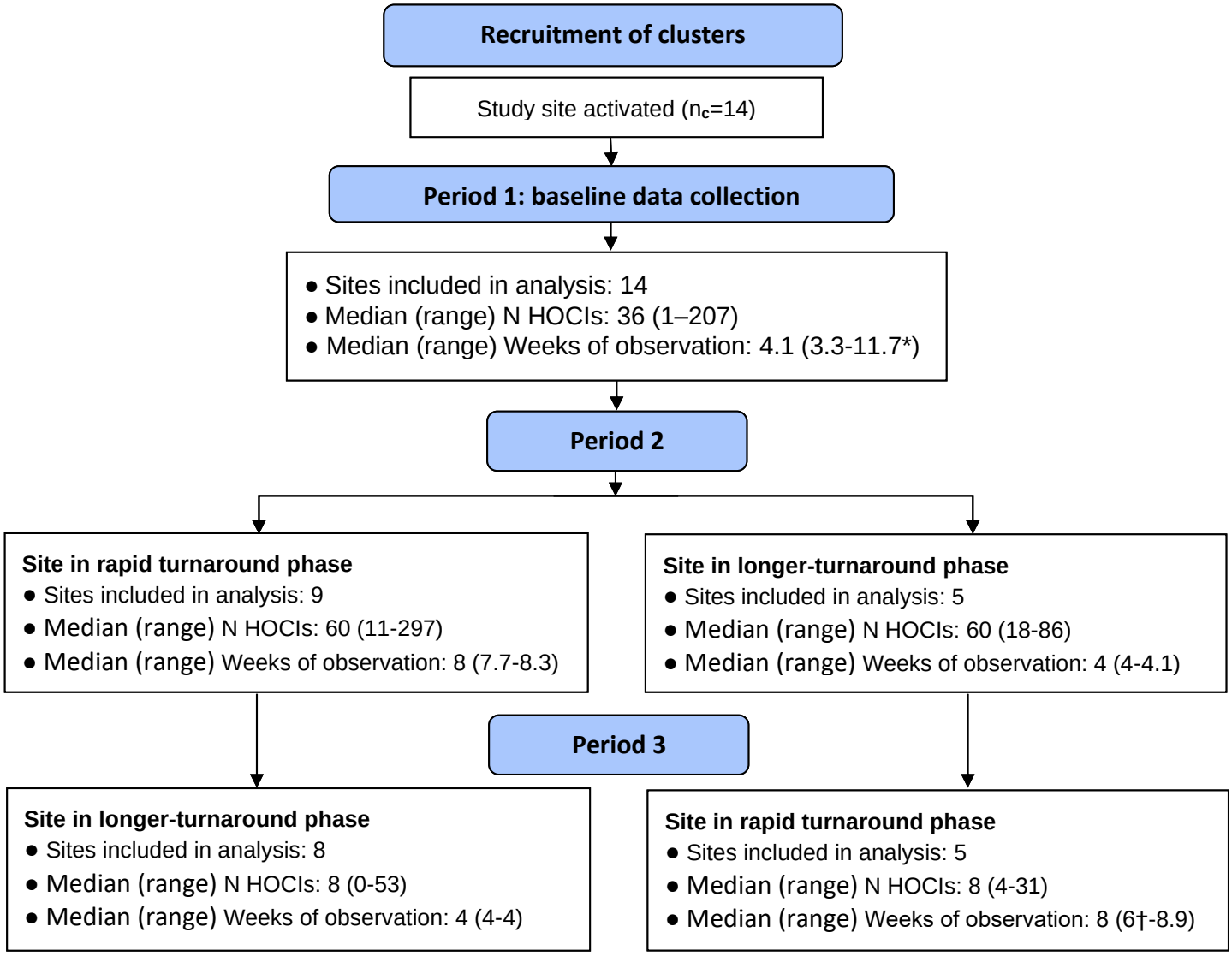
Participant flow

*Baseline phase extended for one site due to a complete lack of HOCI cases during first few weeks of study period and omission of longer-turnaround sequencing phase.
†Rapid sequencing phase truncated at one site due to cessation of enrolment at all sites.



