommendations that should be applied on a wider level.

1. If programmes like LCIA are to move to successful roll-out and commissioning, **more time may be necessary than anticipated to demonstrate effectiveness and cost-effectiveness**. Participants identified that any complex innovative collaboration **should be funded across four years.**

The first three years are needed to…	The final year…
• Identify those patient outcomes that the innovation should deliver (e.g., reduction in unscheduled admissions and/ or primary care appointments, as well as improvements in quality of life). • Recruitment and move patients/ users or carers through the innovation, ensuring a critical mass have received, applied and made changes to, the innovation. • Allow the innovations to reach maturity; enabling robust 'testing' of any agreed system structure and process.	• Should be used to try out the different interventions in other health and social care environments; and, • Signing off and agreeing the necessary governance arrangements to do this

2. **Existing and future policy 'levers' could be harnessed to drive commissioning**. For many participants, the inception of the Integrated Care Systems was perceived as a central to appropriate alignment of local with national priorities, ensuring that effective (and cost-effective) innovations could be scaled up and commissioned.

> *'We've said, the budgets are not aligned, the organisations are not aligned. Alignment's coming [through the ICS]. To what degree, well okay, we'll just have to see, but I think the direction of travel's right. The detail's in the execution, but it gets people to think about a coherent, cohesive health and social care economy'* (KWS3).

3. **Changes to the commissioning cycle may be necessary.** As we have highlighted, participants perceived that the relatively short-term (one- year) commissioning cycle demands innovations demonstrate effectiveness or cost-effectiveness within their first year of operation or, are unlikely to be scaled up, rolled-out or commissioned. Two changes to the commissioning cycle were recommended.
    a. Where complex innovations combining several technologies were being developed and tested, **the existing yearly commissioning cycle should be extended to three years**, ensuring outcomes could be shown. This would also make it easier for governance agreements to be signed-off and any targeted expansion designed and put in place.
    b. In addition, where technology innovations are commissioned, any **contracts should be for at least two years**, recognising that for many innovations, their initial programme investment was unfunded.

> *'There is a cost recovery period and I'd probably suggest two or three years, at the end of that period there is then the opportunity for that to be opened up in a normal commercial fashion and there's competitive markets where [innovation] and other colleagues will compete to keep that contract'.* (KWS2)

Finally, it was argued that the commissioning process for innovation should be a **centralised procurement route**, enabling 'LCIA in a box' to be effectively selected and implemented in other areas. Such a model was perceived as leading to economies of scale.

Appendix A. Topic Guide

Exploring the barriers and enablers to the commissioning and procurement process for rollout of innovative collaborations between the NHS and health-tech companies

Workshop aspect	Further details
Date and time	• Tuesday 5th February 2019
Venue	• Lancaster House Hotel, Green Ln, Bailrigg, Lancaster LA1 4GJ

Time	Workshop session	Session details
9:30 – 10	**Arrivals and registration**	• Coffee and refreshments

10 – 10:30	**Introduction and plenary** (group as a whole)	• Introduction from LCIA and NatCen
		  ○ LCIA to present on their innovative collaborations as part of Test Beds Wave 1
		  ○ Introduction from NatCen team on the day's activities

10:30-12pm (1.5 hours)	**Focus group session 1 (The 'what'):** Exploring the purpose and need of commissioning and procuring innovative collaborations	• Introduction (10 mins) • What are the benefits of commissioning and procuring innovative collaborations? (25 mins) • What are the guiding values for commissioning and procuring innovative collaborations? (20 mins) • Identifying key components and features of commissioning and procuring innovative collaborations (25 mins) • Lessons learned: the key points from the first session (10 mins)
Lunch 12 – 1pm		
1—2:15pm (1hr15)	**Focus group session 2 (The 'how'):** Identifying key barriers and enablers to commissioning and procuring innovative collaborations	• Introductions (15 mins) • What are the barriers (issues and challenges) in commissioning and procuring innovative collaborations, and how can these be solved? (30 mins) • What are the key enablers to successful commissioning and procurement? (25 mins) • Lessons learned: the key points from the second session (5 mins)
Comfort break 2.15 – 2.30pm		
2:30-3.40pm (1hr10)	**Focus group session 3 (the 'future'):** Looking to the future: reflecting on future direction of commissioning and procuring innovative collaborations	• Introduction (10 mins) • What are the future directions in commissioning and procuring innovative collaborations in the NHS? (20 mins) • What should happen to 'scale-up' LCIA? (20 mins) • Lessons learned: What do other sites need to know if they are to commission and procure innovative collaborations? (20 mins)
3.50-4:15pm (25 mins)	Final plenary and close	• NatCen to lead presentation on first findings • NHS England to discuss the future of the Test Beds programme

