SUPPLEMENTAL MATERIAL

Table of Contents

Appendix S1.
Equilibrating the KCCQ and MLWHF to define a responder definition for the MLWHF
While there are well established thresholds for what is a clinically meaningful changes in the KCCQ scores, evidence as to what is meaningful in the MLWHF is more sparse. Bennet et al did report -4.8 +/- 17.43 point change as associated with a minimal clinical change but this was in a small sample (n=165) and given the very high standard deviation was felt to be unreliable.[3] For this reason we attempted to estimate what a 5, 10, and 15 point change in KCCQ at 3 months would be for the MLWHF.
A regression analysis yielded the equation:
MLWHF change at 3 months =KCCQ change at 3 months * (-0.74902) – 2.92430
Using this equation the following assumptions were created:
0 point change in KCCQ = -2.92430 point change in MLWHF
5 point change in KCCQ = -6.6694 point change in MLWHF
10 point change in KCCQ = -10.4145 point change in MLWHF
20 point change in KCCQ = -17.9047 point change in MLWHF

Table S1. Quality of Life Measurements and Time points of Colletction by Trial.

	CARE-HF n = 813	MIRACLE n = 541	MIRACLE-ICD n = 555	RAFT n = 1798	REVERSE n = 610	Total n = 4317
KCCQ at 3 months	0	0	0	0	514	514
KCCQ at 6 months	0	0	0	0	512	512
KCCQ at 9 months	0	0	0	0	0	0
KCCQ at 12 months	0	0	0	0	507	507
KCCQ at 15 months	0	0	0	0	0	0
KCCQ at 18 months	0	0	0	0	162	162
MLWHF at 3 months	658	507	525	1450	576	3716
MLWHF at 6 months	0	480	509	1574	574	3137
MLWHF at 9 months	0	0	260	895	0	1155
MLWHF at 12 months	0	363	423	1528	567	2881
MLWHF at 15 months	0	0	0	729	0	729
MLWHF at 18 months	546	144	238	1334	222	2484

Values are shown as absolute numbers. MLWHF = Minnesota Living with Heart Failure; KCCQ = Kansas City cardiomyopathy questionairre

Table S2. Characteristics of patients deceased prior to 3 months versus those in analytic cohort.

	Died prior to 3 months n=98	Study Cohort n=3614	p-value
Age (y)	67.6 ± 10.3	65.2 ± 10.3	0.020
Male	80 (81.6%)	2827 (78.2%)	0.419
QRS width (ms)	160.4 ± 23.2	162.2 ± 24.2	0.454
Left bundle branch block	74 (77.1%)	2722 (75.8%)	0.764
CRT	47 (48.0%)	1890 (52.3%)	0.396
Implantable defibrillator	48 (49%)	1890 (52.3%)	<0.001
NYHA Class			
II	21 (21.4%)	1819 (50.3%)	<0.001
III	60 (61.2%)	1685 (46.6%)	
IV	17 (17.3%)	110 (3.0%)	
Left ventricular EF	22 ± 7	24 ± 6	0.004
Ischemic cardiomyopathy	72 (73.5%)	2100 (58.1%)	0.002
Diabetes mellitus	33 (42.1%)	888 (30.0%)	0.022
MLWHF at baseline	57.5 ± 23.5	42.5 ± 23.5	<0.001
ACE-I/ARB	81 (84.4%)	3445 (95.3%)	<0.001
Beta blocker	54 (55.1%)	2841 (78.6%)	<0.001

Table S3. Characteristics of patients with missing QoL data versus those in the analytic cohort.

	Missing QoL Data n=505	Study Cohort n=3614	p-value
Age (y)	65.4 ± 9.9	65.2 ± 10.3	0.597
Male	404 (80.0%)	2827 (78.2%)	0.363
QRS width (ms)	160.7 ± 24.7	162.2 ± 24.2	0.200
LBBB	381 (77.6%)	2722 (75.8%)	0.371
CRT	254 (50.3%)	1890 (52.3%)	0.399
ICD	364 (72.1%)	1890 (52.3%)	0.003
NYHA Class			
II	287 (56.8%)	1819 (50.3%)	<0.001
III	192 (38.0%)	1685 (46.6%)	
IV	19 (3.8%)	110 (3.0%)	
Left ventricular EF	24 ± 6	24 ± 6	0.107
Ischemic cardiomyopathy	293 (58.0%)	2100 (58.1%)	0.970
Diabetes mellitus	150 (33.2%)	888 (30.0%)	0.164
MLWHF at baseline	40.0 ± 25.0	42.5 ± 23.5	0.05
ACE-I/ARB	472 (95.4%)	3445 (95.3%)	0.976
Beta blocker	420 (83.2%)	2841 (78.6%)	0.018

