Supplementary file 2. Site and participant characteristics

Table 1. Summary of characteristics of included sites

Characteristic		Number of sites
Region	London	5
	South West	7
	South East	5
	North West	5
	North East	2
	East Midlands	2
	East of England	1
	Yorkshire and Humber	1
Size of population	<250,000	4
	250,000-500,000	8
	500,000-1 million	11
	>1 million	5
% Urban (% rural)	65-80 (20-35)	9
	80-95 (5-20)	9
	95-100 (0-5)	10
Deprivation	**% of population in most deprived quintile**	
	0-15	13
	15-25	7
	25-50	7
	50+	1
	% of population in least deprived quintile	
	0-15	13
	15-25	7
	25-50	8
	50+	0
Ethnicity (% of population non-white)	0-5	8
	5-15	11
	15-30	4
	30-50	3
	50-65	2

Table 2. Staff survey demographics

	Service managers/clinical leads (n=70)	Delivery staff (n=222)	Total (n=292)
Professional role within the service n (%)*			
Clinical	49 (70)	157 (71)	206 (71)
Non-clinical	23 (33)	63 (28)	86 (29)
Student	1 (1)	4 (2)	5 (2)
Other	4 (6)	0	4 (1)
Redeployed n (%)			
Yes	7 (10)	71 (32)	78 (27)
No	52 (74)	131 (59)	183 (63)
Not applicable	11 (16)	20 (9)	31 (11)
Length of time involved in the service n (%)			
< 1 month	1 (1)	13 (6)	14 (5)
1-3 months	14 (20)	91 (41)	105 (36)
4-6 months	37 (53)	81 (37)	118 (40)
7-9 months	13 (19)	18 (8)	31 (11)
> 10 months	5 (7)	19 (9)	24 (8)
Where based for the service n (%)			
Remotely	30 (43)	106 (48)	136 (47)
Hot hub	8 (11)	23 (10)	31 (11)
GP practice	6 (9)	7 (3)	13 (4)
Hospital	15 (21)	32 (14)	47 (16)
Other	11 (16)	54 (24)	65 (22)
Mode of monitoring n (%)			
Tech-enabled and analogue	53 (76)	173 (78)	226 (77)
Analogue-only	17 (24)	49 (22)	66 (23)

Note. Service leads n=70 and delivery staff n=222 unless specified.

*Respondents were able to select more than one response

Table 3. Demographic characteristics for patient and carer survey respondents

		n (%)
Survey respondent	Patient	936 (87.6)
	Carer	48 (4.5)
	Unknown	85 (8)
	Total	1069 (100)

Demographic characteristic		Patient n (%)	Carer n (%)
Gender (patient n=920; carer n=45)	Female	531(58)	27 (60)
	Male	385 (42)	18 (40)
	Other/prefer not to say	4 (0.4)	0
Age (patient n=923; carer n=46)	Under 50 years	195 (21.1)	13 (28.3)
	50-64 years	428 (46.4)	24 (52.2)
	65-79 years	256 (27.8)	4 (8.7)
	>=80 years	43 (4.7)	5 (10.9)
	Prefer not to say	1 (0.1)	0
Living circumstances (patient n=863)	Living alone	132 (15.3)	
	Household of 2	339 (39.3)	
	Household of 3	152 (17.6)	
	Household of 4/5/	201 (23.3)	
	Household of 6+	36 (4.2)	
	Prefer not to say	3 (0.3)	
Ethnicity (patient n=918; carer n=47)	White British/English/Welsh/Scottish/ Irish or any other white background	836 (91.1)	38 (80.9)
	Black/African/Caribbean/Black British or any other Black background	16 (1.7)	0
	Asian/Asian British or any other Asian background	48 (5.2)	9 (19.1)
	Mixed or multiple ethnic background	12 (1.3)	0
	Any other ethnic group	2 (0.2)	0
	Prefer not to say	4 (0.4)	0
Highest educational qualification (patient n=914; carer n=46)	No formal qualification	146 (16)	10 (21.7)
	GCSE/CSE/O level or equivalent	273 (29.9)	16 (34.8)
	A level/AS level or equivalent	106 (11.6)	8 (17.4)
	Degree level or higher	212 (23.2)	7 (15.2)
	Other	80 (8.8)	1 (2.2)
	Prefer not to say/not sure	97 (10.6)	4 (8.7)
Age completed full time education (patient n=791; carer n=28)	15 years or under	146 (18.5)	4 (14.3)
	16 years	267 (33.8)	7 (25.1)
	17-18 years	163 (20.6)	12 (42.9)
	19-21 years	104 (13.1)	2 (7.1)
	>21 years	99 (12.5)	3 (10.7)
	Prefer not to say	12 (1.5)	0 (0.0)
Work situation* (patient n=969; carer n=45)	Working full time/self-employed	396 (41.9)	17 (35.4)
	Working part time	128 (13.5)	6 (12.5)
	Student in higher education	2 (0.2)	0
	Unemployed	18 (1.9)	3 (6.3)
	Homemaker/ Full time carer	40 (4.2)	4 (8.4)
	Retired	274 (29)	9 (18.8)
	Furloughed	15 (1.6)	0
	Not in work due to poor health or disability	65 (6.9)	5 (10.4)
	Other/prefer not to say	31 (3.3)	1 (2.1)