Patient Activation Measure®

Report

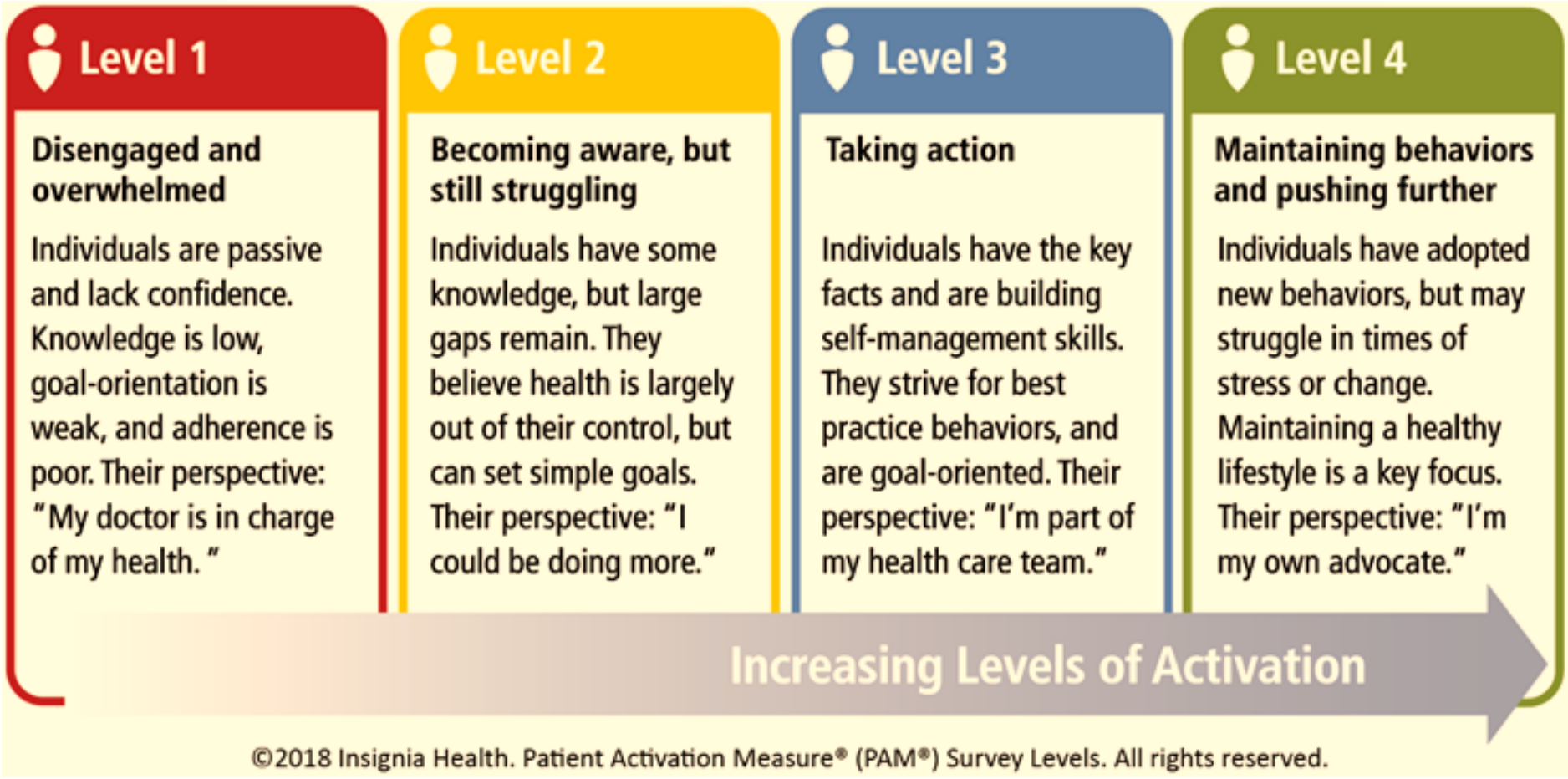
LCIA Test Bed

September 2018 – March 2019

1. Segment your population – PAM your population to identify those low in activation
2. Predict Risk & Allocate Resources – PAM scores narrow segmentation to individuals requiring intensive approach
3. Tailor Coaching – PAM specific interactions by PAM level focusing on levels 1&2
4. Measure Change – Reassess individuals to monitor expected outcomes, your Key Performance Indicators

DISCLAIMER: This report is for informational purposes only and should not be used to count the number of participants or completed PAM® surveys. Insignia Health cannot verify the accuracy of the information provided to it and is not responsible for any potential errors in these numbers

PAM Levels



Phase 1.5 Test Bed Demographics

Based on 514 patients who engaged with the Test Bed programme

Lancashire & Cumbria Innovation Alliance

Population of 1.4M

your care our priority
The Fylde Coast Vanguard

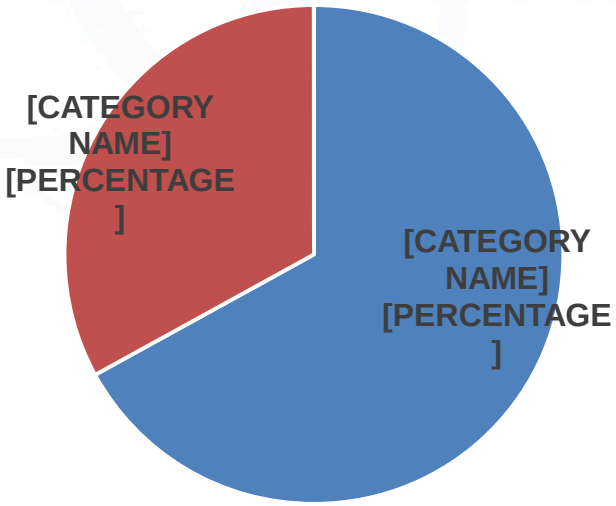
Bay Health & Care Partners delivering
bettercare together

Lancashire Care NHS
NHS Foundation Trust

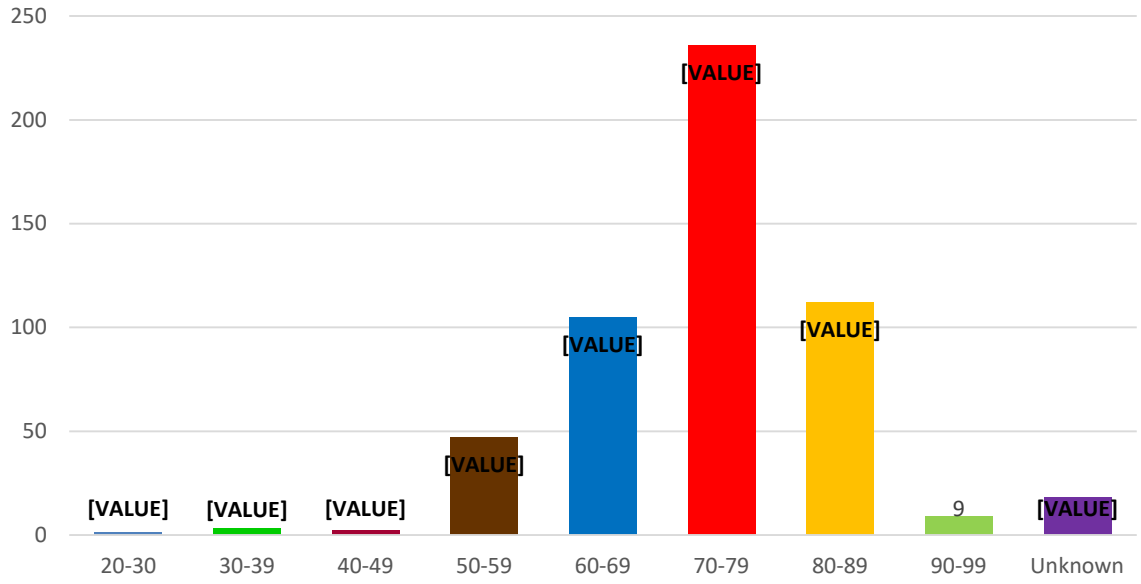
INNOVATION AGENCY
Academic Health Science Network for the North West Coast

