

Business case with commissioning model options for the spread and sustainability of web-based consulting; supporting self-management in diabetes.

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1. Executive Summary

Prevalence of Diabetes in Newham is high at 5.7% and the total number of people with diabetes in Newham is rising by >800 each year. These demographic, demand side factors have required an innovative approach to delivering accessible and affordable care.

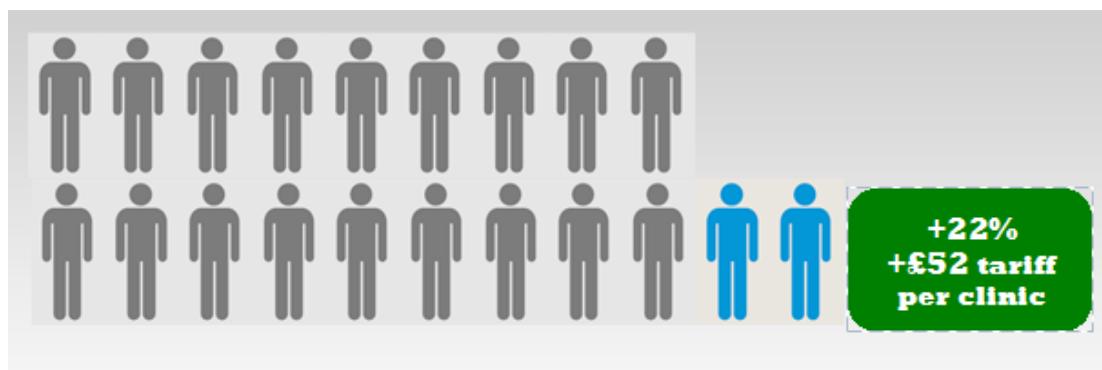
Skype is now routinely used in the general diabetes and young adult diabetes clinics in Newham using a blended model, based on patient choice, between secondary care out-patient attendances as usual and Skype web based consulting. As a result of Health Foundation funded projects completed by the diabetes team in Newham there is sufficient observational and audit data from which to derive real life operational costings and savings models suitable for sharing with other potential adopters.

The following headline findings from Newham are expanded on in the main report with metrics and methodology allowing adaptation to local context

1.1 Staff time. Input cost of consultant time per contact between conventional outpatient clinic (no skype option) and blended clinic of face to face attendances and skype appointments



1.2 Staff productivity and increased income from tariff. Offering Skype in the Consultant led clinic increased actual productivity for each clinic slot by 22% in a real life setting.



This productivity saving is 22% increased clinic capacity. Productivity in Diabetic Specialist Nurse clinics rose by 28%.

The 2105 King's Fund report, Better Value in the NHS: The role of changes in clinical practice, gives estimates of the average annual growth in NHS productivity overall from the early 1980s to 2012/13 at around 0.7 per cent to 1.2 per cent.

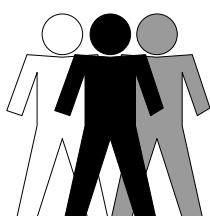
These productivity savings have potential for extra income to the provider where contracts allow for tariff payments from additional appointments. Converting this to two extra non-face-to-face tariffs only produces £52 extra per clinic. Currently the Skype appointment do not qualify for the face-to-face tariff of £122.50 per appointment (see sections 5.2 and 7.2)

1.3 Missed appointments

Further efficiencies are realised by significant reductions in missed appointments observed in those patients using skype. Patients using Skype more than once missed 7% of scheduled Skype appointments but the same patients' rate for outpatient attendance was 24%. See section 5.4 for details.



1.4 Saving for patients. Mean (median) savings per patient from exercising Skype appointment option per appointment = £17.36 (£22.50). Savings reported by patients from travel, parking and loss of earnings (see section 6.1 for details).



**Saving to patient
per appointment:**
Mean £17.36
Median £22.50

1.5 Clinical cost saving from avoided complications

Diabetes related complications are empirically linked to engagement and treatment adherence. About half of diabetic ketoacidosis (DKA) hospitalisations could be avoided with better outpatient and self-delivery of care. The evidence base for this is reported in section 5.5 with national rates and costs for other common complications. Complications incur tariff costs to the commissioners. The Newham DREAMS study undertook complex statistical

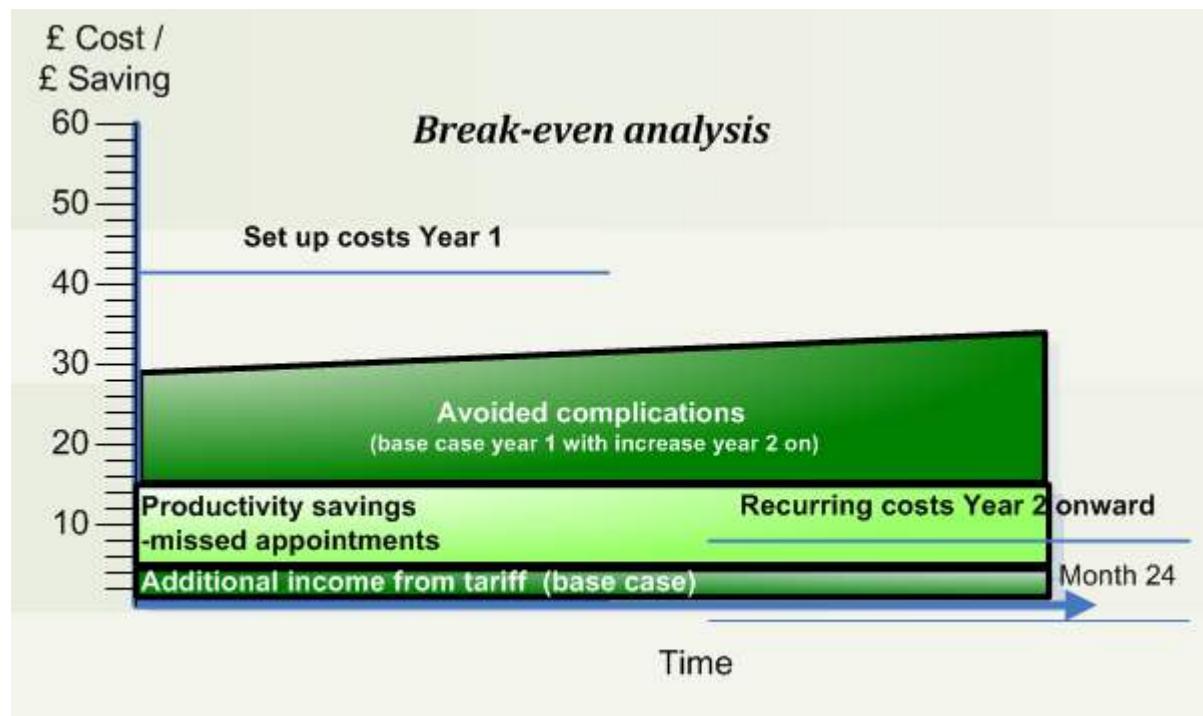
analysis of one such high cost complication: A&E attendance. Project data concluded that the event rate is lower for Skype participants but that these findings should be treated with caution. Taking A&E attendance and DKA admission costs only we can offer a sensitivity analysis based on low, base and high annual event avoidance numbers for these complications.

