

Appendix B.

Detailed information on the cost estimates associated with the telehealthcare solution.

Assumptions		Elaboration	Reference
Number of heart failure patients in Denmark	66,000	Estimate from 2014 based on registrations in the Danish National Patient Registry.	[4]
Number of heart failure patients in the North Denmark Region	6700	Cross-country prevalence, expected to be equal, though the North Denmark Region is known to have a lower registered prevalence. Per 2017, approximately one-tenth of the Danish population resided in the North Denmark Region.	[4]
Number of heart failure patients and patients with chronic obstructive pulmonary disease in the North Denmark Region	10,500	Estimate applied in the TeleCare North COPD trial.	[24]
Overhead and development costs may be allocated to more patients			
One-time start-up costs are annuitized		Under the expectation that the intervention will be used over a more extended period, i.e., the lifetime of the equipment	
Technology lifetime	5	Used for annuitization	[38]
Discount rate	0.04	The socio-economic discount rate	[39]
Annuity factor given a lifetime of 5 years and a discount rate of 0.04	4.4518	Annual costs = K/annuity factor	[26]
Annuitized cost items		Software development costs + support in relation to heart failure, education of healthcare professionals, Telekit including instructions.	
Conversion rate DKKR to £	8.2718	DKKR8.2719 per £1 per 31 December 2018	[29]
Use of effective hourly wages		'præsteret time' in Statistics Denmark - the combined earnings in relation to the job: the basic earnings incl. holiday allowances, holiday and public holiday payments, pensions, benefits in kind, nuisance compensations, etc. but excluding holidays, free hours of public holidays, absence due to sickness, children's sickness, parental leave, etc. Used to estimate the payers' hourly expenses of having the employee.' Approximation of the effective hourly wage, in accordance with good practice in economic evaluation to use effective hours.	[26,35]
Costs of respite care, daily expense 2018	£156.74	Estimated from annual expenses assessed in 2002. Indexed to represent 2018 using the consumer price index.	

Wage estimate	£ (2018)	Assumption	Reference
Municipality nurse without managerial responsibility	£37.16	statistikbanken.dk - LONS20 // earnings per hour performed // 2221 nursing work without managerial responsibility in municipalities // salaried and hourly paid // 2017 (222110 in DISCO-08)	[35]
Municipality nurse with managerial responsibility	£46.39	statistikbanken.dk - LONS20 // earnings per hour performed // 2221 nursing work w managerial responsibility in municipalities // salaried and hourly paid // 2017 (222110 in DISCO-08)	[35]
Regional nurse without managerial responsibility	£37.03	statistikbanken.dk - LONS20 // earnings per hour performed // 2221 nursing work without managerial responsibility in regions // salaried and hourly paid // 2017 (222110 in DISCO-08)	[35]
Regional nurse with managerial responsibility	£46.57	statistikbanken.dk - LONS20 // earnings per hour performed // 2221 nursing work w managerial responsibility in regions // salaried and hourly paid // 2017 (222110 in DISCO-08)	[35]
Physician with managerial responsibility, the Regions	£82.64	statistikbanken.dk - LONS20 // earnings per hour performed // 2211 standard medical work w managerial responsibility in regions // salaried and hourly paid // 2017 (221100 in DISCO-08)	[35]
Physician without managerial responsibility, the Regions	£52.50	statistikbanken.dk - LONS20 // earnings per hour performed // 2211 standard medical work w/o managerial responsibility in regions // salaried and hourly paid // 2017 (221100 in DISCO-08)	[35]
Administrative manager within the public sector	£73.18	statistikbanken.dk - LONS20 // earnings per hour performed // 1213 management within public administration w managerial responsibility in regions // salaried and hourly paid // 2017 (121320 in DISCO-08)	[35]
Physiotherapist w/o managerial responsibility (the Regions and municipalities)	£34.98	statistikbanken.dk - LONS20 // earnings per hour performed // 2264 physiotherapist and relaxation therapists w/o managerial responsibility in municipalities and regions // salaried and hourly paid // 2017 (226410 in DISCO-08)	[35]

Software development costs + support in relation to HF	£	Assumption
2016 ATEA: planning and status meetings	£1878.35	Fixed cost, irrespective of the number of patients. Development of software and modification of hardware, support. It could be considered whether this should be allocated to all HF patients in DK and not the proportion in the North Denmark Region - cut to a tenth.
2016 OTH: new questionnaire	£1390.25	
2016 C-Innovation - info app	£2671.70	
2017 ATEA New MDM group comorbidity	£2130.71	
Total	£8071.00	
Total per patient given 6700 HF patients	£1.20	

Telekit incl. instructions	£	Assumption
Tablet Samsung Galaxy tab incl. charger	£197.78	Based on expected purchase price 2018. Original cost 2333
Cover	£18.13	
Digital blood pressure monitor, UA-767 Plus BTC w. 1 cuff Continua Certified	£139.02	
Scale	£15.71	Note: The expectation of having a normal non-Bluetooth connected scale in the future - precision is irrelevant. Original cost £184.36. Scale 200 kg UC-321 PBT-C, Continua Certificeret Blue Tooth. // New price estimate based on purchase price in stores.
Flightcase	£14.51	
Target stylus	£0.46	Original price £4.23. New offer, supplied to patients now.
User manual, welcome letter, patient leaflets	£2.42	
Instruction for use of the Telekit	£27.87	Performed by municipality nurses without managerial responsibility. Expectation of a 45 min session. Not included transport to and from the resident's home. Conservative estimate; otherwise in group sessions of 3-4 persons at the municipality health center of duration 75 minutes.