Baseline Characteristics

Table 1: Demographic and baseline characteristics of the participants by study phase

	Study phase			
Characteristic at screening	Baseline	Longer-turnaround	Rapid	**Total**
N HOCI cases	850	373	947	2170
N HOCI cases per site, median (range); *N* sites	36 (1-207); 14	19 (0-86); 13	30.5 (4-297); 14	103.5 (40-451); 14
HAI classification, *n* (%)				
Indeterminate (3-7 days)	362 (42.6)	166 (44.5)	371 (39.2)	899 (41.4)
Probable (8-14 days)	236 (27.8)	121 (32.4)	270 (28.5)	627 (28.9)
Definite (>14 days)	252 (29.6)	86 (23.1)	306 (32.3)	644 (29.7)
Age (years), median (IQR, range)	77.5 (65.4-85.6, 0.4-100.5)	77.6 (64.6-86.7, 0.7-100.7)	76.4 (62.6-85.5, 0.6-103.5)	76.7 (64.4-85.6, 0.4-103.5)
Age ≥70 years, *n/N* (%)	589/850 (69.3)	240/373 (64.3)	598/947 (63.1)	1427/2170 (65.8)
Sex at birth: female, *n/N* (%)	457/850 (53.8)	177/372 (47.6)	460/947 (48.6)	1094/2169 (50.4)
Ethnicity, *n* (%)				
White	668 (78.6)	275 (73.7)	732 (77.3)	1675 (77.2)
Mixed ethnicity	9 (1.1)	6 (1.6)	8 (0.8)	23 (1.1)
Asian	46 (5.4)	26 (7.0)	34 (3.6)	106 (4.9)
Black Caribbean or African	36 (4.2)	18 (4.8)	46 (4.9)	100 (4.6)
Other	6 (0.7)	1 (0.3)	4 (0.4)	11 (0.5)
Unknown	85 (10.0)	47 (12.6)	123 (13.0)	255 (11.8)
Symptomatic at time of sampling, *n/N* (%)	167/739 (22.6)	58/322 (18.0)	106/659 (16.1)	331/1720 (19.2)
Significant comorbidity present, *n/N* (%)	650/776 (83.8)	260/323 (80.5)	574/757 (75.8)	1484/1856 (80.0)
Pregnant, *n/N* (%)	6/451 (1.3)	1/177 (0.6)	4/445 (0.9)	11/1073 (1.0)
Hosp. admission route, *n* (%)				
Emergency department	605 (71.2)	258 (69.2)	549 (58.0)	1412 (65.1)
Hospital transfer	59 (6.9)	21 (5.6)	51 (5.4)	131 (6.0)
Care home	3 (0.4)	0 (0)	0 (0)	3 (0.1)
GP referral	38 (4.5)	15 (4.0)	76 (8.0)	129 (5.9)
Outpatient clinic ref.	27 (3.2)	20 (5.4)	30 (3.2)	77 (3.5)
Other	42 (4.9)	9 (2.4)	48 (5.1)	99 (4.6)
Unknown	76 (8.9)	50 (13.4)	193 (20.4)	319 (14.7)

HAI, hospital-acquired infection; HOCI, hospital onset COVID-19 infection; Hosp., hospital.

