

County Durham and Darlington NHS Foundation Trust INR telehealth pilot

Economic considerations for INR telehealth and current service models

1 Executive summary

The CDDFT INR telehealth pilot demonstrated significant improvements in %TTR for patients participating in the pilot scheme. This section discusses the financial implications of introducing an INR telehealth service in Durham and Darlington with the view of expanding the existing service on a sustainable basis. Cost implications were analysed from the NHS cost perspective. The key findings are:

- The INR telehealth service can be cost neutral from the perspective of variable NHS costs per patient compared to the INR outpatient clinic when the savings from the reduction of strokes and other thromboembolic events for patient self-monitoring [1, 2] is taken into account.
- For the existing service models, variable INR monitoring costs per patient are lowest for the INR outpatient clinic at £152 per year compared to satellite clinics (£190) or home care (£333).
- Costs for INR telehealth is estimated at £146 per patient per year for the current cohort of 200 patients where the meters are already funded separately.
- Costs for fully funded INR telehealth is estimated at £210 per patient per year. Expanding the service beyond an additional 200 patients would require additional CCG funding. One option is to coverer £40 prescribing of test consumables on the CCG formulary budget.

1.1 Implications for the CDDFT INR service

The current INR telehealth service is not at its full capacity. This could be achieved by moving more patients onto the system and possibly adjusting the staff hours.

Sustainable funding in the medium term: moving 200 additional people to INR telehealth should be financially viable for the Trust in the medium term because the meters for the first 200 patients are already fully funded. The INR telehealth cost for these 200 patients is only £146 per year – lower than the INR outpatient clinic. The average cost for 400 (200 patients at full cost of £206 and 200 at £146) is £176 – lower than £190 for the satellite service and practically fully funded by the current tariff.

Sustainable funding in the long term: Expanding the service beyond 400 would require the CCG to cover some costs. For example, the costs for the consumables (£40) could be covered by the formulary (see section below).

1.2 Implications for the CCG

INR service funding and budget impact: the INR telehealth service delivers significantly better INR control than outpatient based care. This should lead to a significant reduction in adverse events, such as strokes [1], saving the CCG the associated acute care costs (estimated at approximately £52 on average per year per patient in the telehealth service). However, the current per patient tariff does not fully cover the INR telehealth service costs. The CCG therefore needs to provide additional funding. One option would be to take the costs of the consumables (test reagents) on the CCG formulary via prescribing. At £40 per patient per year, this would be overall cost neutral for the CCG given the average savings of £52 in acute care costs.

Formulary budget impact: Improved INR control may prevent patients from switching to newer anticoagulants that do not achieve sufficient %TTR on warfarin. The current local guidelines [4] set the threshold for good INR control at 50% TTR. The updated NICE guideline, due for publication in August 2014, sets the threshold at 65% [5]. Based on the data from the cohort of 100 initial patients, the number achieving less than 50% TTR more than halved from 28 to 12, potentially saving £12,640 per annum in prescribing costs of NOACs. For a threshold of 65% TTR the respective potential savings are £25,280 (see table below).

TTR threshold	N before telehealth	N after telehealth	NOAC per year[6]	Saving
<50%	28	12	£790	£12,640
<65%	63	31	£790	£25,280

1.3 Future improvements

Telehealth may serve as a stepping-stone for some patients to self-manage, i.e., self-adjust their warfarin dose. Migrating patients to self-management in the future could save significant costs: the variable annual INR monitoring costs per patient self-managing would be approximately £120 (based on the INR telehealth costs but excluding the cost for the telehealth system and staff time) compared to £152 outpatient based INR monitoring. It is also likely that prices for telehealth systems may decrease when patient numbers in the NHS increase significantly.

2 Service models

NHS cost of the INR telehealth service were calculated bottom-up based on the observed activity level and resource use for INR telehealth and for three additional service models: INR outpatient clinic, satellite clinic and home care. The main cost drivers were:

- Staff time
- INR test reagents
- Patient meters and telehealth system

In addition to the cost of INR monitoring (INR service costs) the costs of warfarin related adverse events, i.e. strokes, MIs and embolisms, were estimated to compare the total NHS costs of the different service models at CCG level. The sections below detail resources for each service model.

Certain fixed costs, i.e. for dosing software, clinic meters & QA were not considered as it was assumed that they would not change if people moved between different service models and were in fact common fixed costs of the entire INR service.

Significant benefits that accrue to the patient, like savings in travel cost to clinic and time for clinic attendance, were not included in the calculations but would further favor INR telehealth.

2.1 INR outpatient clinic

The typical clinic operates 3-4 of hours. During this time the following staff are required:

- 1 band 2 administrator: for admin & booking of appointments
- 1 band 3 nurse: taking samples & run tests
- 1 band 6 nurse: dosing

Based on observations from data from 5 clinics with 19 hours of clinic time and 331 appointments, the average number of appointments per clinic hour is 17.4. The average number of appointments per patient per year was 17.54.

Consumables include the test strips (main costs), lancets, gauze, plaster.

Main fixed costs of the clinic are meters, QA consumables & (dosing) software. These costs were not included in the variable per-patient costs.

Transport costs for patients requiring transport, clinic waste and stationary were not estimated.

2.2 INR satellite clinic

A single band 6 nurse runs this clinic in a community location. The travel time was added to the clinic time for staff costs. Based on 8 clinics with a total of 25 staff hours and 125 appointments the average number of appointments per hour is 6. It was assumed a patient in the satellite clinic would have – on average – the same number of appointments as in the outpatient setting and the consumable costs were the same.

