

# **Baroreflex activation therapy in patients with heart failure and reduced ejection fraction: quality of life responder rates and measures analyzed by gender**

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# Presenter Disclosure Information

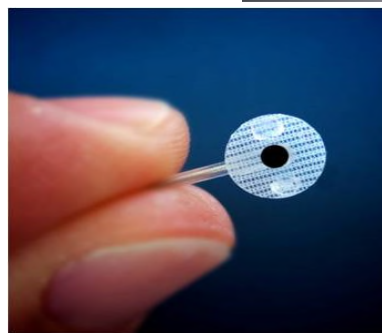
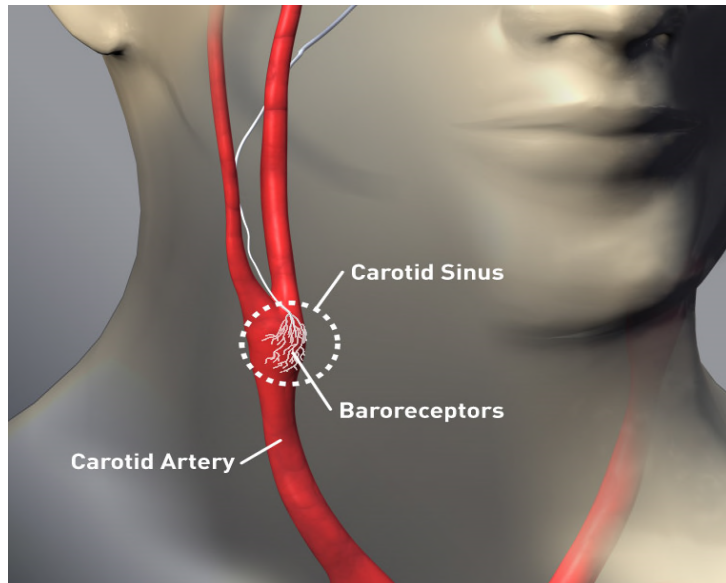
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Consultant: Abbott, Astra-Zeneca, Boehringer-Ingelheim, CVRx, Edwards Lifesciences, Impulse Dynamics, VWave

Grants: Astra-Zeneca, Sensible Medical, Volumetrix

# Mechanism of BAT in HFrEF

## Device design



2 mm electrode  
7mm silicone backer  
Unipolar design



4-5 year longevity  
RF telemetry  
Programming flexibility



8.7 mA amplitude  
125 ms duration  
40 pps frequency

## Carotid Baroreceptor Stimulation Afferent Signaling



Integrated Autonomic Nervous System  
Response

**Inhibits Sympathetic Activity**  
**Enhances Parasympathetic Activity**



↓ Heart Rate  
↓ Remodeling



↑ Vasodilation  
↓ Elevated BP



↑ Diuresis  
↓ Renin secretion



## **Baroreflex Activation Therapy in Patients with Heart Failure and a Reduced Ejection Fraction: BeAT-HF Trial**

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**Purpose:** Demonstrate safety and effectiveness of BAT in HFrEF patients

**Design:** Multicenter, prospective, randomized controlled trial

Randomized 1:1 to receive BAT plus Optimal Medical Therapy ("BAT") or Optimal Medical Therapy alone ("Control")