Complication event	Low n (£ saving)	Base n (£ saving)	High n (£ saving)
A&E attendance n	5 (£610)	10 (£1,220)	20 (£2,440)
DKA admission n	5 (£8500)	10 (17,000)	20 (£34,000)
Total saving to CCG	£9,110	£18,220	£36,440

1.6 Break-even analysis. Set up costs versus savings- break-even and sensitivity analysis

Newham's costs in the implementation year for the the current model of Skype appointments was £41,412. Adopter Trusts can take advantage of the standard operating procedures produced by the Newham Diabetes Service to fast track implementation and test cycles.

Year 2 onward costs are IM&T support costs and training new staff only estimated at less than £10,000 per annum.



Savings are shown as light green productivity savings (reducing missed appointments) and dark green where income is received on tariff, or spend is reduced on tariff for A&E attendances and admissions from diabetes related complications. Savings to patients are excluded as this is to demonstrate return on investment for purchasers and providers.

Tariff income on additional patients seen from productivity gains of 2 extra patients seen per clinic in just one Consultant clinic a week would amount to £2,600 a year minimum assuming that only the basic low rate for non-face-to -face activity continues to be applied locally . Were

a local Skype tariff to be agreed somewhere between this and the face-to-face tariff of 122.50 this would more realistically be in the region of 6,000 per year.

Activity for the Diabetes Specialist Nurses is covered by a block contract so any extra activity cannot be readily converted into income.

The base case for just two of the most commonly avoided presentations arising from poor adherence (A&E and DKA admissions) adds a further £18,220 and these savings accrue into years 2 and beyond.

Patients using Skype more than once missed of 7% of Skype scheduled appointments but the same patients' rate for outpatient attendance was 24%. See section 5.4 for details. Using their activity these 60 patients would have attended 79 more appointments per annum on Skype. This would bring £9,677.50 per annum to Newham if converted to tariff income. The more patients convert to Skype the greater the reduced waste from missed appointments.

Incidental costs are detailed in section 6. Reductions for receptionist time, clinic facilities, and consumables would only be realised at a scale at which fewer physical clinics could be operated. Experience has shown that Skype impacts positively on reducing patient transport, advocacy and translation costs in the Newham setting. Patients attending who need advocacy or translators incur costs at £26 per hour to the departmental budget. The learning from Skype is that patients are resourceful in using a family member to translate and this is facilitated by the flexibility and reduced effort of travel and attendance that Skype affords. We do not yet have enough advocacy activity data to reliably quantify this saving.

1.7 Conclusion

We have shown in a pragmatic cost consequence analysis that savings can be quantified and attributed to each beneficiary. Commissioning contract arrangements complicate the business case and make some of these financial gains opaque to clinicians. For example the block contract for Diabetic Nurse Specialists means that we have not been able to count their significant productivity and throughput savings. Nevertheless we have demonstrated that set up and 'retooling' costs can be largely recovered in year 1 and a return on investment surplus in subsequent years. This is over and above the benefits from keeping up with rising demand.

2. Introduction

This report aims to articulate more fully the business case and economic benefits for web based consulting. Data follows two Health Foundation funded projects by the diabetes team in Newham:

The Newham DAWN study (**D**iabetes **A**ppointments **W**ebcam **N**ewham) set out to test the initial implementation of web based consulting in a 1 year pilot completing in April 2012.

The DREAMS study, (**D**iabetes **R**eview, **E**nagement and **M**anagement via **S**kype) explored the role of Skype consultations in patients who find it difficult to engage with and attend diabetes services. The research ran between January 2012 and December 2014 and aimed to provide a

better understanding of how the introduction of remote consultations alters patterns of service use, the experience of remote consultations from the perspective of patients and service staff, and the challenges of introducing remote consultations in a clinical setting.

Skype is now routinely used in the general diabetes and young adult diabetes clinics in Newham using a blended model based on patient choice between secondary care out-patient attendances as usual and Skype web based consulting.

Considerable interest from around the country and in different clinical settings has provided further impetus to develop an economic / business case to support onward adoption. In particular a local proposal aims to explore the scope and feasibility of delivering Skype-based review of patients in two primary care GP sites.

2.1 Setting

Newham's demographic and socio economics are relevant as determinants of health. Newham has one of the highest recorded levels of diabetes in the country¹. Local Development Plan information shows that there are currently 20,698 people living with diabetes in Newham. The prevalence is high at 5.7% (May 13 LDP) and the total number of people with diabetes in Newham is rising by >800 each year (March 13 LDP). In 2010/11, Newham had the third highest rate of emergency hospital admissions for diabetes in children and young people aged under-19 years in London, at a rate of 86.0 admissions per 100,000 population. The average rate for London was 56.9 admissions per 100,000 and the average for England was 65.1 per 100,000².