2.3 INR telehealth

INR telehealth (calls) is offered 4 days per week outside outpatient clinic times but alongside home visits. During this time, one band 6 nurse attends to the system (review of test results, transfer to DAWN, dosing & calls to patients). Based on data from 6 clinics with 25 hours and 197 calls (telehealth & home care) the current number of calls is 8 per hour.

The current level of telehealth calls & staff leaves huge capacity gaps. It is estimated that time could be reduced by 60%, leading to a capacity of 20 telehealth calls/tests per hour of band 6 nurse time. This level is reasonable, given that a band 6 nurse can now manage approximately 17 outpatient visits per hour if different staff (see outpatient clinic) do tests and administration.

The average number of tests/calls per patient was 14 per year.

Telehealth patients visit the clinic twice per year (every 6 months). These visits are costed at the average cost of an outpatient clinic visit.

Consumable costs (per patient) based on test strips & lancets with the same price as for standard INR clinic, excluding supply of gauze, plasters.

Meter costs were annualized over 5 years. Telehealth software was assumed to incur an annual charge per patient.

2.4 INR home care

A district nurse (band 5) visits the patient to test. The average time is 35 minutes. Average journey is 6 miles @ 67p per mile.

Admin time to record staff visit results and reporting was 1 band 3 0.2wte for 8906 visits.

Consumable costs per test are the same as for the outpatient INR clinic.

The average number of visits per year was 16.4 based on 8906 visits for 542 patients.

Fixed costs of meter and QA etc. were not included.

3 Costs

3.1 Stroke, MI and embolisms

The average costs of strokes, MIs or embolisms were calculated based on the distribution of observed events and the event costs from NHS reference costs based on the data published in Craigh at al. [2]. The average cost per event was estimated at £4,124. Based on the data in Heneghan et al. [1], patients in standard INR care have an incidence of thromboembolic events of 2.6% per year. This nearly halved for patients self-monitoring to 1.3%.

With the observed significant improvements in TTR for patients in the telehealth service, it is assumed that a similar benefit can be applied.

On average, $2.6\% \times £4,124 = £106$ of NHS costs per patient per year can therefore be attributed to stroke and other thromboembolic events in standard INR care compared to £54 for patients self-monitoring. These costs are assumed applicable to the outpatient INR clinic, satellite INR clinic and telehealth patients, respectively. It is not clear whether the costs are realistic for home care patients due to their likely higher morbidity and mortality.

3.2 Cost base

Staff cost per clinic hour (including overheads, absence etc.) based on salary band were taken from the literature [3]. Costs for consumables, meters and software are based on manufacturer/list prices. The key costs are listed in the table below:

Item	Unit cost	Source
Staff costs per hour clinic by salary band. Full on-costs including overheads for pension, admin, facilities & absence.		
Band 2	£ 21	PSSRU 2013 – ‘Clinical support worker nursing (community) based on agenda for change base salary of Band 2, £16,193 per year [3]
Band 3	£ 24	Scaled from band 2 by base salary.

Band 4	£	26	Scaled from band 2 by base salary.
Band 5	£	33	Scaled from band 6 PSSRU cost based on basic salary.
Band 6	£	41	PSSRU 2013 -Nurse specialist (community). Based on band 6 base salary of £31,752 per year [3].
Consumables, meters and telehealth system.			
Test strip	£	2.85	List price based on box of 24.
Other consumables per test	£	0.02	List prices for lancet, gauze & plaster.
Patient Meter	£	59.80	Annualized cost over 5 years.
Telehealth system	£	60.00	Charge per patient per year
Strokes, MIs or embolisms			
Average cost per event	£	4,124	Based on Craigh et al. [2]
Average per annum per patient in standard care	£	106.56	Based on rates in Heneghan et al. [1] and average event costs.
Average per annum per patient on telehealth	£	54.39	Based on rates in Heneghan et al. [1] and average event costs.

4 Results

Variable INR service costs per patient per year for the individual service models based on staff costs, consumables, meters & telehealth system (if applicable) are summarized in the table below. The table also includes the average costs for strokes, MIs & thromboembolisms to estimate the total variable NHS costs per patient per year. Cost of NOACs are shown for comparison.

	INR outpatient clinic	INR satellite clinic	Telehealth	Home Care	NOAC
INR service					
Staff costs	£101.75	£ 137.84	£28.70	£220.18	
Consumables	£50.65	£ 52.65	£ -	£47.45	
Patient meters & telehealth system	£ -	£ -	£119.80	£ -	
Variable INR service costs	£152.39	£190.48	£165.88	£333.68	£ -
CCG					
Adverse events	£106.65	£106.65	£54.39	Not estimated	Not estimated
Test consumables	£ -	£ -	£40.18		

prescribing					
anticoagulant prescribing [6]	£18.72	£18.72	£18.72	£18.72	£790.00
Total NHS cost	£277.76	£315.85	£279.17	> £352	>£790

5 References

[1] Heneghan et al. Lancet 379 (2012): 322-334.

[2] Craigh et al. Journal Medical Economics January 2014.

[3] Unit Costs of Health and Social Care 2013. PSSRU (2013). Available at:
<http://www.pssru.ac.uk/project-pages/unit-costs/2013/>

[4] Available at:
http://www.cddmedicinesmanagement.nhs.uk/documents/Prescribing/Guidelines/Cardiovascular/Stroke_Risk_Stratification_Thromboprophylaxis_DRUG-CAR-0058.pdf

[5] NICE AF guideline update – draft consultation (2014). Available at www.nice.org.uk

[6] NICE anticoagulation commissioning toolkit (2013). Available at
<http://www.nice.org.uk/usingguidance/commissioningguides/AnticoagulationTherapyCAB.jsp>