Lancashire & Cumbria Innovation Alliance

Gender Split



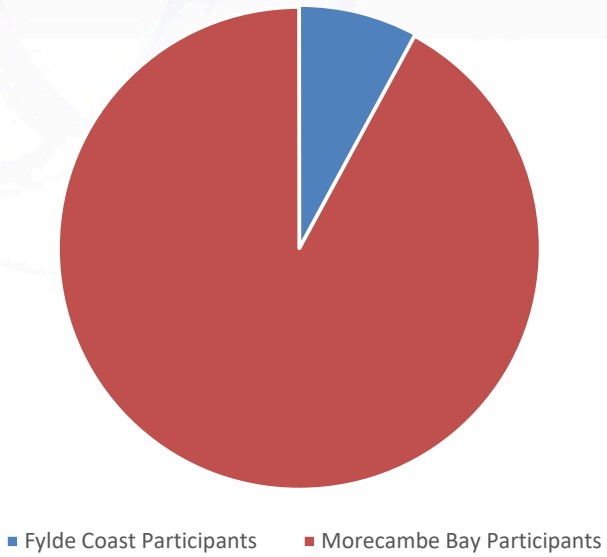
Age Split



The average age of phase 1.5 of the LCIA Test Bed programme was 71 years

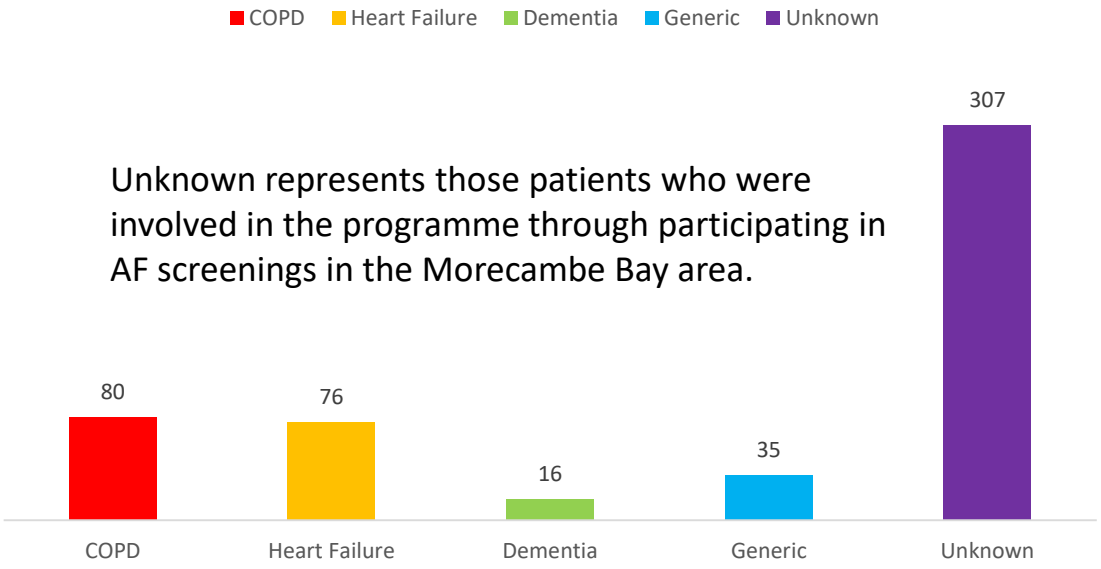
Insignia Health

Geographical Patient Split



Lancashire & Cumbria Innovation Alliance

Patient Long Term Condition Split

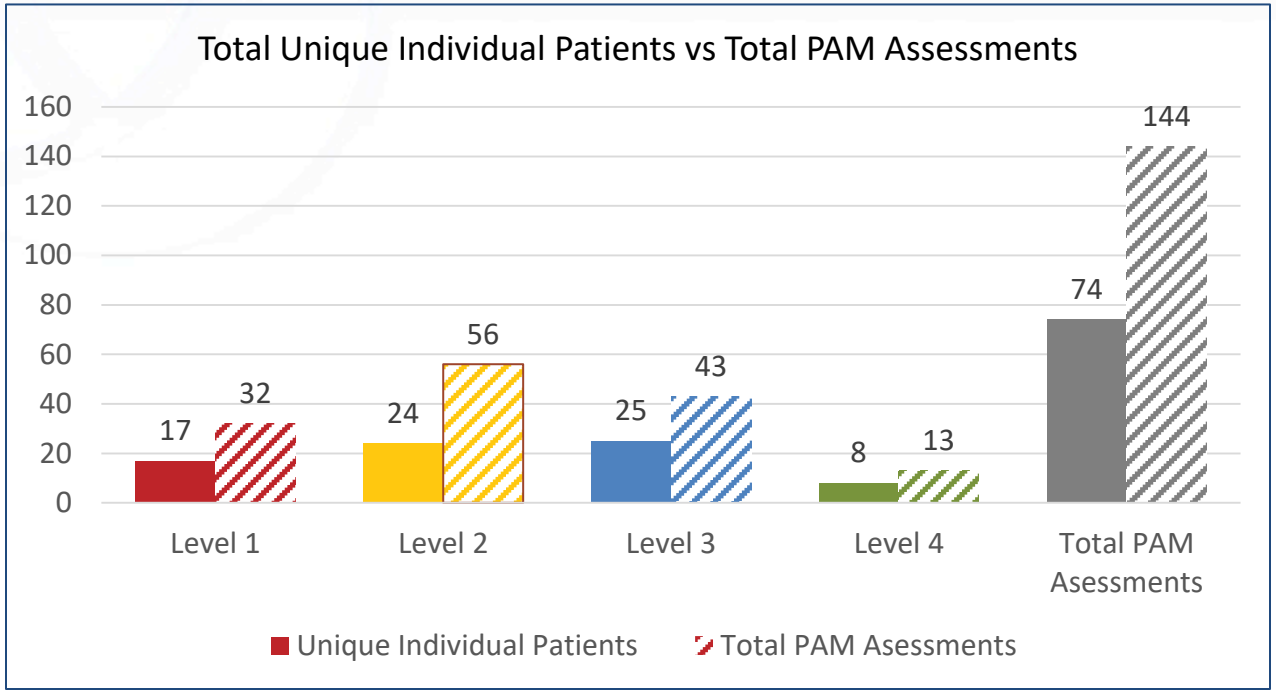


Unknown represents those patients who were involved in the programme through participating in AF screenings in the Morecambe Bay area.

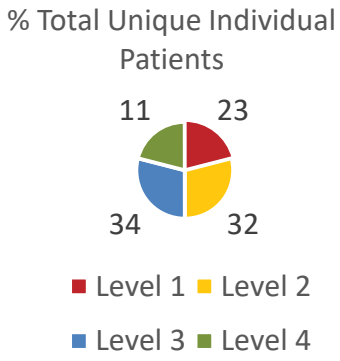
Insignia Health

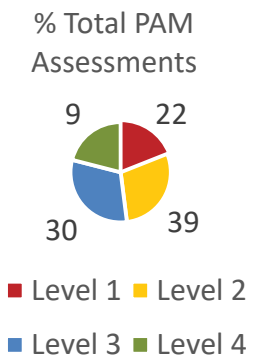
PAM Level Distribution

Shows the aggregated distribution of PAM levels by numbers and percentages



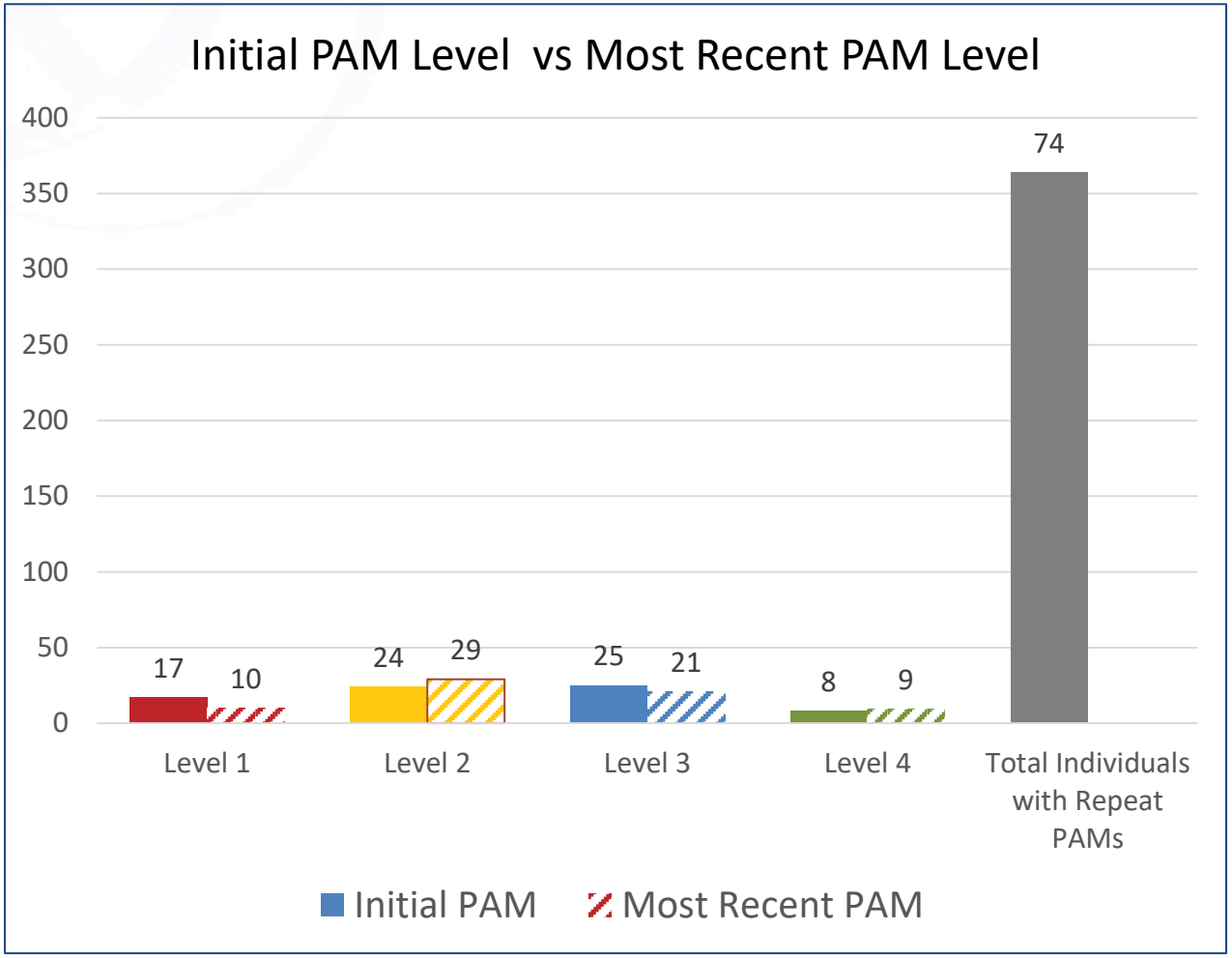
- Total Unique Individual Patients represents the number of patients who have completed more than one PAM assessment during the Test Bed programme.
- Total PAM Assessments represents all patient completing one or more PAM assessment.