Sexual orientation (patient n=919; carer n=44)	Straight/heterosexual	858 (93.4)	41 (93.2)
	Gay or lesbian	13 (1.4)	0
	Bisexual	5 (0.5)	0
	Other/Prefer not to say	43 (4.7)	3 (6.8)
English as first language (patient n=925; carer n=43)	Yes	852 (92.1)	35 (81.4)
	No	66 (7.1)	8 (18.6)
	Prefer not to say	7 (0.8)	0
Day to day activities limited by a health problem or disability (patient n=920; carer n=46)	Limited a lot or a little	351 (38.1)	20 (43.4)
	Not limited at all	482 (52.4)	17 (37)
	Prefer not to say/Not sure/not applicable	87 (9.4)	9 (19.6)
Deprivation score (patient n=767; carer n=37)	D1 or D2 (Most deprived)	182 (23.7)	13 (35.1)
	D3 or D4	137 (17.9)	5 (13.5)
	D5 or D6	149 (19.4)	7 (18.9)
	D7 or D8	161 (21)	9 (24.3)
	D9 or D10 (Least deprived)	138 (18)	3 (8.1)
Relationship to patient (carer n=42)	Spouse or partner		24 (57.1)
	Son or daughter		11 (26.2)
	Other		7 (16.7)

*Respondents able to select more than one option

Table 4. Staff interview demographics

Staff characteristics	Interview participants (n=58)	
Gender	Female	38
	Male	20
Role in remote monitoring	Service lead	23
	Delivery staff	28
	Data lead	7
Job role categorisation*	Senior clinical lead/doctor equivalent roles	18
	Nursing and allied healthcare professional roles	19
	Administrative roles**	4
	Management/operational team roles	16
	Not known	1
Mode of monitoring used	Analogue-only	11
	Tech-enabled	47

Notes: *Job roles reported in interviews and categorised by two researchers (MS & HW), **e.g. administrators / healthcare assistants involved in monitoring

Table 5. Demographic characteristics for patient and carer interview respondents

Demographic characteristic		Patient n (%)*	Carer n (%)
Patient or carer who took part in the interview		59 (95%)	3 (5%)
Gender	Female	31 (50%)	3 (100%)
	Male	31 (50%)	0
Age	Under 50 years	8 (13%)	2 (67%)
	50-64 years	31 (50%)	
	65-79 years	21 34%	1 (33%)
	>=80 years	2 (3%)	
Living circumstances	Live alone	5 (8%)	
	Household of 2	36 (58%)	2 (67%)
	Household of 3	11 (18%)	
	Household of 4-5	9 (15%)	
	Household of 6+	1 (2%)	1 (33%)
Home ownership/renting	Own home outright	26 (42%)	1 (33%)
	Own home with mortgage	16 (26%)	1 (33%)
	Own home (not specified)	3 (5%)	
	Rent from local authority/house association	9 (15%)	
	Rents privately	6 (10%)	
	Other	2 (3%)	1 (33%)
Ethnicity	White British/English/Welsh/Scottish	50 (81%)	
	White Irish		
	Any other white background		
	Black/African/Caribbean/Black British	3 (5%)	
	Asian/Asian British	7 (11%)	2 (67%)
	Missing	1 (2%)	1 (33%)
	Not enough information	1 (2%)	
Age completed full time education of	15 years or under	13 (21%)	
	16 years	21 (34%)	
	17-18 years	16 (26%)	
	19-21 years	5 (8%)	
	>21 years	5 (8%)	1 (33%)
	Not known	2 (3%)	2 (67%)
Highest educational qualification	No formal qualification	14 (23%)	
	GCSE/CSE/O level or equivalent	21 (34%)	
	A level/AS level or equivalent	5 (8%)	
	Degree level or higher	14 (23%)	2 (67%)
	Other	7 (11%)	