Follow-up appointment in use of the Telekit	£27.87	Performed by municipality nurses without managerial responsibility. Expectation of a 45-min session, not including transport to and from the resident's home.
Delivery by Atea	£100,94	Price paid
Total per patient	£544,71	

Education of health care professionals	N, courses held	Duration, hours	Participants, N	Target group	Instructor	Valuation, participants		Valuation, instructor		Total cost
						job function	£	job function	£	
Kickoff meetings	4	1.5	88	Project managers, key persons, and health care professionals who will be affiliated with the TCN HF project	The steering committee and administrative office, TCN HF	Regional nurse w/managerial responsibility	46.57	Administrative manager within public sector	£73.18	£ 6220.54
Open Teleseminar	5	4.0	51	Regional and municipality nurses and other clinicians who are to use Open Tele and the Telekit in relation to TCN HF	Specialist nursing consultant (nurse)	Municipality nurse w/o managerial responsibility	37.16	Regional nurse w managerial responsibility	£46.57	£ 7626.62
Academic meeting	2	8.5	48	Municipal specialist nursing players with monitoring tasks in TCH HF	Regional ECG technician, staff physician, nurse	Municipality nurse w/o managerial responsibility	37.16	Physician w/managerial responsibility, regions	£82.64	£ 15242.74
Educational seminar	2	6.0	45	Regional and municipality nurses in TCN HF	2*Developmental consultant (nurse) spl. cand.mag. and spl. cand.cur.	Municipality nurse w/o managerial responsibility	37.16	Regional nurse w/managerial responsibility	£46.57	£10078.99
Project day about rehab.	1	3.0	41	Regional HF nurses	Municipality rehabilitation nurses	Regional nurse w/o managerial responsibility	37.03	Municipality nurse w/o managerial responsibility	£37.16	£4591.42

Project day about palliation	2	3.0	37	Specialist nursing players from HF ambulatories and municipalities	Nurse in the hospital (Cardiologic department, AAUH) and healthcare center, Aalborg	Municipality nurse w/o managerial responsibility	37.16	Regional nurse w/managerial responsibility	£46.57	£4171.01
After-work meetings, general practitioners	3	2.0	30	General practitioners and general practice workers	Staff physician, HF	Physician w/o managerial responsibility, regions	52.50	Physician w/managerial responsibility, regions	£82.64	£3232.38
Seminar on increasing competencies in HF	30	2.0	510	Municipality nurses working with HF	Municipality nurse	Municipality nurse w/o managerial responsibility	.37.16	Municipality nurse w/o managerial responsibility	£37.16	£37937.42
Follow-up education Open Tele	5	3.0	15	Regional and municipality nurses and other clinicians who are to use Open Tele and the Telekit in relation to TCH HF	Specialist nursing consultant (nurse)	Municipality nurse w/o managerial responsibility	37.16	Regional nurse w/managerial responsibility	£46.57	£1718.64

Basic operation, COPD + HF	£	Assumption
Server service in the North Denmark Region (hardware, licenses, surveillance, operation of shared services)	£45502.97	
Monitoring system, Open Tele Health, support and contingency arrangements, 2nd and 3rd level	£10154.86	
Support of health professionals performed by Frederikshavn municipality, 2nd level	£33245.08	Given 780 hours/year
Total	£88902.91	
Total, per patient given 10500 patients	£8.47	

Development costs and extra support	£	Assumption
ATEA: Development costs and extra support (RFCs, changes, apps, certificate expiration, etc)	£15727.40	Though not occurring each year, development costs, changes to IT systems, further requests for support, licenses, expiry of app useful life, etc., should be expected and are, therefore, included here. Related to 'extraordinary' operation that cannot be anticipated. If excluded, the costs related to running the system would be underestimated. // Running from August 2016 to November 2018 (28 months). Only annual costs are needed = (12/28 months) of total costs.
ATEA: Status meetings	£6392.12	
FRH: Extra support, first half of 2017	£9187.73	
OTH Development costs and extra support	£8846.21	
IT North Denmark Region, extra support hours, system update	£2961.83	
Total	£43115.31	
Total, per patient given 10500 patients	£1.76	

Operational costs	£	Assumption
ATEA: Substitution of faulty equipment	£0.56	£100.94 per 1 substitution per month in 180 users.
ATEA: Handling of assets, number in use + 30% (number of active units used)	£0.54	
ATEA: MDM License: number in use + 30% (number of active units used)	£2.82	
TCD: Simcard, data, number in use + 30% (number of active units in use)	£2.93	
Total per month	£6.85	
Total per patient per year	£82.15	