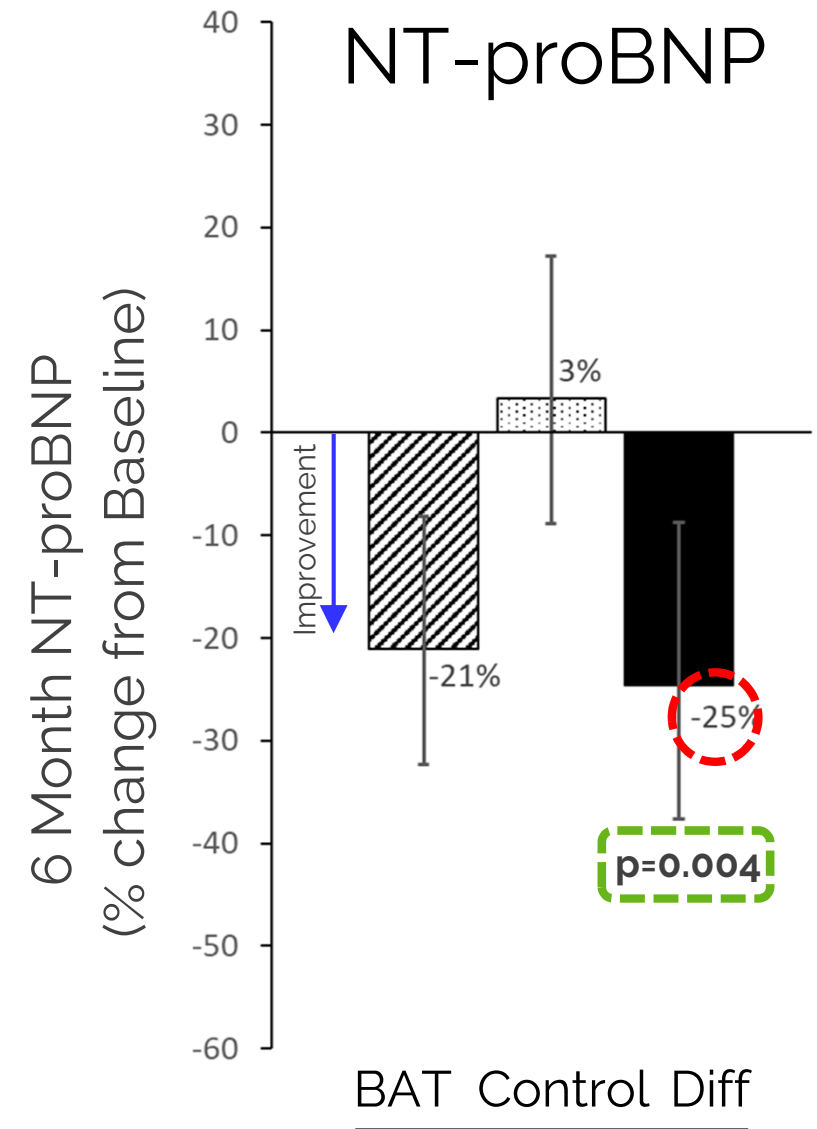
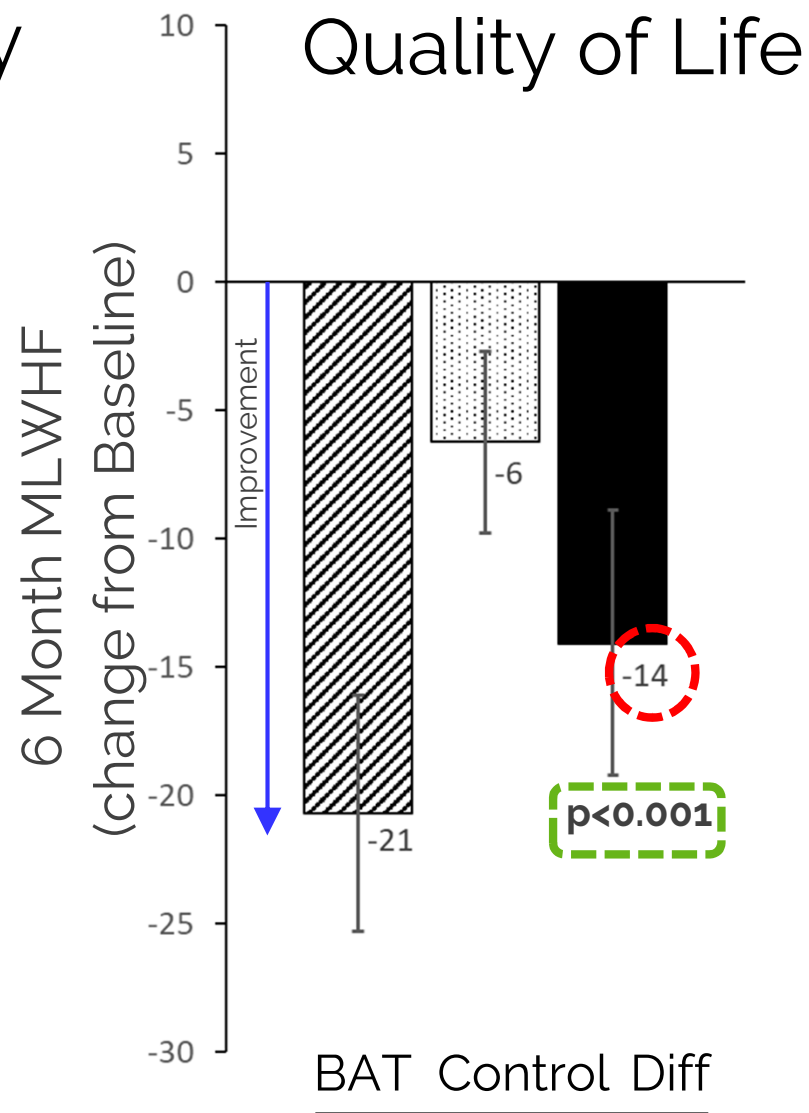
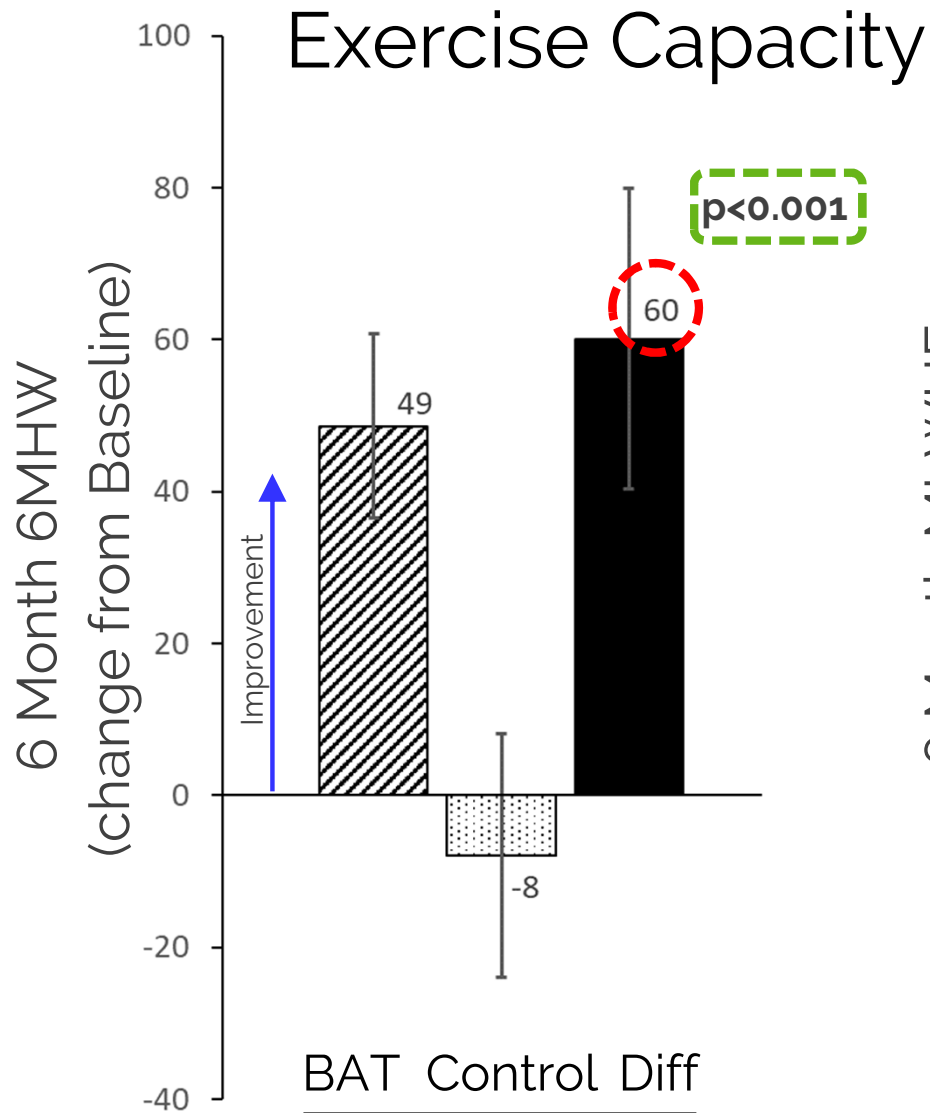
**Primary Endpoint:** Improvement in Exercise Capacity (6MHW), Quality of Life (MLWHF), NT-proBNP for Breakthrough Devices Program Approval with an ongoing morbidity and mortality trial