	Not sure	1 (2%)	1 (33%)
Work situation	Working full time	25 (40%)	2 (67%)
	Working part time	1 (2%)	
	Self-employed	2 (3%)	
	Not working	1 (2%)	
	Homemaker	2 (3%)	
	Retired	23 (37%)	
	Furloughed	1 (2%)	
	Not in work due to poor health or disability	7 (11%)	
	Not sure	0 (0%)	1 (33%)
Sexual orientation	Straight/heterosexual	62 (100%)	3 (100%)
English as first language	Yes	54 (87%)	3 (100%)
	No	7 (11%)	
	Not specified	1 (2%)	
Day to day activities limited by a health problem or disability	Yes limited a lot	6 (10%)	
	Yes limited a little	6 (10%)	
	Limited (but not specified how much)	4 (6%)	
	No not limited at all	46 (74%)	2 (67%)
	Not known		1 (33%)
Relationship to patient	Spouse or partner		1 (33%)
	Son or daughter		2 (67%)

Note. *59 patients took part in the interviews, but we have demographic characteristics for 62 patients as carers reported patient demographics too

Table 6. Number of patients in programme's pathways, by CO@h services and data submission mode

Throughput and outcome	CO@h service		CVW service		Tech-enabled with Analogue mode				Analogue-only mode			
					CO@h service		CVW service		CO@h service		CVW service	
	No. of patients	% of monitored patients	No. of patients	% of monitored patients	No. of patients	% of monitored patients	No. of patients	% of monitored patients	No. of patients	% of monitored patients	No. of patients	% of monitored patients
Patients triaged	26,126	149.9%	1,761	103.0%	18,906	141.3%	706	105.2%	7,219	178.5%	1,056	101.5%
The average number per site	1,188		135		1,212		500		1,267		660	
Patients monitored	17,424	100.0%	1,711	100.0%	13,379	100.0%	671	100.0%	4,045	100.0%	1,040	100.0%
The average number per site	792		132		865		457		735		637	
Patients deteriorated and escalated	2,898	16.6%	185	10.8%	2,352	17.6%	83	12.4%	547	13.5%	101	9.7%
Deaths	160	0.9%	12	0.7%	117	0.9%	5	0.8%	43	1.1%	7	0.7%
Patients deteriorated and escalated	No. of patients	% of deteriorated & escalated patients	No. of patients	% of deteriorated & escalated patients	No. of patients	% of deteriorated & escalated patients	No. of patients	% of deteriorated & escalated patients	No. of patients	% of deteriorated & escalated patients	No. of patients	% of deteriorated & escalated patients
ED	2,240	77.3%	135	73.0%	1,295	55.0%	58	70.1%	946	173.0%	76	75.4%
Admitted to the hospital	1,257	43.4%	161	87.2%	855	36.4%	62	73.9%	402	73.4%	99	98.2%
ICU	403	13.9%	7	3.5%	389	16.5%	2	2.8%	15	2.7%	4	4.1%
Primary care	1,806	62.3%	73	39.4%	1,546	65.7%	73	87.4%	260	47.6%	0	0.0%

Source: Based on data provided by each site.