Census and the local Joint Strategic Needs Analysis data shows the Index of Multiple Deprivation (IMD) as the 3rd most deprived local authority area in the country. Newham's premature mortality rate is the 3rd worst in London and significantly worse than the London and national averages. This means that more people in Newham are dying early from potentially preventable conditions. 2011 Census data for the ethnic mix in Newham shows the borough has the UK's lowest proportion of White British people in England and Wales (16.7%), the second largest Bangladeshi population and fourth largest Black African population. The proportion of residents born in other countries, at 42.4%, is the highest in London. This compares to the London average of 26.4% and England average of 9.4³.

These demand side demographic factors make the need for new approaches and pathways particularly pressing in Newham. Continuing to provide more of the same would be labour intensive and unaffordable.

2.2 Care pathway

A simplified care pathway showing the local health care system and patient pathway is given on page 8. Patients are offered a choice of participating in Skype appointments at Consultant follow up and by the specialist nurses. Traditional face to face appointment options are shown

¹QOF, 2010/11.

²CHIMAT Disease Management Information Toolkit – Paediatrics. Reported in JSNA see footnote 2

³ Office for National Statistics table '2011 Census KS201EW ethnic groups, local authorities in England and Wales (11th Dec 2012)

in blue and Skype appointments in yellow. Activities shown in white do not carry a skype option currently.

2.3 Aim

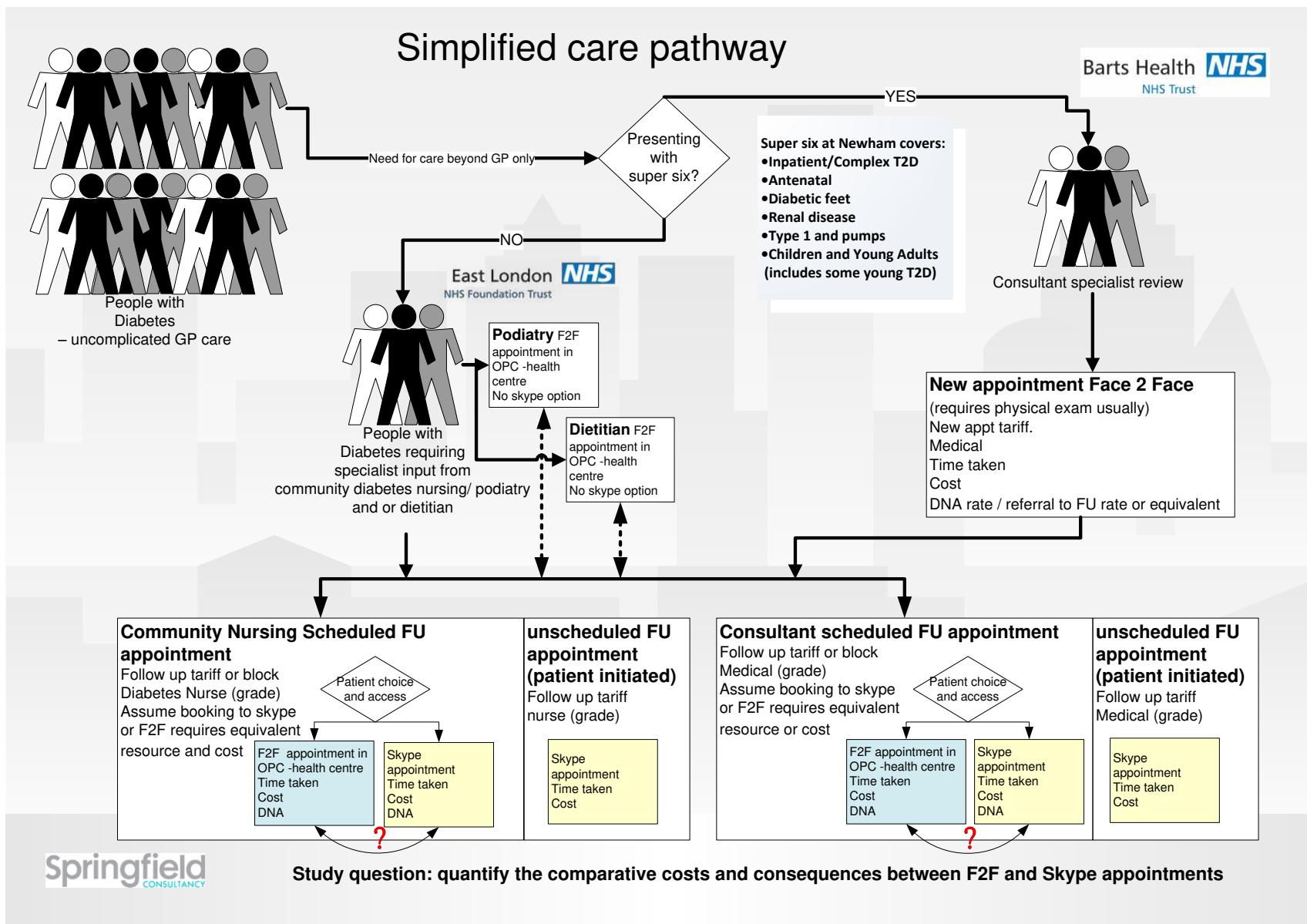
To quantify the comparative costs and consequences for the care and treatment of diabetic long terms conditions between conventional secondary care out-patient attendance and Skype based consultation.

How will the business case help others to judge the value of replicating this intervention in clinical, managerial or commissioning practice?

3 Methods

A mixed methods cost consequence analysis comparing the conventional outpatient attendance pathway vs the Skype intervention pathway in a real life setting of Newham Diabetes Service using benchmarked national costs where available. Costings for diabetes-attributable direct inputs, such as staffing time, consumables and training are used where available. Since this is a service for complex management in a long term condition, with multiple comorbidity, episodes of care and patient type are heterogeneous.

Benefits are quantified from the relative consequences of each pathway. We use the Institute for Healthcare Improvement's distinction between 'dark green dollars' (cash releasing) or 'light green dollars' (productivity gains and waste reduction that would only release cash at the scale of head count reduction or closure of facilities). Benefits from improved patient access and throughput are productivity savings 'light green dollars' unless the contractual environment means that extra patients actually results in additional income for the provider in which case this can be counted as 'dark green dollars'. Reduced actual spend from the avoidance of costly diabetes related complications are also 'dark green dollars' but these savings accrue to the purchaser not the provider.