Outcome Measures

Table 2: Per hospital onset COVID-19 infection (HOCI) implementation and outcome summary by study intervention phase, overall and within the 7/14 sites included in the 'per protocol' sensitivity analysis

	All study sites			**Sensitivity analysis**	
	Study phase			**Study phase**	
	Longer-turnaround	Rapid	**Total**	Longer-turnaround	Rapid
N HOCI cases	373	947	1320	143	533
Implementation					
Sequence returned within expected timeline, *n* (%)*	229 (61.4)	377 (39.8)	606 (45.9)	81 (56.6)	204 (38.3)
Sequence returned within study period, *n* (%)*	277 (74.3)	596 (62.9)	873 (66.1)	98 (68.5)	347 (65.1)
SRT report returned within target timeline (10d for longer-turnaround, 2d for rapid), *n* (%)	79 (21.2)	44 (4.6)	123 (9.3)	35 (24.5)	44 (8.3)
SRT report returned within study period, *n* (%)	215 (57.6)	435 (45.9)	650 (49.2)	92 (64.3)	317 (59.5)
Time from sample to report return (days), median (IQR, range) [*n*]	13 (9-15, 0-36) [215]	5 (3-11, 2-84) [430]	9 (4-14, 0-84) [645]	13 (9-17, 6-29) [92]	4 (3-6, 2-64) [312]
Sequencing results					
SRT suggestive patient acquired infection post-admission, *n/N* (%)	196/212 (92.5)	384/423 (90.8)	580/635 (91.3)	85/92 (92.4)	287/311 (92.3)
SRT suggestive patient is part of ward outbreak, *n/N* (%)	151/212 (71.2)	260/423 (61.5)	411/635 (64.7)	65/92 (70.7)	202/311 (65.0)
Linkage identified not suspected at initial IPC investigation:					
All HOCIs in phase *n/N* (%†, 95% CI)	24/348 (6.8, 1.7-11.8)	46/915 (6.7, 2.0-11.3)	70/1263 (5.5)	11/139 (7.9, 3.4-12.4)	39/512 (7.6, 5.3-9.9)
When SRT returned *n/N* (%)	24/190 (12.6)	46/403 (11.4)	70/593 (11.8)	11/88 (12.5)	39/296 (13.2)
SRT excluded IPC-identified hospital outbreak, *n/N* (%)	14/213 (6.6)	27/428 (6.3)	41/641 (6.4)	9/92 (9.8)	25/310 (8.1)
Impact on IPC					
SRT changed IPC practice:					
All HOCIs in phase *n/N* (%†, 95% CI)	25/373 (7.4, 1.1-13.6)	74/941 (7.8, 2.4-13.2)	99/1314 (7.5)	1/143 (0.7, 0.0-2.1)	52/527 (9.9, 7.3-12.4)
When SRT returned *n/N* (%)	25/215 (11.6)	74/429 (17.2)	99/644 (15.4)	1/92 (1.1)	52/311 (16.7)
SRT changed IPC practice for ward, *n/N* (%)	13/215 (6.0)	31/429 (7.2)	44/644 (6.8)	0/92 (0.0)	28/311 (9.0)
SRT used in IPC decisions beyond ward, *n/N* (%)	12/215 (5.6)	45/428 (10.5)	57/643 (8.9)	1/92 (1.1)	27/310 (8.7)
IPC team reported SRT to be useful, *n/N* (%)					
Yes	107/215 (49.8)	303/428 (70.8)	410/643 (63.8)	25/92 (27.2)	245/310 (79.0)
No	67/215 (31.2)	71/428 (16.6)	138/643 (21.5)	50/92 (54.3)	57/310 (18.4)

Unsure	41/215 (19.1)	54/428 (12.6)	95/643 (14.8)	17/92 (18.5)	8/310 (2.6)
HCW absence on ward					
Prop. HCWs on sick leave due to COVID-19, median (IQR, range) [*n*]	0.09 (0.00-0.15, 0.00-0.30) [49]	0.13 (0.07-0.29, 0.00-1.00) [162]	0.13 (0.04-0.27, 0.00-1.00) [321]‡	0.09 (0.00-0.15, 0.00-0.30) [49]	0.13 (0.08-0.29, 0.00-1.00) [143]

HCW, healthcare worker; IPC, infection prevention and control; IQR, interquartile range; Prop., proportion; SRT, sequence reporting tool. *As recorded by site, not based on recorded date or availability on central CLIMB server. †Estimated marginal value from mixed effects model, not raw %, evaluated on intention-to-treat basis with lack of SRT report classified as 'no'. ‡Includes data for baseline phase: 0.13 (0.00-0.30, 0.00-0.88) [110].