Notes: 1.Since some of the patients were not eligible for remote monitoring, the number of patients triaged was higher than the number of patients monitored.
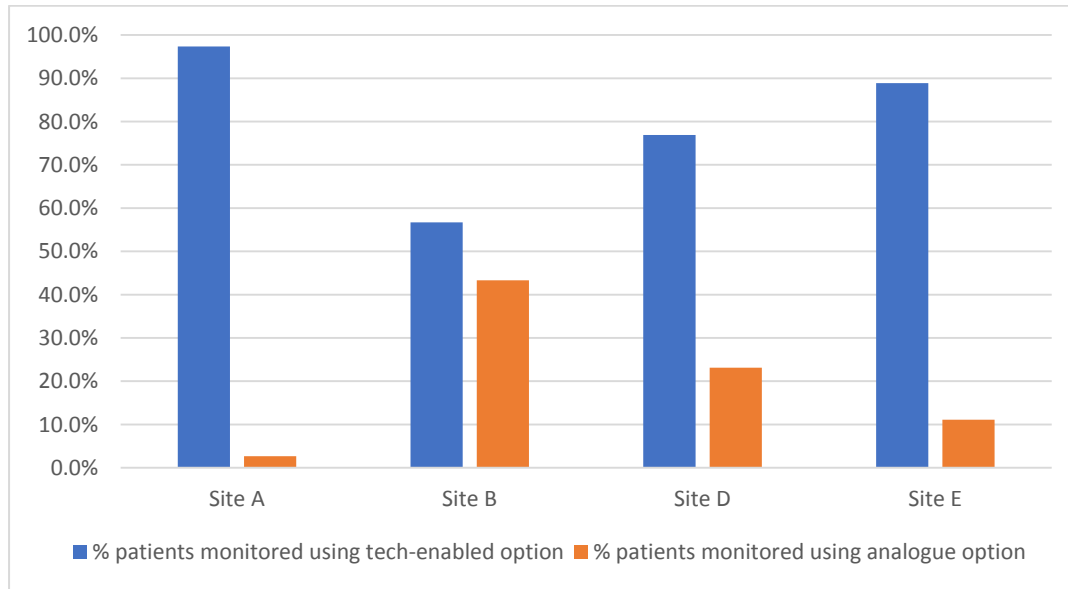
2. Please note that patients who were escalated to other services may have experienced more than one of these other services, which explains why the sum of the percentages in the second part of the table exceeds 100%.

Table 7. The proportion of clinical and non-clinical staff involved in monitoring patients