4 Metrics

4.1 Bottom up unit costs

We have used national mean costs for staff input time (cost incurred by the provider) and national tariff (costs incurred by the purchaser in this case Clinical Commissioning Group) indicating London and Market Force Factor (MFF) multipliers that apply locally as below in tables 1 and 2.

Table 1. Staff input time with on costs.

Unit	Cost per hour	notes
Medical consultant time	£101	Mean national salary ⁴ taken from electronic staff record (ESR) Includes employer's National Insurance (14%) and management and capital on costs but excludes original training for qualification costs. Standard contracted hours without overtime /on call. Mean annual basic salary £87,060. Taken from NHS Careers (2014) <i>Pay and benefits, National Health Service</i> , London. Overall source: Unit Costs of Health and Social Care. Personal Social Services Research Unit. University of Kent 2014.
Diabetes Specialist Nurse	£51	Based on the mean full time equivalent basic salary ⁵ for Agenda For Change band 7. July 2013-June 2014 NHS staff earnings estimates for qualified nurses. Includes employer's National Insurance (14%) and management and capital on costs but excludes original training for qualification costs. Standard contracted hours without overtime. Mean annual basic salary for band 7 £38,345. Overall source: Unit Costs of Health and Social Care. Personal Social Services Research Unit. University of Kent 2014.
Clinic Receptionist	£21	Mean annual pay for band 2 administrative staff £16,282. Costs included /excluded and source as above.
Secretarial,	N/A	Costs of booking appointment and letters are equivalent between face to face or Skype. Precise costing of band 3-4 secretarial staff not available from PSSRU, nor required for differential costing.
Podiatry/ Dietitian	£32 / £33	No current Skype option available. Costs included /excluded and source as above.

4.2 Tariff income

Table 2. National Tariff for HRG (Health Related Groups) contractual costs under Payment by Results 2013-14 for outpatient attendances. Consultant –led (£)

⁴ London costs multiplier adds 1.19 (19%) typically. Barts Health NHS Trust Market Forces Factor is 1.2128 (21.28%) Actual Newham consultant costs are also inflated by excellence awards for treating consultants.

⁵ London costs multiplier adds 19% typically. Barts Health NHS Trust Market Forces Factor is 1.2128 (21.28%)

HRG	discipline	New first attendance (single professional)	New first attendance (multi professional)	Follow up attendance (single professional)	Follow up attendance (multi professional)
307	Diabetic Medicine	225	227	101	101

Local tariff for appointments classed as non-face-to-face	
Diabetic Medicine	26

Currently Skype appointments do not qualify as face-to-face and a local tariff for Skype or virtual clinics has not been agreed (see section 7.2)

5. Business case and economic findings

The demand side demographic factors in Newham described on page 2 contrive to push up activity considerably. The total number of people with diabetes in Newham is rising by >800 each year. Without the opportunity provided by Skype appointments to reduce workload, the Trust would need to expand capacity at cost and the CCG would face greater spend on tariff. Newham Diabetes Service and Newham CCG have managed to avoid both of these eventualities through innovation. This can be quantified in the cost consequence analyses below. As outlined in the introduction we have used the Institute for Healthcare Improvement's distinction between 'dark green dollars' (cash releasing) or 'light green dollars' (productivity gains and waste reduction that would only release cash at the scale of head count reduction or closure of facilities).

5.1 Implementation and project management costs (non-recurring set up)

The following are actual costs from the implementation phase of the DAWN project⁶ and are therefore non- recurring. Recurring costs would be limited to small amount of telehealth staff training/retraining and IM&T support which can be absorbed into business as usual.

Table 3. Set up costs year 1.

item	Cost £	notes
Project management time	£20,000	Project management: <ul style="list-style-type: none"> • Change management • IM&T • Training
Clinical Lead time	£17,510 £3,113	Clinical Leadership: Consultant 2 PAs Nurse lead
Webcams and headsets	553	Given free to patients who required these to

⁶ Research costs have been removed as a component of the project management costs.

for patients		participate
Communication and patient information	236	
Total	£41,412	

Table 4. Recurring costs year 2 onwards.

item	Cost £	notes
Staff time	£9,500	Project management Training refreshers /new staff IM&T support
Webcams and headsets for patients	500	Depreciation and replacement of IT equipment.
Total	10,000	estimate

5.2 'Light Green' savings from increasing productivity and throughput (potential for 'Dark Green' where contracts allow for tariff income from additional appointments)

For the Consultant led clinics the current patterns of Skype use and clinic booking have produced a 22% increase in throughput for follow up appointments compared to attendance only clinic. This accrues from the reduced duration of Skype appointments enabling the booking of more appointments into the clinic. Appointment duration and clinic capacity for each scenario are shown below. Current practice of blended clinic offering patient choice is shown in bold in the grey banded row. Administrative time for notes and letters is equivalent in all scenarios.

Table 5 Consultant led clinic productivity

Scenario	Duration of appointments Minimum /mean/ maximum	Outpatient clinic capacity. (clinics run half day am or pm)	Advantage % increase in productivity throughput
Base case: Attendance clinic	Minimum 20 minutes/ mean of 25 minutes/ max 45 minutes	8-10 patients per clinic	0%
Current case: Blended clinic with attendees (n=9) and Skype (n=2)	Face to Face Minimum 20 minutes/ mean of 25 minutes/ max 45 minutes ----- Skype Minimum 5 minutes/ mean of 9 minutes/ max 15 minutes	10-12 patients per clinic	22%
Enhanced case: Skype only clinic	Minimum 5 minutes/ mean of 9 minutes/max 15 minutes	Potential for 25 patients per clinic	178%

Table 6.Consultant led clinic; impact on income and costs by scenario

Scenario	Outpatient clinic capacity ⁹ .	Tariff income* to Trust per clinic at national face-to- face with MFF and local non-face-to-face tariff	Tariff income± to Trust per clinic at national face-to- face with MFF and locally agreed Skype tariff at 50% of face-to-face (£61.25)	Actual cost of consultant time - national per contact (per clinic ⁷) £	Actual cost of consultant time - with London multiplier of 1.19 per contact (per clinic ⁹) £
Base case: conventional clinic	8-10 patients per clinic	1,102.5	1,102.5	48 (429)	57 (511)
Current case: Blended clinic with attendees (n=9) and Skype (n=2)	10-12 patients per clinic	1,102.5 + 52 = 1154.5	1,102.5 + 122.5 =1225	39 (429)	46 (511)
Enhanced case: Skype only clinic	Potential for 25 patients per clinic	650	1,531.25	17 (429)	20 (511)

*Potential for 'dark green' benefits through increase income on tariff by activity is mitigated by CCG contractual understanding that activity will not grow beyond historical levels. CCGs are seeking to control risk of rising costs where payment is determined by activity.