Table S4. Baseline characteristics of Cardiac Resynchronization Therapy vs. control

|	CRT N = 1890	Control N = 1724	p-value
Male	1486 (78.6%)	1341 (77.8%)	0.541
Age	65.0 ± 10.3	65.3 ± 10.3	0.413
QRS width (ms)	161.6 ± 24.2	162.9 ± 24.2	0.129
LBBB	1441 (76.6%)	1281 (74.9%)	0.235
MLWLHF	42.2 ± 23.5	42.5 ± 23.2	0.741
Systolic Blood Pressure	118.3 ± 18.1	117.8 ± 17.7	0.443
Medical history			
ICD	1246 (65.9%)	1123 (65.1%)	0.619
NYHA II	987 (52.2%)	832 (48.3%)	0.017
NYHA IV	61 (3.2%)	49 (2.9%)	0.500
Ejection fraction	24.0 ± 6.3	24.0 ± 6.1	0.795
Ischemic CM	1112 (58.8%)	988 (57.3%)	0.352
Diabetes	456 (29.0%)	432 (31.0%)	0.229
Baseline Medications			
ACE/ARB Usage	1805 (95.5%)	1640 (95.1%)	0.593
Beta blockers	1518 (80.3%)	1323 (76.7%)	0.008
Spironolactone	752 (42.3%)	725 (45.2%)	0.091

Values are shown as absolute numbers (percentages), mean ± SD. NYHA, New York Heart Association; MLWHF, Minnesota Living with Heart Failure; ACE-I, angiotensin converting enzyme-inhibitor; ARB, angiotensin II receptor blocker

Table S5. Clinically meaningful changes in quality of life of CRT versus control

QOL Change Category	CRT n=1890	Control n=1724	p-value
Large deterioration	7.6	10.0	<0.001
Moderate deterioration	6.5	11.3	
Small deterioration	7.0	7.3	
No change	16.5	19.2	
Small improvement	9.5	8.8	
Moderate improvement	14.1	12.9	
Large improvement	38.7	30.6	

Values are shown as percentages. CRT, cardiac resynchronization therapy

Figure S1. Quality of Life Over time measure by Minnesota Living With Heart Failure and Kansas City Cardiomyopathy Questionnaire
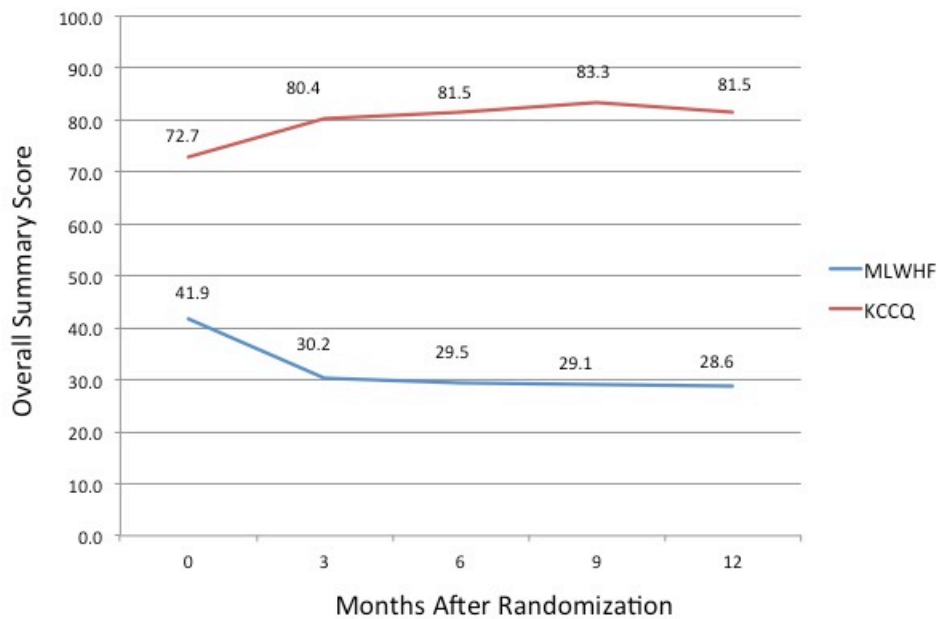
Values shown as mean overall scores. MLWHF = Minnesota living with heart failure; KCCQ = Kansas City Cardiomyopathy Questionnaire.
*The KCCQ overall summary scored is 0-100 with higher numbers reflecting better quality of life. The MLWHF is scored 0-105 with lower scores representing better quality of life.