# BeAT-HF Phase III | Key Eligibility Criteria

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- NYHA Functional Class III
- Left ventricular ejection fraction  $\leq 35\%$
- Six-minute hall walk distance (6MHW) 150 – 400 m
- Elevated NT-proBNP or previous Heart Failure Hospitalization
- Stable optimal medical therapy  $\geq 4$  weeks
- Subjects not indicated for CRT
- No restriction on AF, QRS width or concomitant devices

# BeAT-HF | Primary Endpoints *(In press JACC)*



# FDA Approval Aug 2019: Instruction For Use

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- The BAROSTIM NEO® System is indicated for the **improvement of symptoms** of heart failure – quality of life, six-minute hall walk and functional status, for patients who remain symptomatic despite treatment with guideline-directed medical therapy, are NYHA **Class III or Class II** (who had a recent history of Class III), have a left ventricular ejection fraction **≤ 35%**, a **NT-proBNP < 1600 pg/ml** and excluding patients indicated for Cardiac Resynchronization Therapy (CRT) according to AHA/ACC/ESC guidelines.

# BeAT-HF

## Baseline Demographics by Gender

Variable	Women (n=53)	Men (N=211)
Age (years)	61 ± 11	63 ± 11
Race: Caucasian	70%	74%
NYHA: Class III	91%	95%
MLWHF QOL Score*	62 ± 22	50 ± 24
6 Minute Hall Walk Distance (m)	289 ± 75	309 ± 70
HR (bpm)	77 ± 10	75 ± 11
SBP (mmHg)	122 ± 19	120 ± 16
DBP (mmHg)	73 ± 10	73 ± 10
LVEF (%)	28 ± 5	27 ± 6
NT-pro BNP (pg/mL, Median [IQR])	797 [131, 1586]	719 [473, 1058]
eGFR (mL/min)	61 ± 17	63 ± 19
QRS Interval*	99 ± 14	112 ± 23
History of Atrial Fibrillation	32%	37%
History of Coronary Artery Disease	53%	68%
Previous HF hospitalization	40%	48%

\*p < 0.05



# BeAT-HF Phase II

## Baseline Medical Therapy by Gender

Variable	Women (n=53)	Men (n=211)
Number of Meds	3.9 ± 1.2	4.1 ± 1.3
ACE-I/ARB/ARNI	83%	87%
Beta-Blocker	94%	95%
Diuretic	83%	87%
Ivabradine	4%	3%
ICD	77%	79%

\*p < 0.05

# BeAT-HF Phase II

## Symptomatic Results by Gender

Endpoint (Mean ± SD)	Women			Men			Interaction
	BAT N=23	Control N=26	Diff	BAT N=97	Control N=99	Diff	P-value
6MHW	44 ± 45	-32 ± 118	81*	50 ± 71	-1.5 ± 78	55*	0.33
MLWHF QoL	-34 ± 27	-9 ± 23	-23*	-18 ± 24	-5.5 ± 19	-12*	0.10
NYHA Class	70%	27%	43%*	64%	32%	32%*	0.46