± No agreement has been reached in Newham on a Skype or virtual tariff and Skype activity currently qualifies for non-face to face tariff or is included in block.

In effect therefore the increase in productivity and throughput could be realised financially by reducing the number of clinics and deploying the consultant time in other income generating activity. Ultimately this may accrue into cash through release of a part time post or reduced consultant PAs.

Diabetes Nursing is provided by East London NHS Foundation Trust FT who hold a service level contract with Barts Health to provide 4 hours/week of specialist nursing for 16-25 year old patients with diabetes. Activity for the Diabetes Specialist Nurses is covered by a block contract so any extra activity cannot be readily converted into income. Cash releasing savings would only be made at scale where fewer clinics and sessional activities were needed.

⁷ Clinic duration at Newham is 255 minutes (4 hours 15 minutes) on average not including time spent ordering tests and doing letters.

We have data from the young adults clinics as presented here but the Skype training has been provided to all community diabetes nurses with plans for routine use from 2015. They are also commencing a Thursday evening clinic again offering a Skype option. Conventional face to face appointments are more variable in length than consultant led appointments (maximum of 90 minutes for complex cases). The reductions afforded by the option of blended Skype appointments in terms of productivity and reduced time and input costs as shown in tables 7 and 8 below.

Table 7. Specialist Nurse clinic productivity

Scenario	Duration of appointments Minimum /mean/ maximum	Outpatient clinic capacity. (clinics run half day am or pm)	Advantage % increase in productivity throughput
Base case: Attendance clinic	Minimum 15 minutes/ mean of 30 minutes/ max 90 minutes	7 patients per clinic	0%
Current case: Blended clinic with attendees (n=9) and Skype (n=4)	Minimum 15 minutes/ mean of 30 minutes/ max 90 minutes ----- Skype Minimum 5 minutes/ mean of 9 minutes/ max 15 minutes	8-10 patients per clinic	28%
Enhanced case: Skype only clinic	Minimum 5 minutes/ mean of 9 minutes/max 15 minutes	Potential for 15 patients per clinic	114%

Table 8. Specialist Nurse clinics; impact on income and costs by scenario

Scenario	Outpatient clinic capacity.	Income: Block contract so changes in activity are cost neutral £	Actual cost of Specialist Nurse time - national per contact (per clinic ⁸) £	Actual cost of Specialist Nurse time - with London multiplier of 1.19 per contact (per clinic ¹⁰) £
Base case: Attendance clinic	7 patients per clinic	0	29 (204)	35 (243)
Current case: Blended clinic with attendees (n=9) and Skype (n=2)	8-10 patients per clinic	0	23 (204)	27 (243)
Enhanced case: Skype only clinic	Potential for 15 patients per clinic	0	13.5 (204)	16 (243)

⁸ Clinic duration at Newham is contracted for 225 minutes (4 hours).

5.3 'Light green' balancing factors -unscheduled Skype activity

Productivity savings have been offset in practice by a rise in patient initiated unscheduled appointments. Increased access to clinicians in an unscheduled (but non-urgent) manner is tolerated by the Newham clinicians who are seeking to engage flexibly with patient need and choice. This has proved popular with patients and in terms of costs adds to clinician time but as each impromptu appointment is being recorded as a contact they are charged in the same way as a scheduled appointment. Approximately 50% of all webcam appointments in 2013/15 were unscheduled but unscheduled Skype appointments are typically only a few minutes in duration.

The following vignettes demonstrate the value in these flexible contacts for engaging challenging and vulnerable patients:

A hard to engage patient and chronic non-attender (82% of previous appointments) had recently missed a scheduled webcam appointment but had already agreed in principle to a webcam appointment and was already a 'contact' of the nurse on Skype. In 2012 the nurse saw that the patient was on Skype and made contact through the system. The patient agreed to an impromptu consultation. This patient had only had one other appointment since July 2007.

A vulnerable patient with type 1 diabetes using an insulin pump, had a miscarriage during pregnancy a few years ago. During a recent pregnancy, she had 42 brief Skype-based self-initiated nursing appointments as she struggled with insulin requirements and blood glucose control. She delivered a baby girl without any problems, and felt pregnancy was more positive experience this time.

5.4 'Light Green' process savings from the reduction in missed appointments (did not attend -DNA).

DNAs are a significant cause of waste in the NHS. More clinically significant however is that failure or partial failure to engage in treatment and associated diabetes related complications (see section 5.4)

Table 9 Baseline DNA rates before Skype (figures from DREAMS study) are shown below

Baseline Period	Clinician		Attended		Total appointments	Overall DNA rates %	
			No	Yes			
2007 to June 11	Consultant Physician	25 and under	202	189	391	52%	Combined effective rate 33%
		over 25s	478	1209	1687	28%	
	Diabetes Specialist Nurse	all	972	3092	4064	24%	

Service changes, including a merger of Newham University Hospital NHS Trust into Barts and The London NHS Trust, has made DNA data recording between the two time periods unreliable.