Table 3: Incidence outcomes by study intervention phase, overall and within the 7/14 sites included in the 'per protocol' sensitivity analysis

	Study phase			IRR† (95% CI, *P*)	
	Baseline	Longer-turnaround	Rapid	**Longer-turnaround vs baseline**	**Rapid vs baseline**
All sites					
n HOCI cases	850	373	947	—	—
n IPC-defined HAIs	488	207	576	—	—
Weekly inc. of IPC-defined HAIs per 100 inpatients, mean (median, IQR, range)* [primary outcome]	1.0 (0.5, 0.0-1.4, 0.0-5.6)	0.7 (0.3, 0.0-0.7, 0.0-7.6)‡	0.6 (0.3, 0.0-0.8, 0.0-5.3)‡	1.60 (0.85-3.01; 0.14)	0.85 (0.48-1.50; 0.54)
n IPC-defined outbreak events	129	33	114	—	—
Weekly inc. of IPC-defined outbreak events per 1000 inpatients, mean (median, IQR, range)*	2.7 (1.1, 0.0-4.1, 0.0-23.0)	0.8 (0.0, 0.0-1.0, 0.0-8.9) ‡	0.7 (0.0, 0.0-0.0, 0.0-8.9) ‡	1.09 (0.38-3.16; 0.86)	0.58 (0.24-1.39; 0.20)
n IPC+sequencing-defined outbreak events	—	40	133	—	—
Weekly inc. of IPC+seq. -defined outbreak events per 1000 inpatients, mean (median, IQR, range)*	—	1.1 (0.0, 0.0-1.5, 0.0-13.4) ‡	0.9 (0.0, 0.0-1.4, 0.0-7.6) ‡	—	—
Sensitivity analysis					
n HOCI cases	290	143	533	—	—
n IPC-defined HAIs	179	91	337	—	—
Weekly inc. of IPC-defined HAIs per 100 inpatients, mean (median, IQR, range)* [primary outcome]	0.3 (0.0, 0.0-0.3, 0.0-3.0)	0.3 (0.0, 0.0-0.0, 0.0-3.4)‡	0.4 (0.0, 0.0-0.3, 0.0-5.3)‡	2.21 (0.82-5.92; 0.10)	1.75 (0.75-4.08; 0.16)
n IPC-defined outbreak events	58	14	55	—	—
Weekly inc. of IPC-defined outbreak events per 1000 inpatients, mean (median, IQR, range)*	1.1 (0.0, 0.0-1.3, 0.0-12.9)	0.3 (0.0, 0.0-0.0, 0.0-5.7) ‡	0.4 (0.0, 0.0-0.0, 0.0-8.9) ‡	0.83 (0.14-4.93; 0.80)	0.46 (0.11-1.86; 0.21)
n IPC+seq.-defined outbreak events	—	14	67	—	—
Weekly inc. of IPC+seq. -defined outbreak events per 1000 inpatients, mean (median, IQR, range)*	—	0.3 (0.0, 0.0-0.0, 0.0-5.7) ‡	0.5 (0.0, 0.0-0.0, 0.0-7.6) ‡	—	—

HAI, hospital-acquired infection; HOCI, hospital onset COVID-19 infection; IPC, infection prevention and control; IQR, interquartile range; IRR, incidence rate ratio; seq., sequencing.
IPC-defined HAIs are considered to be 'probable' or 'definite' HAIs. *Descriptive data over all week-long periods at all study sites. †Adjusted for proportion of current inpatients at site that are COVID-19 cases, community incidence rate and calendar time (as displayed in Appendix 1—figure 5 and Appendix 1—figure 6 for all sites). ‡Not including data from the first week of each intervention period, or in the week following any break in the intervention period.

Adverse Events

No adverse events were reported.