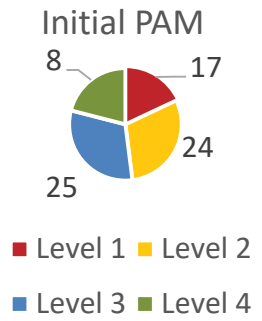


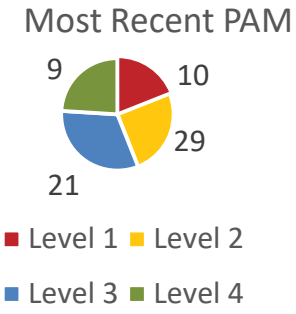


PAM Trend

Shows PAM trending data over time for those administered more than once







Population improvement by PAM Level

PAM Change within Level

Shows PAM score changes within each level over time

PAM Level	Survey Counts*	Initial Mean PAM Score	New Mean PAM Score	Average PAM Score Change	% Declined	% Unchanged	% Improved
1	17	43.08	46.05	2.97	29.4%	5.88%	64.71%
2	24	51.12	54.63	3.51	29.17%	12.5%	58.33%
3	25	62.3	61.17	-1.13	56%	12%	32%
4	8	80.23	69.25	-11	75%	25%	0%

Assessing score change within each initial activation level is the most important approach to assessing the impact of a programme

***Includes all Individuals that had at least 2 PAM surveys administered during the programme**

The PAM score change by activation level report shows score change based upon baseline PAM activation level across a population or subgroup. Assessing score change within each baseline activation level is the most important approach to assessing the impact of a programme. Emphasis should be placed upon monitoring the impact with patients in the lower two activation levels where gains are greatest and most important. PAM level 4 should be viewed separately, as these highly-activated individuals tend to see little to no change in PAM score, and often fall back a few points, but remain in the highest activation level.

Insignia advertise: "Each point increase in PAM score correlates to a 2% decrease in hospitalization and 2% increase in medication adherence". Insignia Health (2018). Patient Activation Measure (PAM) Survey Level.

Conclusions

- The PAM data collected has demonstrated that technology and changes to patient care pathways has contributed to an improvement in patient activation to self-manage long term conditions for the LCIA Test Bed.

- The increase in activation scores varied according to the baseline level of activation.

- The LCIA Test Bed patients with the lowest activation scores in the beginning saw the largest improvements in activation over time.
  - **For example, the average PAM score of the Test Bed population (74 patients) who started at activation level 1 increased from 43.08 to 46.05 (mean difference 2.97). This is a 1.74 mean difference increase from phase 1 of Test Bed.**
  - **PAM score of the Test Bed population who started at activation level 2 increased from 51.12 to 54.63 points (mean difference 3.51). In comparison Phase 1 reported a mean difference of 7.09.**
- Much lower improvements (or in some cases, reductions) in patient activation were observed for those patients already in the highest categories of activation, which is a typical finding in studies using PAM, as these patients learn more about their conditions.

Level 4
Level 3
Level 2
Level 1

Patient self-reporting outcomes

Patients using the Doc@Home© Telehealth care plans were asked to complete an online questionnaire about their experience. Patient cohorts for chronic obstructive pulmonary disease (COPD) and heart failure (HF) had a different question set to the generic pathway cohort, and the tables below show the positive responses to the two question sets.

Of 75 patients on the COPD and HF pathways who completed a customer usage questionnaire for their experiences of using telehealth, this table shows the number of patients who gave positive responses.	No.	%
Have made positive changes to their lifestyle as a result of using telehealth	17	22.6
Felt their health had improved as a result of using telehealth	15	20
Felt their condition had been better managed as a result of using telehealth	36	48
Felt the number of times they had needed to see a health professional had reduced as a result of using telehealth	12	16
Felt number of visits to hospital had reduced as a result of using telehealth	10	13.3
Felt involved in decision making about care and treatment whilst on telehealth	53	70.6
Indicated improved confidence in managing their own health	60	80
Felt their learning through using telehealth had been useful when seeing a health professional	43	57.3
Felt more able to manage condition so as to reduce need to see doctor or nurse	62	82.6
Have found the surveys and educational content sent via telehealth useful	53	70.6
Would consider using telehealth to support health needs in future	56	74.6
Would recommend the use of telehealth to family and friends	60	80
Felt those around them had benefitted from their use of telehealth	40	53.3

Of 17 patients in the Generic cohort who completed a customer usage questionnaire for their experiences of using telehealth, this table shows the number of patients who gave positive responses.	No.	%
Have made positive changes to their lifestyle as a result of using telehealth	5	29.4
Felt their health had improved as a result of using telehealth	4	23.5
Felt their condition had been better managed as a result of using telehealth	8	47
Felt the number of times they had needed to see a health professional had reduced as a result of using telehealth	3	17.6
Felt number of visits to hospital had reduced as a result of using telehealth	1	5.8
Indicated improved confidence in managing their own health	12	70.6
Felt more able to manage condition so as to reduce need to see doctor or nurse	15	88
Would consider using telehealth to support health needs in future	13	76.5
Would recommend the use of telehealth to family and friends	15	88
Felt those around them had benefitted from their use of telehealth	15	88

It is interesting to note the similarity in scores for both question sets with the exception of the final question, “Felt those around them had benefitted from their use of telehealth “– COPD/HF cohort scored 53.3% with Generic 88%. This will require further investigation to understand if this is due to sample size or is condition specific.