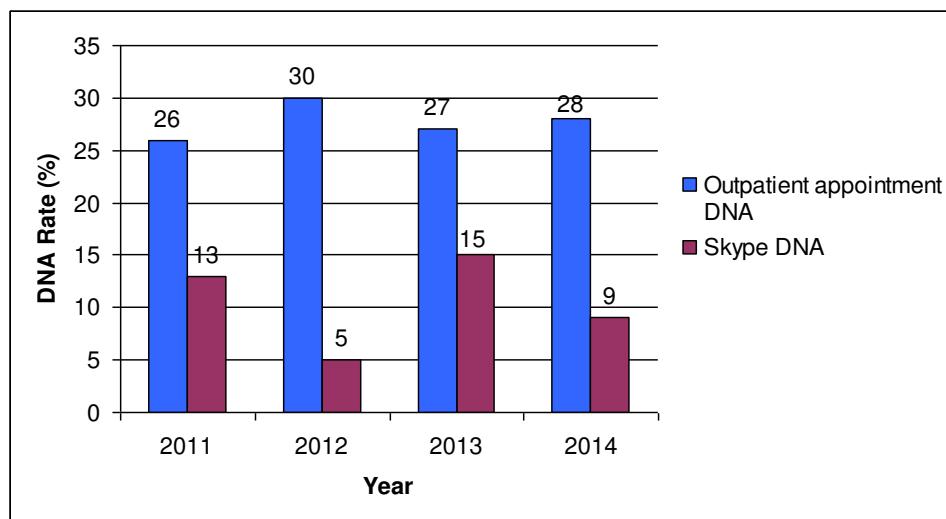
We are therefore reliant upon the DREAMS study data to determine estimates of DNA changes between the two service offers. DREAMS only analysed changes in DNA for a small subset of 104 clinic attendees, namely those patients that used Skype. It could be argued that patients consenting to Skype are likely to be more engaged and activated. Comparison of their DNA rates for conventional appointments however shows a similar rate to all patients. We can be confident than that Skype does confer advantages for missed appointments when offered and that these contribute to the business case. We can only cost these advantages however for the small subset of Skype users.

Group 1. Used Skype at least once N=104

Group 2. Active users used skype more than once N=60

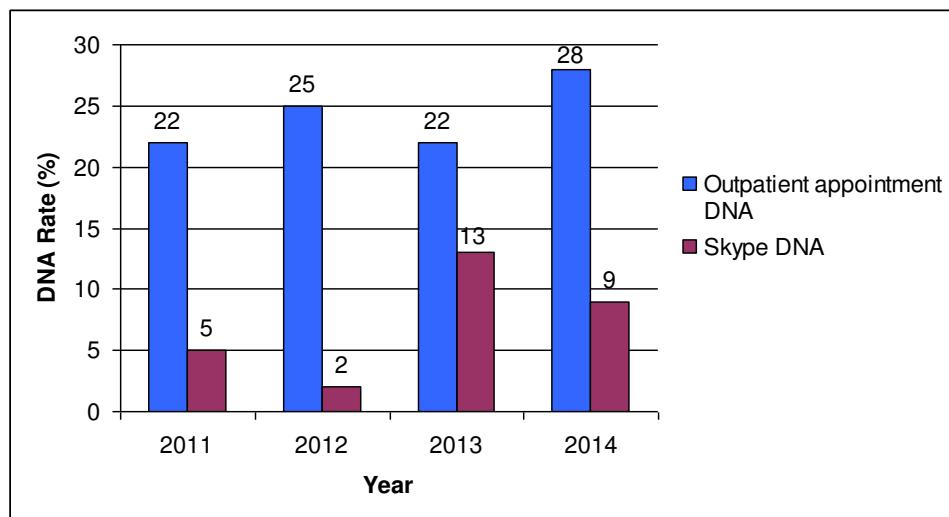
Charts below shown patterns of DNA between the two treatment modalities for these groups.

Figure 1: Comparative DNA Rates for scheduled outpatient and Skype appointments for all Skype users (all patients who used Skype at least once N=104) during 2011-2014



The total number of outpatient appointments for this sample during this time was 1644 with an average DNA rate of 28%. The total number of Skype appointments within this sample for the same period was 480 with an average DNA rate of 13%.

Figure 2: Comparative DNA Rates for scheduled outpatient and Skype appointments for subset of active users (used skype more than once N=60) during 2011-2014



Total number of outpatient appointments for active users was 941 with an average DNA rate of 24%. Total number of Skype appointments was 376 with an average DNA rate of 7%.

Using the regular skype user sample of 60 patients this confers 237 appointments attended that would not have been attended as conventional appointments. (the difference in appointments between 24% of total appointments and 7%). Were these to be converted into tariff income at the Newham follow up tariff of £122.50 this amounts to £29,032.50 or £9,677.50 per annum. The more patients converted to Skype the greater the reduced waste from DNA.

5.5 'Dark Green' savings to CCG from avoided complications and urgent care use

Poor adherence to treatment is empirically linked to adverse outcomes and this section details the evidence and costs associated with this. We have shown that Skype confers advantages for engagement and adherence through reduced DNAs for scheduled appointments but also the facility for unscheduled appointments⁹. Complications incur tariff costs to the commissioners. The Newham DREAMS study undertook complex statistical analysis of one such high cost complication: A&E attendance. Project data concluded that the event rate is lower for Skype participants but that these findings should be treated with caution. The service has also conducted a basic audit of high cost A&E attenders and tracked those who went on to use Skype to show reduced service utilisation. Taking A&E attendance and diabetic ketoacidosis (DKA) admission costs only we can offer a sensitivity analysis based on low, base and high annual event avoidance numbers for these complications from these information sources.

⁹ It should be noted that the Newham diabetes service does not advocate to patients that they should use unscheduled skype appointments for emergencies.

Table 10. Sensitivity analysis on avoided A&E and DKA episodes

Complication event	Low n (£ saving)	Base n (£ saving)	High n (£ saving)
A&E attendance n	5 (£610)	10 (£1,220)	20 (£2,440)
DKA admission n	5 (£8500)	10 (17,000)	20 (£34,000)
Total saving to CCG	£9,110	£18,220	£36,440

Action for Diabetes published by NHS England in 2014 itemises the potentially avoidable complications and associated costs to the health economy:

Diabetes is estimated to have cost the UK £9.8 billion in direct costs in 2010/2011, this equates to approximately ten per cent of the total health resource expenditure.

It is estimated that 80 per cent of these costs are incurred in treating potentially avoidable complications.