Figure S2. Observed versus predicted probability of no change in quality of life at 12 months
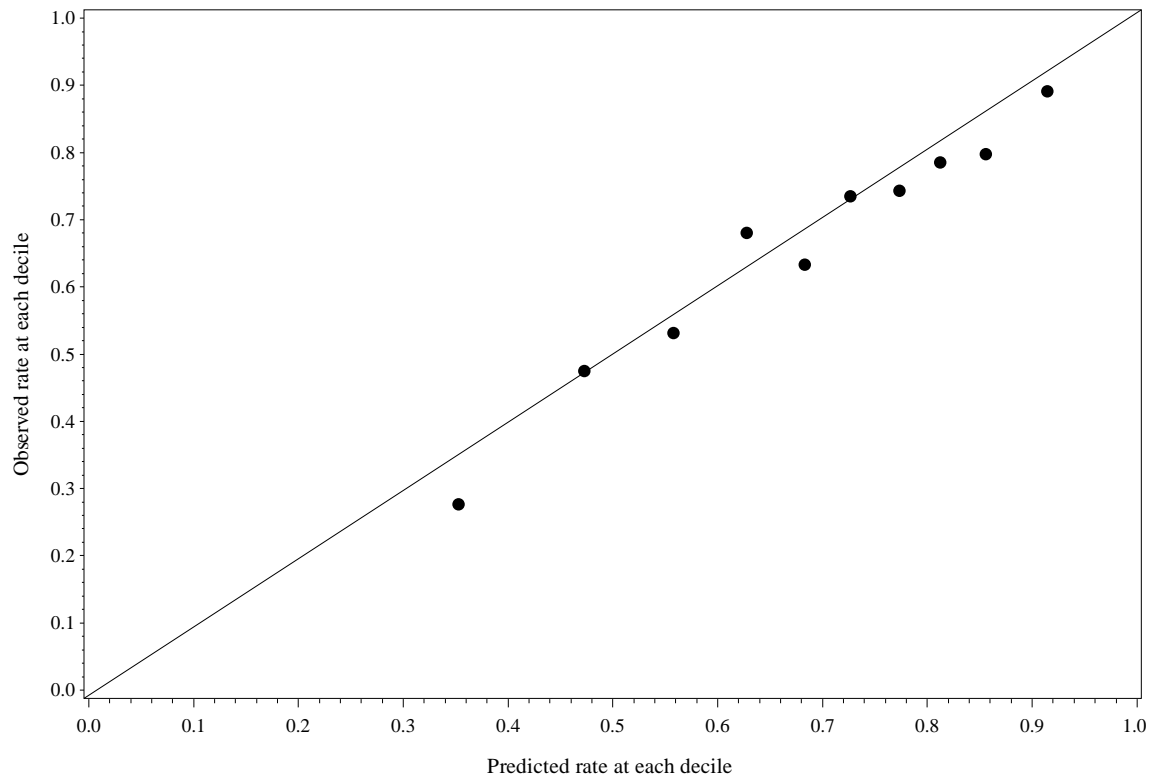
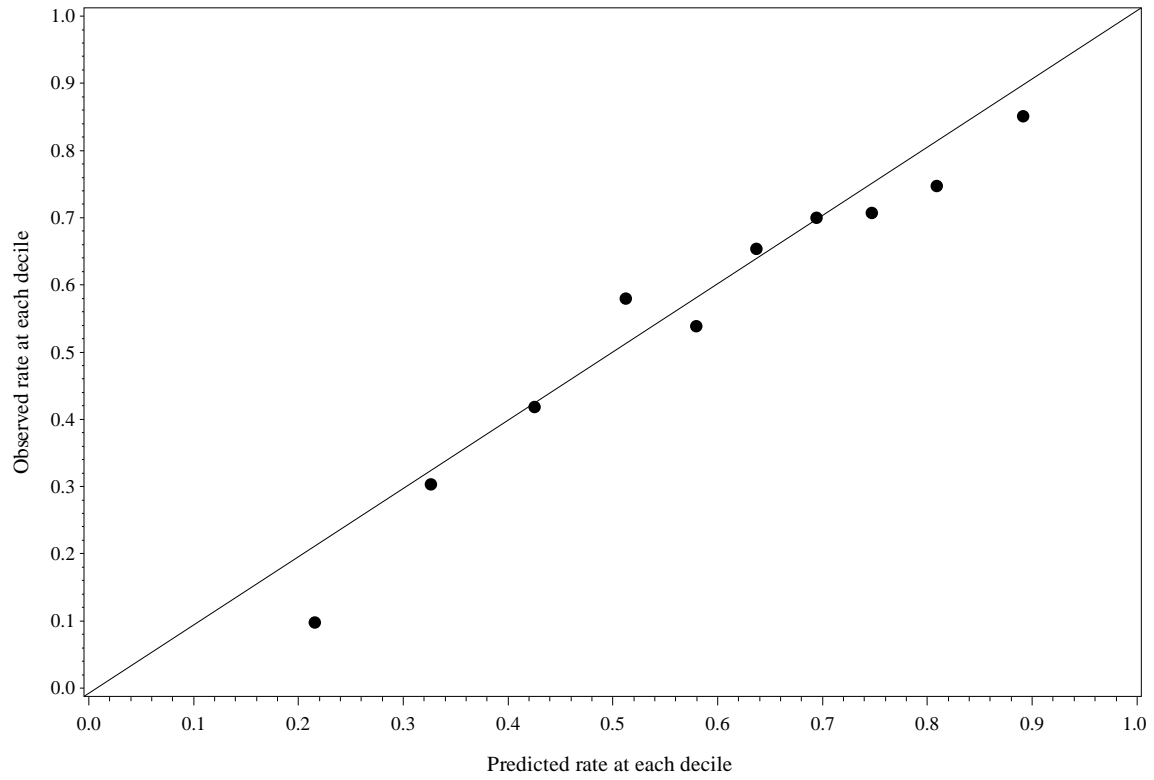Figure S3. Observed versus predicted probability of a small improvement in quality of life at 12 months