It is also interesting to note that “Ability to manage condition” scores are consistent with the phase 1 qualitative evaluation findings[1]

1. Lancashire & Cumbria Innovation Alliance Test Bed: Final Evaluation Report for a Targeted Supported Self-Care Programme. Christine Milligan, Céu Mateus, Tom Palmer, Sandra Varey, Alejandra Hernandez, Mandy Dixon. Lancaster University

Test Bed 1.5

COHORT 4 – E-TITRATION

EVALUATING THE IMPLEMENTATION OF DIGITIAL SOLUTIONS IN THE 12 WEEK DEMENTIA MEDICATION TITRATION PHASE ACROSS 2 MEMORY ASSESSMENT SERVICES

30TH April 2019

Jayne Marshall
Test Bed Clinical Lead/Occupational Therapist

EXECUTIVE SUMMARY

- Recruitment commenced October 2018-January 2019. It took 6 months to design and finalise the dementia and carer questions sets to be ready for launch.
- 13 patients diagnosed with dementia and 13 carers were recruited to the e-titration pilot study. The original total target for Cohort 4 was between 25-50 recruits.
- 7 patients and 7 carers completed the 12 week programme with 4 patients and 4 carers withdrawing. 2 patients & 2 carers did not complete the 12 weeks.
- All patients and carers achieved a positive change in their Goal Attainment score as an outcome measure including the 2 patients who did not complete the pilot.
- 100% of patient and carer feedback reported an increased understanding of their condition and expressed reassurance by the remote monitoring of the technology during titration.
- 100% clinicians commented that patient/carer reported BP & Pulse readings, twice weekly over a month were more accurate than monthly one-off clinician-led readings.
- 90% of carers reported that they felt reassured that their needs were being remotely monitored and felt more supported.
- 100% of managers commented on the potential of the technology to support increased Memory Assessment service clinical capacity and demand supported by a revised staffing model specific to each geographical area.
- Themes from patient/carer semi-structured interviews included reliability and connectivity of technology; training and information; value of involvement and shape future versions of technology.
- Themes from clinicians included capacity and demand; training and development; organisational support for change in clinical practice; clinical decision-making.

INTRODUCTION

In 2018 LCIA were successful in our application for further funding to extend the testing out of identified combinatorial technologies in conjunction with a new innovator, Docobo. Taking a service review and business as usual approach as well as learning from the findings from Wave 1.0 our aims for our Cohort 4 (people living with dementia and their carers) concentrated on the following:

1. The Implementation of new recruitment criteria.
2. Testing out and evaluation of revised dementia question sets via Docobo from both a patient/carer experience and clinical decision-making perspective.
3. To design; test out and analyse a new carer question set via Docobo via carer feedback.

4. To redesign a clinical pathway for people living with dementia who are prescribed dementia medication.
5. To test out the clinical effectiveness and impact of introducing an electronic monitoring system over a 12 week medication titration period with 2 Memory Assessment Teams across 2 geographical areas (Fylde Coast & Morecambe Bay).
6. Investigate and evaluate if the technology impacted on patients goal setting achievements.
7. Examine if the use of technology during titration impacted on patient/carer self-management of their long-term condition.
8. Identify potential solutions in order to embrace the implementation of technology with people living with dementia.

This Executive Report does not describe in detail the development of the dementia question sets as a demonstration of patient/carer/clinician/innovator collaboration. It does not include any data analysis around the Patient Activation Measure/staffing models or financial cost-benefits. However, it does contain a narrative around clinical data on interventions or outcomes as recorded on the Docobo system. More information on these data sets will be incorporated in the main LCIA Report commissioned by NHS England.

This report was commissioned by the LCIA Test Bed Programme Manager.

DATA COLLECTION, ANALYSIS & FINDINGS

In order to capture the complex and often diverse perspectives of patient care this pilot used a mixed method of collecting, analysing and interpreting data. It included:

Quantitative methods: Patient Activation Measurements (not recorded in this report)

Goal Attainment Scoring

Patient Data – referrals (covered in main LCIA report)

Narrative & Data from Docobo Systems

Qualitative methods: Focus groups (House of Memories)

Patient/carer semi-structured interviews

Clinician semi-structured interviews

Manager semi-structured interviews

Observed practice/review of existing policies/procedures/meetings.

RECOMMENDATION from Test Bed Wave 1.0	ACTIONED/IMPLEMENTED in Wave 1.5
1. Sample sizing/recruitment targeting to be calculated by taking into consideration number of people diagnosed within a stipulated "stage" of dementia and not from the total number of people diagnosed at all stages of dementia. This would indicate a more realistic recruitment target.	NO - Not applicable as open to all patients with mild – moderate dementia living at home commenced on medication.
2. Consider exclusion factors such as percentage of people living in a care home; percentage that will decline and percentage that may be eligible but not suitable within sample sizing calculations.	YES - Incorporated into exclusion criteria
3. Consider the Sustainable Transformation Partnerships (STP) geographical footprint to increase recruitment rates for people diagnosed with mild dementia if continuing to include this as an exclusive criterion.	NO - Unable to expand into other geographical areas due to NHS England stipulation.
4. Consider enhancing the criteria of the programme to include people diagnosed with moderate stage of dementia who have a carer to support using the combinatorial technology at home.	YES – included in inclusion criteria
5. Widen the recruitment pathway to include self/carer referrals and referrals from multiple agencies that support people living with dementia and actively case find from all NHS older adult mental health services.	NO – exclusively for patients within MAS Titration Pathway
6. Consider registering future Test Bed Programmes with "Join Dementia Research" (DOH, 2018) to advertise and share recruitment across the localities.	NO – as point 3 above.
7. Record "stage" of dementia at diagnosis to allow easier identification within ECR when case finding.	YES – included within patient records across all geographical footprint.
8. Provide more patient focused information to MAS staff/NHS older adult mental health staff prior to launch to increase their awareness and understanding of the programme.	YES – series of training sessions, presentations at team meetings and 1:1 mentoring throughout recruitment period (see table xxx)
9. Ensure technology is ready to roll out on launch of recruitment.	YES – this was essential in testing out and eliminating technical errors before launch of e-Titration tech (see table xx).
10. Provide a Recruitment Checklist as a guide to inclusion/exclusion criterion at a glance.	YES – adapted and developed in collaboration with MAS MDT.
11. Provide regular communication to staff about the programme progression to enhance engagement and referrals into the Test Bed.	YES - as point 8.
12. Challenge staff assumptions of technology by promoting the benefits of technology and provide data on technology usage by older adults in general.	YES – clinical champions identified; coaching and mentoring on-going throughout project.
13. Support the development of dementia-friendly digital coaching/training with local digital learning provider(s).	NO - unfortunately LEARNING PROVIDER pulled out of co-production and unable to identify replacement during project period.

Table 1.

PATIENT DATA

Within Test Bed Wave 1.0 recommendations were made for the improvement of recruitment. Table 1 describes which were implemented and reasons why if not.

By implementing a revised patient screening criteria (recommendation #4 & #10) and described in table 2, recruitment (as illustrated in Diagram 1 & 2) was still below expectation/target due a number of patients & carers withdrawing from the pilot as

described in Table 3. Feedback from clinicians included issues around choosing the right patients to be recruited, resistance to commit to the pilot due to perceived increased workload and mistrust of technology replacing people.