Diabetes is a major cause of premature mortality with over 22,000 additional deaths each year.⁶

Diabetes doubles the risk of cardiovascular disease (heart attacks, heart failure, angina, strokes).

Diabetes is the most common reason for end stage kidney disease and the most common cause of blindness in people of working age.

Up to 100 people a week have a limb amputated as a result of diabetes, and in many cases this is avoidable.

Nearly 1 in 5 people with diabetes have clinical depression and for those with anxiety and/or depression health care costs increase by around 50%.

Diabetes related complications are empirically linked to engagement and treatment adherence. The Joint British Diabetes Societies for Inpatient Care (JBDS – IP) report titled Admissions avoidance and diabetes: guidance for clinical commissioning groups and clinical teams

About half of DKA hospitalisations could be avoided with better outpatient and self-delivery of care^{10,11}. One study of a multi-ethnic population identified that of 167 admissions with DKA over a one year period, 18% were due to acute illness, 23% due to new-onset diabetes and 59% due to non-compliance. A significant proportion of DKA admissions are due to recurring episodes in a minority of adults. Risk factors for DKA include higher mean A1c level, higher reported insulin dose, puberty, female gender, lower socioeconomic status and the coexistence of psychiatric disorders.

¹⁰ Kaufman F R, Halvorson M. The treatment and prevention of diabetic ketoacidosis in children and adolescents with type I diabetes mellitus. *Pediatric Annals* 1999;28:576-82.

¹¹ Curtis J R, To T, Muirhead S, Cummings E, Daneman D. Recent trends in hospitalization for diabetic ketoacidosis in Ontario children. *Diabetes Care* 2002;25:1591-6.

2012-13 saw 10650 people admitted to hospital with diabetic ketoacidosis (DKA) nationally. One third of all DKA admissions (n= 3118) were in the 16-25 age group.

A&E only attendance without admission tariff is between £78 and £237 according to severity category¹². For the DREAMS study we quoted an average cost of an A & E attendance as £122 with significantly higher costs for patients with diabetes requiring ITU/ HDU spells. Each DKA admission costs approximately £1700¹³.

Avoidable complications from suboptimal engagement in treatment include foot ulceration and amputation. In 2010-11, the NHS in England spent an estimated £639 million–£662 million, 0.6–0.7% of its budget, on diabetic foot ulceration and amputation¹⁴. The same economic review itemised spending on primary, community, and outpatient care including A&E of just ulceration in people with diabetes. This accounted for half the cost at £324 million in 2010/11 as shown below with out patients the largest proportion of cost.

6 Other costs

Translation costs of £26 per hour are borne by the Diabetes Service. The DAWN study produced qualitative data showing patients reporting that it is easier to use a relative to translate for them whilst having a Skype appointment at home, compared to having an appointments at the clinic.

Patients on eligible welfare benefits or qualifying as a result of a low income are able to claim a refund on travelling to hospital for NHS treatment under a consultant. This includes bus and train fares, or petrol costs. We do not have activity data on hospital transport costs reimbursed to patients.

6.1 'Dark Green' Financial savings for patients

Savings for patients are uncomplicated and actual. Savings are estimated from questions included in patient questionnaires used for the DAWN project:

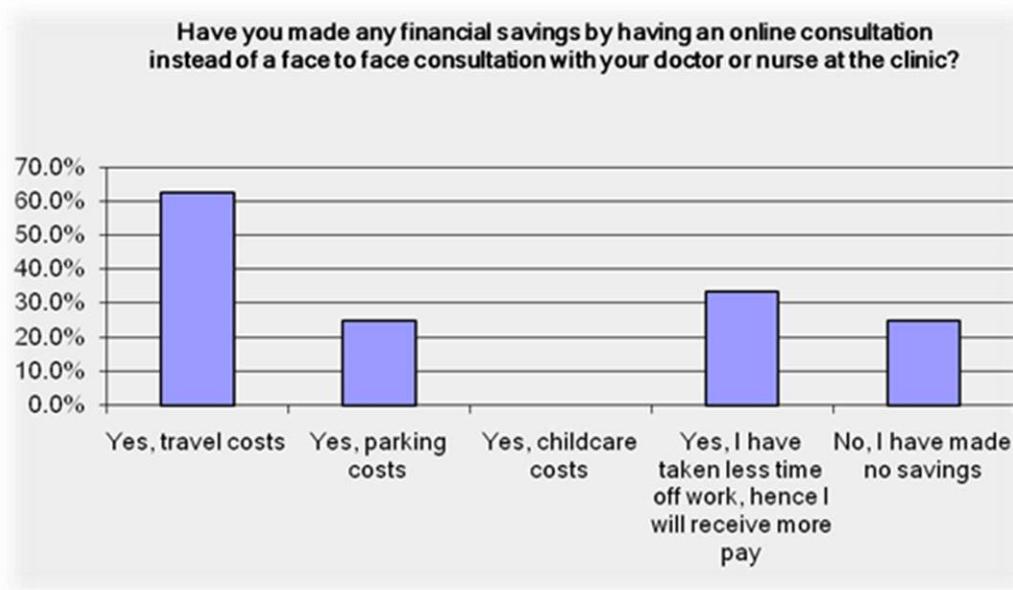
¹²PbR tariff information spreadsheet 2013-14.

¹³Source presentation from Nottingham Children's Hospital on Diabetes Paediatric Best Practice Tariff accessed 5-7-15 at:

<http://www.leicestershirediabetes.org.uk/uploads//documents/Tabitha%20Randell%20-%20Best%20Practice%20Tariff%20and%20transition.pdf>

¹⁴ Foot Care for People with Diabetes: The Economic Case for Change. Marion Kerr. Insight Health Economics, NHS Diabetes 2012.

Fig 3 savings by type:



Six of 18 respondents said that taking less time off work to attend appointment has impacted their pay.

Have you saved time by having an online consultation instead of a face to face consultation at the clinic? (18 respondents answered yes)

If you have made any financial savings by having an online consultation, can you estimate how much for each online consultation?