Type of site (by no. patients)	Number of sites*	Mean number of staff (FTE equivalent)	Non-clinical staff (FTE equivalent)			Clinical staff (FTE equivalent)			
			Total number of non-clinical staff (%)	Total number of Band 6+ (as % over the total)	Total number of Band 5 & below (as % over the total)	Total number of clinical staff (%)	Total number of Band 8+ (as % over the total	Mean number of Band 6-7 (as % over the total)	Total number of Band 5 & below (as % over the total)
CO@h service									
The total sample									
Very small sites (0-200 patients)	3	3.7	3.2 (28.7%)	1.8 (16.6%)	1.3 (12.0%)	7.9 (71.3%)	0.3 (2.5%)	2.8 (24.9%)	4.9 (43.9%)
Small sites (201 - 600 patients)	6	4.2	7.9 (31.6%)	1.1 (4.3%)	6.8 (27.3%)	17.1 (68.4%)	8.0 (6.4%)	6.6 (26.3%)	2.6 (10.2%)
Medium sites (601 - 1000 patients)	5	9.7	19.0 (39.1%)	2.8 (5.7%)	16.2 (33.4%)	29.6 (60.9%)	2.9 (5.9%)	14.3 (29.3%)	12.5 (25.7%)
Large sites (1001+ patients)	8	9.8	21.5 (27.4%)	1.7 (2.2%)	19.8 (25.2%)	57.1 (72.6%)	8.4 (22.7%)	26.2 (33.3%)	22.5 (28.6%)
Total sample	**22**	**7.4**	**51.6 (31.6%)**	**7.4 (4.5%)**	**44.2 (27.1%)**	**111.8 (68.4%)**	**19.6 (11.3%)**	**49.8 (30.5%)**	**42.4 (25.9%)**
Tech-enabled and Analogue									
Very small sites (0-200 patients)	3	3.7	3.2 (28.7%)	1.8 (16.6%)	1.3 (12.0%)	7.9 (71.3%)	0.3 (2.5%)	2.8 (24.9%)	4.9 (43.9%)
Small sites (201 - 600 patients)	2	4.0	5.6 (69.3%)	0.2 (2.2%)	5.4 (67.1%)	2.5 (30.7%)	0.5 (6.4%)	2.0 (24.3%)	0.0 (0.0%)
Medium sites (601 - 1000 patients)	5	9.7	19.0 (39.1%)	2.8 (5.7%)	16.2 (33.4%)	29.6 (60.9%)	2.9 (5.9%)	14.3 (29.3%)	12.5 (25.7%)
Large sites (1001+ patients)	6	5.9	12.3 (34.7%)	1.1 (3.2%)	11.1 (31.5%)	23.1 (65.3%)	8.0 (22.7%)	13.2 (37.4%)	1.9 (5.3%)
Total Tech-enabled and Analogue	**16**	**6.4**	**40.0 (38.8%)**	**5.9 (5.7%)**	**34.1 (33.1%)**	**63.1 (61.2%)**	**11.7 (11.3%)**	**32.2 (31.2%)**	**19.2 (18.6%)**
Analogue-only									
Small sites (201 - 600 patients)	4	4.2	2.3 (13.8%)	0.9 (5.3%)	1.4 (8.5%)	14.6 (86.2%)	7.5 (43.9%)	4.6 (27.2%)	2.6 (15.1%)
Large sites (1001+ patients)	2	21.6	9.3 (21.4%)	0.6 (1.4%)	8.7 (20.1%)	34.0 (78.6%)	0.4 (1.0%)	13.0 (30.0%)	20.6 (47.7%)
Total Analogue-only	**6**	**10.0**	**11.6 (19.3%)**	**1.5 (2.5%)**	**10.1 (16.8%)**	**48.6 (80.7%)**	**7.9 (13.1%)**	**17.6 (29.2%)**	**23.2 (38.5%)**
CVW service									
The total sample									
Very small sites (0-200 patients)	11	1.8	2.3 (11.5%)	0.3 (1.3%)	2.0 (10.2%)	17.7 (88.5%)	2.1 (10.4%)	5.7 (28.4%)	9.9 (49.7%)
Small sites (201 - 600 patients)	2	3.7	1.3 (18.1%)	0.0 (0.0%)	1.3 (18.1%)	6.0 (81.9%)	0.2 (2.9%)	5.8 (79.0%)	0.0 (0.0%)
Total sample	**13**	**2.1**	**3.6 (13.3%)**	**0.3 (0.9%)**	**3.4 (12.3%)**	**23.7 (86.7%)**	**2.3 (8.4%)**	**11.5 (42.0%)**	**9.9 (36.3%)**
Tech-enabled and Analogue									
Very small sites (0-200 patients)	5	1.9	1.2 (12.7%)	0.2 (2.0%)	1.0 (10.7%)	8.1 (87.3%)	0.4 (4.5%)	3.2 (34.0%)	4.5 (48.8%)
Small sites (201 - 600 patients)	1	4.0	1.3 (33.2%)	0.0 (0.0%)	1.3 (33.2%)	2.7 (66.8%)	0.2 (5.3%)	2.5 (61.5%)	0.0 (0.0%)
Total Tech-enabled and Analogue	**6**	**2.2**	**2.5 (18.9%)**	**0.2 (1.4%)**	**2.3 (17.5%)**	**10.8 (81.1%)**	**0.6 (4.7%)**	**5.6 (42.3%)**	**4.5 (34.1%)**
Analogue-only									
Very small sites (0-200 patients)	6	1.8	1.1 (10.4%)	0.1 (0.6%)	1.0 (9.8%)	9.6 (89.6%)	1.7 (15.5%)	2.5 (23.5%)	5.4 (50.6%)
Small sites (201 - 600 patients)	1	3.4	0.0 (0.0%)	0.0 (0.0%)	0.0 (0.0%)	3.4 (100.0%)	0.0 (0.0%)	3.4 (100.0%)	0.0 (0.0%)
Total Analogue-only	**7**	**2.0**	**1.1 (7.9%)**	**0.1 (0.5%)**	**1.0 (7.4%)**	**13.0 (92.1%)**	**1.7 (11.8%)**	**5.9 (41.8%)**	**5.4 (38.5%)**

Source: Based on data provided by each site. Note: *) Please note that 9 sites used both CO@h and CVW services and therefore they appear in both services.

Figure 1. Proportion of patients monitored using each data submission option

Legend: ■ % patients monitored using tech-enabled option ■ % patients monitored using analogue option

Source: Based on data provided by each site.