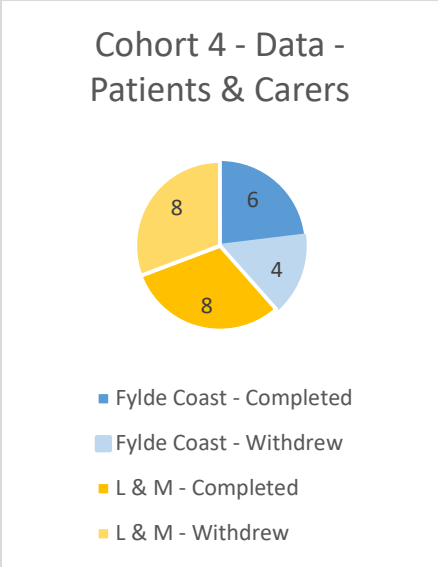


Diagram 1.

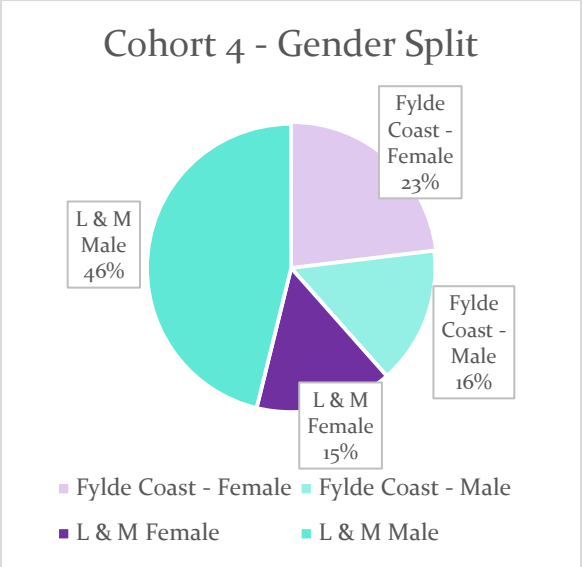


Diagram 2.

Screening Criteria for Recruitment

Phase 1.5 Test Bed

Memory Assessment Service –Titration Clinics

1. Diagnosis of any dementia (mild and moderate stages) and commenced on dementia medication.
2. Person living with dementia - Ability to give written informed consent to being part of pilot.
3. Support from carer/loved one on a daily basis.
4. Prior use of mobile phone and/or tablet device/laptop/computer.
5. Reasonable mobile phone signal in local area or access to WiFi.
6. **EXCLUSION – people who have identified cardiac problems e.g. Atrial Fibrillation will not be accepted onto the trial.**
7. Would be good to have a sample of younger adults living with dementia on the pilot to potentially develop question sets specifically for their needs.

Table 2.

Patient #	Locality	Month Enrolled	Age	Gender	Days post diagnosis	Completed/Did not complete/Withdrew	Reason for non-completion/withdrawal	Carer
1	FC	Dec 18	79	M	1 day	Completed		Spouse
2	L & M	Oct 18	63	M	23 days	Completed		Spouse
3	L & M	Jan 19	72		130 days*	Completed		Spouse
4	L & M	Jan 19	76	F	Year - 2015*	Completed		Spouse
5	L & M	Nov 18	75	M	32 days	Completed		Spouse
6	F.C.	Jan 19	72	F	5 days	Did not complete	Technical issues with internet –forgot Wi-Fi password	Daughter
7	F.C.	Nov 18	63	F	64 days	Completed		Spouse
8	F.C.	Nov 18	78	F	110 days	Completed		Spouse
9	L & M	Jan 19	70	M	6 months*	Did not Complete	Technical Issues – no access to internet	Spouse
10	L & M	Oct 18	74	M	31 days	Withdrew	Carer Burden	Spouse
11	F.C.	Jan 19	73	M	12 days	Withdrew	Carer Burden	Spouse
12	L & M	Nov 18	81	M	11 days	Withdrew	House move	Sister
13	L & M	Dec 18	73	F	27 days	Withdrew	Carer Burden	Daughter
	*These people had a medication change within the last 3 months of enrolment							

Table 3.

Given the wide range of days from diagnosis data it is important to note that receiving a diagnosis of dementia can be a life-changing experience affecting people in many different ways. Consideration could be taken as to the right time for that individual/carer to implement the use of technology in their everyday lives. It appears that carer burden can impact on the uptake of new technology and perhaps other alternatives methods of medication titration or increased support could be beneficial. This was also highlighted within patient/carer interviews (see Document 5). The Docobo dementia questions sets are planned over a period of 12 weeks. However, given individual responses to receiving a diagnosis it may have to be more flexible if the technology is to be made more inclusive.

PREPARATION FOR LAUNCH

As in #8 and #11 of the Wave 1.0 recommendations to prepare clinicians for the embedding of the technology into practice; promote recruitment and regular communication training and support sessions were timetabled with innovators/key Test Bed project members as described in Document 1. This was facilitated over a 6 months period taking into account staffing/resource issues and the specific needs of the clinicians. It also describes the level of collaboration between the Test Bed project Team and innovators in order to be have the question sets "patient ready" as #9 recommends. This took 6 months to finalise in consultation with guest volunteers (previous wave 1.0 recruits) and clinicians. This also focused on a unique question set specifically for supporting carers as this was recognised and highlighted as missing from Wave 1.0.

Table of Summary
of Consultations wi

Document 1.

From April –October 2018 our Test Be project team developed a clinician's guide to using the tech system (Document 2) alongside a patient/carer leaflet (Document 3) adapted from the innovators document available across all cohorts.

Clinician Reference
Guide (en-GB) V2.0.

Docobo - Dementia
patient information

Document 2.

Document 3.

This was positively received by clinicians. Patients/carers suggested that a YouTube video could have been made available as an on-line alternative version to the leaflet for ease of use.

Document 4 provides a timetable/diary of all patient facing consultations and contacts to illustrate the level of clinical lead involvement even within the business as usual approach to implementing the technology into clinical practice.

Timetable of
patient facing Test E

Document 4.

This was also acknowledged by clinicians within their semi-structured interviews (see Document 6). Given that clinicians feel that they currently find integrating new techniques into their everyday challenging due to the workload it would seem prudent

that any future initial set-up of using technology would benefit from temporary extra staffing in order to guarantee success as well as digital champions who can continue to move forward.

GOAL ATTAINMENT SCALES DATA

As a continuation of Wave 1.0 the self-reported Patient Activation Measure (P.A.M 13 and P.A.M. Carer) were used to ascertain any changes in self-management. Alongside this the Goal Attainment Scale (G.A.S.) (Kirusek and Sherman, 1968) was used to measure if patients taking part in the project achieved personal objectives over a 12 week period of dementia medication titration. Unfortunately due to time and workload constraints a randomised control trial was not possible to compare the effect of using/not using the technology or with those who did not receive dementia medication on G.A.S. change scores. Document 5 illustrates the individual goals that were made ranging from maintaining independence in activities of daily living to going out to specific groups/activities.

G.A.S. - Scoring Data.docx

Document 5.

Patient 9 was excluded due to the scores being so different from others it skewed the data. This patient over the 12 week period had had a change in dementia medication that had significantly improved his agitation and verbal aggression and he was able to participate in identified activities with support from a volunteer "dementia buddy" (facilitated by Test Bed project Clinical Lead). Patient 6 was already actively involved in numerous community activities and groups and so this may have positively influenced her scores. Overall, as described in Tables 4 &5, the majority of patients succeeded in achieving higher than average G.A.S. change scores which indicated that change was evident as part of this intervention.