Answer Options	Response Percent	Response Count
Less than £5	44.4%	8
From £5 - £10	16.7%	3
From £10 - £50	22.2%	4
From £50 - £100	16.7%	3

Mean (median) savings per patient from exercising Skype appointment option from mid-point of each range = £17.36 (£22.50)

Have you saved time by having an online consultation instead of a face to face consultation at the clinic? (24 responses)

Answer Options	Response Percent	Response Count
No	12.5%	3
Yes	87.5%	21

Time saved by each webcam appointment ranged from 10 minutes to 5 hours (22 responses).

Time saved each patient	Number of patients	Total time saved
10 minutes	1	10 minutes
20 minutes	1	20 minutes
30 minutes	2	60 minutes
45 minutes	1	45 minutes
1 hour	3	3 hours
1.5 hours	3	4.5 hours
2 hours	5	10 hours
2.5 hours	1	2.5 hours
3 hours	2	6 hours
3.5 hours	1	3.5 hours
4 hours	1	4 hours
5 hours	1	5 hours
Average time saved per patient = 1 hour 38 minutes each (including the 3 patients who saved no time)		

7 Commissioning implications and models

The NHS is effectively rationed and commissioners must ensure value for money and allocation of resources between competing priorities. Payment mechanisms are important determinant in impeding or promoting innovative service delivery models. We have demonstrated that set up and 'retooling' costs can be recovered in year 1. To achieve sustainable and safe change in complex health systems requires project management, some technological expertise, senior clinical and executive sponsorship, and effective communication of benefits and minimising extra workload. These add transaction costs in year 1, detailed in sections 1.5 and 5.1 of this report. In comparison year 2 and future recurring costs are limited to maintenance of the system, depreciation and replacement of IT equipment and any additional training needed. These costs apply to most provider activities and are not any higher in the Skype case.

Many providers are locked into short term concerns about balancing year end budgets. Commissioner savings arise from whole system benefits relating to downstream costs of avoiding complications and public health, as well as the avoidance of simply having to fund more activity and resource as a result of the rising demand outlined in section 2.1

Pragmatic and collaborative approaches between providers and commissioners would involve agreeing to share the modest costs and any associated risks during the implementation period.

Option A -CQUIN

A good example of this would be to use the flexibility of local indicators in the Commissioning for Quality and Innovation (CQUIN) mechanism. An example is given below in 7.1. CQUIN payment frameworks are set each year and enable commissioners to reward excellence, in effect giving providers extra income providing they achieve local quality improvement goals.

Option B – retain face to face tariff pro tem or only marginally reduce tariff

Any renegotiation of tariff and activity caps should take into account development and running costs. For some conditions provider activities are paid on a face to face consultation and a much reduced tariff for telephone consultation. Immediately reducing tariff for virtual consultations or web based consultations equating them to telephone consultation would be a clear disincentive. The counter argument for providers is that without the use of web based consulting providers would be asking for increased funding for staff time to meet demand. Wait times and access would be damaged and patient advocacy groups would agitate for a response

The Newham team have had initial conversations with the Monitor pricing team and other experts. It has been suggested by some informants that a blended model of Skype may lend itself to a year of care tariff. Given experience of the complexity of introducing Payment by Result payment mechanisms into longer term conditions (e.g. in mental health) this approach should be treated with caution. Diabetes patients are not homogeneous and aggregating and bundling costs over a year would introduce many uncertainties. The complexity is beyond that of local health economies and this would need to be tackled at a National level if it were thought to be worth pursuing. The main rationale for year of care would be to incentivise providers to avoid complications if low complication rates were bundled into diabetic year of care tariffs, i.e. providers were not paid for DKA, diabetic ulceration, etc.

7.1 Case study. Payment incentive vignette

Another Health Foundation funded innovation project has implemented a virtual clinic for routine follow up of total hip and knee replacements. British Orthopaedic Association guidelines recommend following up hip and knee replacement patients at one, five and every subsequent five years following surgery. This is currently done via relatively brief face-to-face appointments and review of x-rays. These follow-ups consume considerable NHS resource at tariff cost of £72 for each consultant-led appointment at outpatient clinics. The service is working towards clinic utilisation where 5 virtual appointment s can be conducted in the time allocated for 2 face to face appointments.

The Royal Cornwall Hospital Trust uses a web-based system called 'My Clinical Outcomes' <http://www.myclinicaloutcomes.com/> that allows Patient Reported Outcome Measures (PROMs) on symptoms such as pain and function to be sent in by the patient for review. An x-ray film taken close to the patient's home can be viewed by the orthopaedic surgeon electronically together with PROMS scores in the virtual clinic and the review and any actions communicated to the patients electronically. The platform provides patients with more information about their condition and a way to monitor progress and is proving acceptable to patients who save on travel time in a rural dispersed population country setting.

Through partnering collaboratively with local commissioners implementation of the new system has been supported by agreement of a CQUIN incentive payment in 2015-16. The face to face tariff of £72 has also been retained *pro tem* so as not to disincentivise adoption. Agreement of a virtual tariff is deferred until fuller evaluation of benefits in a mature service has been established.

7.2 Case study: *Payment disincentive vignette*

The project 'E-health for SMI patients', has been running since 2008 in several Dutch mental health providers to improve self-management of patients with Severe Mental Illness (SMI) and to provide an accessible solution for community care in more rural dispersed populations. Patients are provided with a touchscreen device with an integrated camera in their home. This system enables them to have audio visual contact with a mental health professional (MHP) (telecare), but also with friends, family and peers including other patients where consenting.

The project has reached a level of replacing 12-15% of contacts with the web based technology.

Providers are reimbursed through a National system of Diagnosis Treatment Combinations (DBC). The DBC system pays for spells of care from the first consultation until final follow-up check after the treatment. The average tariffs for each DBC include the costs of medical specialist care, nursing care, and the use of medical equipment and diagnostic procedures. This is similar to Mental Health Payment by Results spells in the UK or other year of care bundled payments.

SMI providers are paid by DBC but also have to evidence contact time. For the 'E -health for SMI project' this payment model is a disincentive since they are supplying an expensive platform and the kit to the patient and at a level of 12-15% substitution they are not realising sufficient staff time savings to balance costs . They do not have a business model yet where they can give the patient this technology in routine care settings.

8. Further reading

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