Figure S4. Observed versus predicted probability of a moderate improvement in quality of life at 12 months
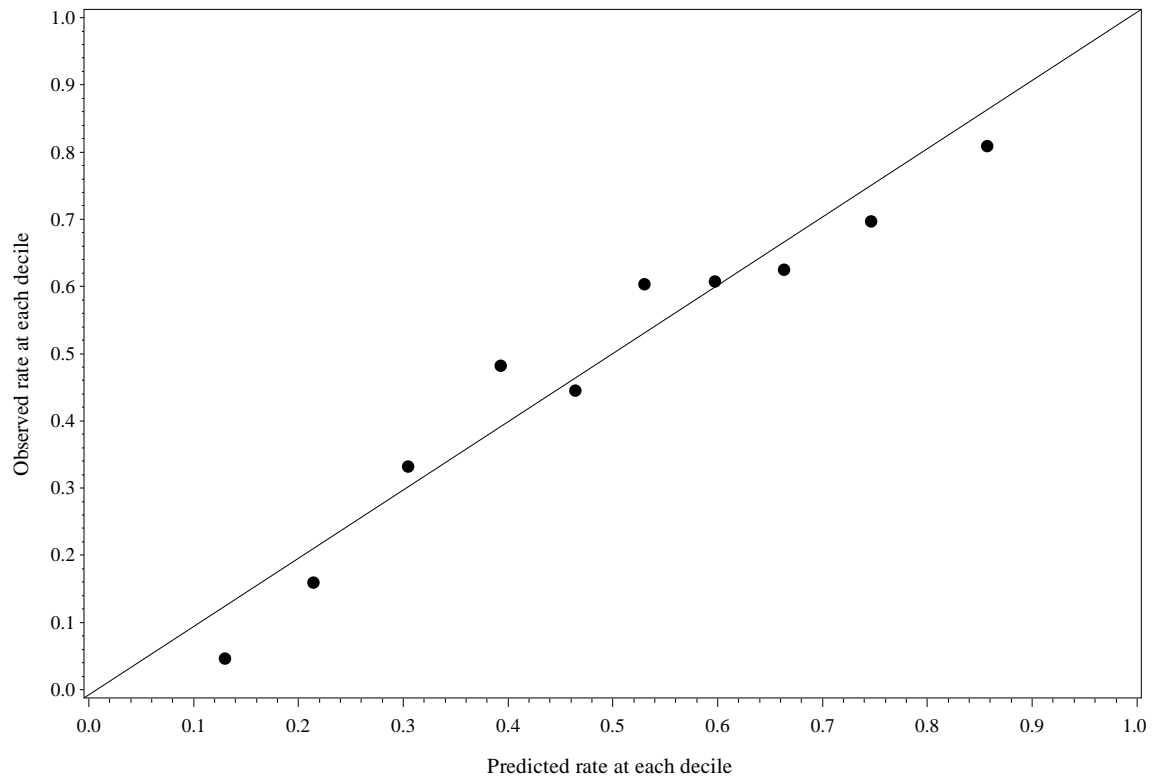
Figure S5. Observed versus predicted probability of a large improvement in quality of life at 12 months