Patient	Baseline T-Score	Achieved –T-Score	Change –T-Score
1	36.8	48.1	11.3
2	22.9	26.7	3.9
3	36.8	50	13.2
4	30.6	44.2	13.6
5	36.3	50	13.7
6 (No tech)	36.3	50	13.7
7	36.3	45.4	9.1
8	36.9	56.0	19
9 (No tech)	~~25.8~~	~~89.7~~	~~63.9~~
Totals	**272.9**	**370.4**	**83.8**

Table 4.

GAS	Average T-Score	Median T-Score	Mode T-Score	Range
Baseline	34.1	36.3	36.3	14
Achieved	46.3	50	50	29.3
Change	10.5	13.6	13.7	15.1

Table 5.

Whether this change can be solely attributed to the use of the technology or by simply setting personal realisable goals with support from the Test Bed Clinical Lead it is difficult to conclude due to the sample size. Further testing would be advisable across all cohorts as G.A.S. provides a good basis for a judgmental evaluation of the total programme.

SEMI-STRUCTURED INTERVIEW DATA

As part of Test Bed Wave 1.5 patients, carers and staff were interviewed as close to the end of the 12 week programme. For those who withdrew or did not complete this took place after a week of notification.

Patients and carers who completed the programme were asked 3 semi-structured questions:

1. Can you tell me your views on the usability of the technology?
2. Which aspects of the technology did you value the most/least?
3. What impact has using the technology had on you?

Patients and carers who withdrew/did not complete were asked the following questions:

1. What were the main reasons for you deciding not to continue with the technology?
2. How can we make things better to support others to use technology?

Document 6 captures all the responses. The results show numerous suggestions about how the question sets can be improved for future system development as well as some comments that highlight how technology can positively support and give reassurance to those who are caring for people living with dementia for example “He will talk to the device but won’t tell me how he’s really feeling as he doesn’t want to upset me”; “We are private people – this helped with information sharing and decision making, and who to contact if help needed”. All carers reported that they “liked” the ability to monitor their loved one’s BP & Pulse (taken twice weekly) as it “reassured us that all is well”.

It is worth noting that the development of the carer question set was positively received by 8 out of 9 carers. One carer was a long-term carer for her adult daughter and so did not find the question set specific enough to her dual caring role which was severely impacting one her carer burden. One carer suggested that a videoconferencing option could be

beneficial especially to those carers in most need for support. This would also offer a more personal approach to their care.

1.5 Patient-Carer
Semi-structured Inte

Document 6.

For those carers who withdrew once recruited the majority gave "carer burden" as the main reason. When interviewed carers felt that using the technology alongside adjusting to the diagnosis and taking on more of carer duties was "too much".

To establish if the technology could enhance clinicians' decision-making, 7 MAS practitioners of varying levels of experience and grades and 3 managers were interviewed to capture their views. Each staff member was asked the following 3 questions:

1. What have been the benefits and challenges to using technology in your practice?
2. What aspects of the technology did you value most/least?
3. What needs to change for you to incorporate technology into your practice?

Document 7 captures all responses. It is worth noting that the majority of clinicians believed that the self-monitoring element to the technology allowed patients and carers time for reflection about symptoms; taking responsibility for example submitting blood pressure and pulse readings can empower and enable independence. It was also mentioned by Nursing clinicians that the Occupational Therapist within the MAS teams was more professionally experienced to identify the patients/carers who would engage with technology via their functional assessments in aiding diagnosis. It is now common practice to ask about use of technology within the MAS holistic assessment across all disciplines.

Another important feature would be the need for staff to feel supported via changing current organisational policies and procedures especially in relation to replacing face to face contacts/appointments with remote monitoring of self-reported data.

1.5 - Clinician -
Semi-structured inte

Document 7.

This was highlighted in Document 1 with acknowledgement from the Lead Pharmacist and Lead NMP Nurse (Non-Medical Prescribers) commitment to reviewing current prescribing guidelines to include digital consultations. It was also emphasised that pathway development was essential in offering further reassurance to clinicians. The Test Bed

Clinical Lead in collaboration with Clinical Care Pathway and Outcomes Lead, Nursing and Quality Directorate refined the titration telehealth pathway illustrated in Document 8.

Titration pathway with telehealth v2.0.

Document 8.

This pathway has been prepared in readiness for future digital solutions within a Memory Service Titration programme.

In order to gather all feedback and subsequent themes derived from all the semi-structured interviews Gale's Patients People Place Framework (2014) was applied.

Qualitative Data

Data Collection Summary Utilising Patients People Place Framework (Gale et al, 2014)

Patients -themes	People -themes	Place- themes
1. User involvement – patients/carers reported feeling empowered by 1:1/1:2 consultations to feedback to – clinicians/innovators becoming experts by experience. 2. Focus groups – e.g. allowed shared experiences, social engagement and general reminiscence about local area. 3. Observable patient/carer-clinician contact/appointments/home visits – captured understanding of the benefits/challenges of using tech – e.g. with suggestions given on how to improve/make more useable. 4. Patient/carer semi-structured interviews –allowed time to reflect on own progress/coping strategies/need for assistance. 5. Patient/carer information – leaflets/website/videos – feedback and suggestions included YouTube video of how to use tech. 6. Patient/carer training –tech – e.g. more time needed from trainer to feel comfortable with using the tech e.g. how to take BP & pulse correctly. 7. Reliability of tech –e.g. connectivity needs to be easy and simple 8. Privacy & security – e.g. patient data storage/sharing. 9. Value statements from staff and patients about initiatives to involve patients; ways of talking about everyday practice and change	10. Stakeholders – (monthly Board meeting) e.g. spread and adoption, commissioning, leadership, organisational commitment; drive and direction. 11. Organisational values demonstrated in patient-clinician interactions e.g. incorporating use of tech in assessments to identify potential use of tech in practice. 12. Clinician Training and development –e.g. tech; systems –confidence in using; incorporating into training models/CPD; IG/Mandatory training. 13. Time – e.g. champions extra to existing staff to support and encourage usage; reduce diagnosis to treatment time. 14. Pathway redesign – organisational policies and procedures adapted to support change in practice and decision-making. 15. Capacity & demand – e.g. positive use of tech to reach more patients/carers; reduce travel; inform future staffing models. 16. Interoperability & development – e.g. use of integrated IT systems; ease of use to increase clinician-patient/carer interaction & capacity. 17. Value statements from senior and frontline staff e.g. deployment of 'champions' to show where perceived barriers to change are; views on role of organisation and government policy. 18. Relationships between clinicians and management e.g. organisational hierarchies; professional divisions of clinical contact.	19. Centralisation of base – bringing together 3 teams into one base – will improved communication; resource distribution; team development. 20. Utilisation of GP facilities – primary care focus/consultations/improved relationships and health promotion. 21. Reduction in home visits/clinic appointments – e.g. incorporate videoconferencing option into system. 22. Patient/carer care at home – e.g. integration with environmental monitoring systems. 23. "Hub" type approach – e.g. integrated team to monitor patients/carers at home; prioritisation of patients most in need; reduction in "routine" appointments. 24. Ideologies of progress e.g. technological development and modernisation; communities of practice.

The summary data presented above are illustrative (not comprehensive) of the sort of findings that were located in each domain, through use of the framework.

Table 6.

Table 6 summaries all the themes which present interesting insights into what is important when introducing technology into practice and can act as a guide for future development and implementation.

One of the most commented on aspects from a patient & carer perspective was that the technology had to be reliable (point 7). There was a number of connectivity issues during the project which affected how often readings or question sets were self-reported. It appears that patients and carers would only pursue with technology if it was simple and easy to use.

On a similar theme worth noting (point 16) clinicians was reported that the interoperability of new technology with existing electronic patient records is essential for prospective success and embedding change in clinical practices.

DIGITAL SOLUTION DATA

Data taken from the Docobo remote monitoring system (Table 7 & 8) illustrated the clinical interventions and outcomes that were recorded by clinicians. Linked to the need to support carers in their role the data gave evidence of the amount of contact between carer and clinicians – a total of 246 across the 2 localities, an average of 21 contacts per carer over a 3 month period, equating to 7 contacts per week, which was mostly over the phone advice. It is unclear what exact type of advice was given but by examining the Morecambe Bay data it could be surmised that on 18 occasions it was identified that referral onto other services was required to support either the carer or the person living with dementia.

Clinical Interventions and Outcomes August 2018 - April 2019 Morecambe Bay			
Interventions	**count**	**Outcomes**	**count**
Spoke to carer by phone	166	Medication titrated safely	18
Liaised with Consultant	17	Medication same dose	49
Referral to Social Care	3	Medication stopped	0
Referral to CMHT	0	Medication changed	1
Referral to RITT	0	Clinic appointment avoided	33
Liaison with Dementia Advisor	3	Home visit avoided	30
Signposted to community services	7	Travel saved	33
Referred to OT -MAS	0		
Referred to OT - community	1		
Medication advice	1		
General advice to carer	62		
Message sent to carer	0		
Spoke to GP by phone	4		
Letter to GP	0		
Referred to Falls Prevention Team	4		
Face to face review	53		

Table 7.

Clinical Interventions and Outcomes August 2018 - April 2019 Fylde Coast			
Interventions	**#**	**Outcomes**	**#**
Spoke to carer by phone	15	Medication titrated safely	9
Liaised with Consultant	14	Medication same dose	12
Referral to Social Care	0	Medication stopped	0
Referral to CMHT	0	Medication changed	0
Referral to RITT	0	Clinic appointment avoided	5
Liaison with Dementia Advisor	0	Home visit avoided	3
Signposted to community services	0	Travel saved	8
Referred to OT -MAS	0		
Referred to OT - community	0		
Medication advice	0		
General advice to carer	3		
Message sent to carer	0		
Spoke to GP by phone	0		
Letter to GP	0		
Referred to Falls Prevention Team	0		
Face to face review	1		

Table 8.

One of the unintended consequences of this project was that it helped identify people diagnosed by the Morecambe Bay MAS team who may not have received the Dementia Adviser referral or Occupational Therapy assessment and intervention as part of the assessment process. These patients subsequently benefitted from this follow-up. There was also one incident of a patient receiving anti-depressant medication as a direct result of the self-monitoring system (there is a specific question set around mood) and successfully reporting an improvement in wellbeing.

It is also worth noting from examining the 2 sets of data that the Fylde Coast MAS team consulted more with their Consultant/Medic. This could be due to the different staffing models across the 2 localities: - Morecambe Bay having an experienced Advanced Nurse Clinician in situ. Future consideration could therefore be given to the need for more Non-Medical Prescribers within MAS teams within staffing models.

Consistency in staffing was also a factor during the project. Fylde Coast had a reduction in Medic sessions during the project (from 0.6 wte to 0.2 wte) which could have also impacted on the recruitment numbers as this increased the assessment to diagnosis time thus reducing the number of people diagnosed. Morecambe Bay had 2 clinicians retire with no backfill in place for 2 out of 3 months. This affected the existing clinicians ability to continue monitoring via the Docobo system and carry out business as usual. These factors need to be part of contingency planning when introducing new practices into clinical areas.

When observing clinical practice it was noted that the both MAS teams continued to carry out their current practice of home visits or clinic appointments alongside the use of the Docobo system. Thus the data indicates that there are more "Face to Face" appointments then would have been predicted. Clinicians therefore reported 71 total hypothetical outcomes involving avoidance of clinic/home visit appointments and 41 "travel saved" components (potential cost savings will be covered in the main Test Bed Report). This could have due to the testing-out of clinical based evidence prior to trusting the data to replace face to face contacts. Also as previously mentioned, changes in current policies and procedures would need to be in place before this change could be implemented. Over the course of the project the majority of clinicians acknowledged the potential for the remote self-monitoring system to provide value added information that could support clinical decision-making. Clinicians did note that in order for this to further advance and streamline clinical pathways, time and improve patient experience there would be a need to incorporate electronic prescribing systems which is now being explored by the innovator.

HOUSE OF MEMORIES

The following House of Memories Report has been compiled by Waqar Hussain, Test Bed Project Support Officer and incorporates the findings of 2 focus groups, and individual conversations with patients and carers from the Test Bed project. It also incorporates consultations with Occupational Therapy and Wellbeing clinicians from the local acute mental health hospital dementia wards.

REPORT HoM from Test Bed FINAL.docx

Document 9.

The main feature of this report focuses on the usability of the House of Memories App, providing feedback to the National Museum of Liverpool about possible improvements as well as the expansion of the app content to be used in schools. In general the App was positively received and is now being recommended by clinicians across the 2 MAS teams and across the dementia wards.

RECOMMENDATIONS

After reviewing all the content of the findings these are the main suggestions for implementing the digital solution within the Memory Assessment Service.

1. Continue to redefine and test out the question sets within the Docobo systems e.g. wording, frequency.
2. Consider including specific question sets/information for younger people living with dementia and their carers e.g. employment support; benefit support.

3. Offer carer question sets and information to all who support people with identified long-term conditions.
4. Continue to collaborate with patients/carers with lived experience to design and test out health and wellbeing technological advances.
5. Ensure reliable up to date technology to increase the amount of engagement with patients and carers. Offer alternative to those who may need individual adjustments e.g. wrist BP/Pulse
6. Consider the spread of the use of the Goal Attainment Scale with all cohorts using a randomised control group to compare clinical effectiveness.
7. Clinician training and support should be made available during introduction of technology alongside in-team champions.
8. Ensure temporary extra staffing to ensure clinician uptake of new technology.
9. Redesign clinical policies protocols and procedures prior to implementing technology.
10. Ensure organisational senior management/professional leadership commitment to support clinicians in their change of practice.
11. Link digital solutions to electronic patient records and e-prescribing to streamline pathways. Consider integrated care systems with primary care to improve communication/patient information sharing.
12. Consider expanding the concept of remote self-monitoring to other mental health diagnoses and with those people may find engagement with services challenging.
13. Consider timing of introduction of technology to allow for adjustment to life changing diagnoses.

References

Gale, N.K., Shapiro, J., McLeod, H.S.T., Redwood, S. & Hewison, A. (2014). Patients-people-place: developing a framework for researching organizational culture during health service redesign and change. *Implementation Science.* 2014 9:106 https://implementationscience.biomedcentral.com/articles/10.1186/s13012-014-0106-z.

Kirusek, T.J. & Sherman, R.E. (1968). Goal attainment scaling: A general method for evaluating comprehensive community mental health programs. *Community Mental Health Journal.* Dec; 4(6):443-53.