\* p-value <0.01; \*\* p-value <0.05; \*\*\* p-value <0.10

# BeAT-HF Phase III | Definition of Responder

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- **Clinically Relevant Responder**

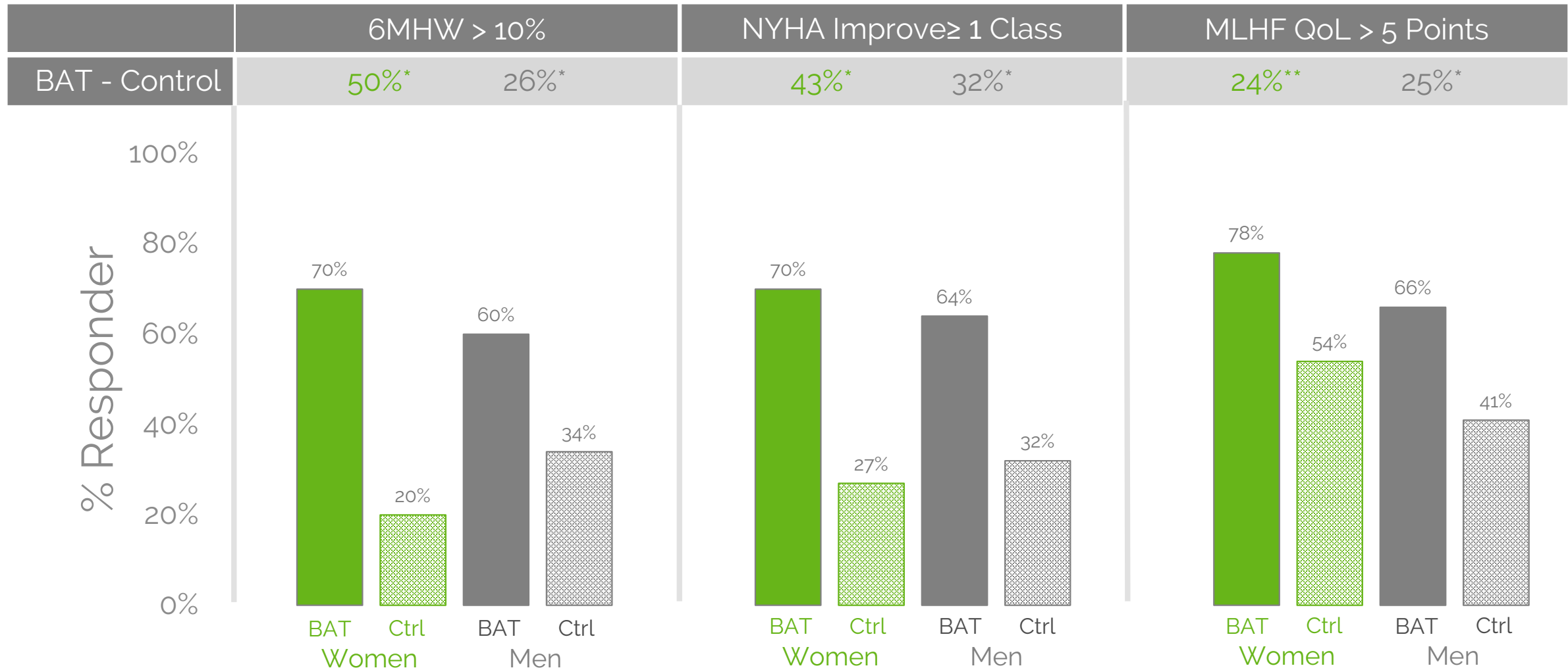
- 6MHW > 10% meter improvement
- NYHA  $\geq$  1 Class improvement
- QoL > 5 points improvement

- **Super Responder**

- 6MHW > 20% meter improvement
- NYHA improved to Class 1
- QoL > 10 points improvement

# BeAT-HF Phase II

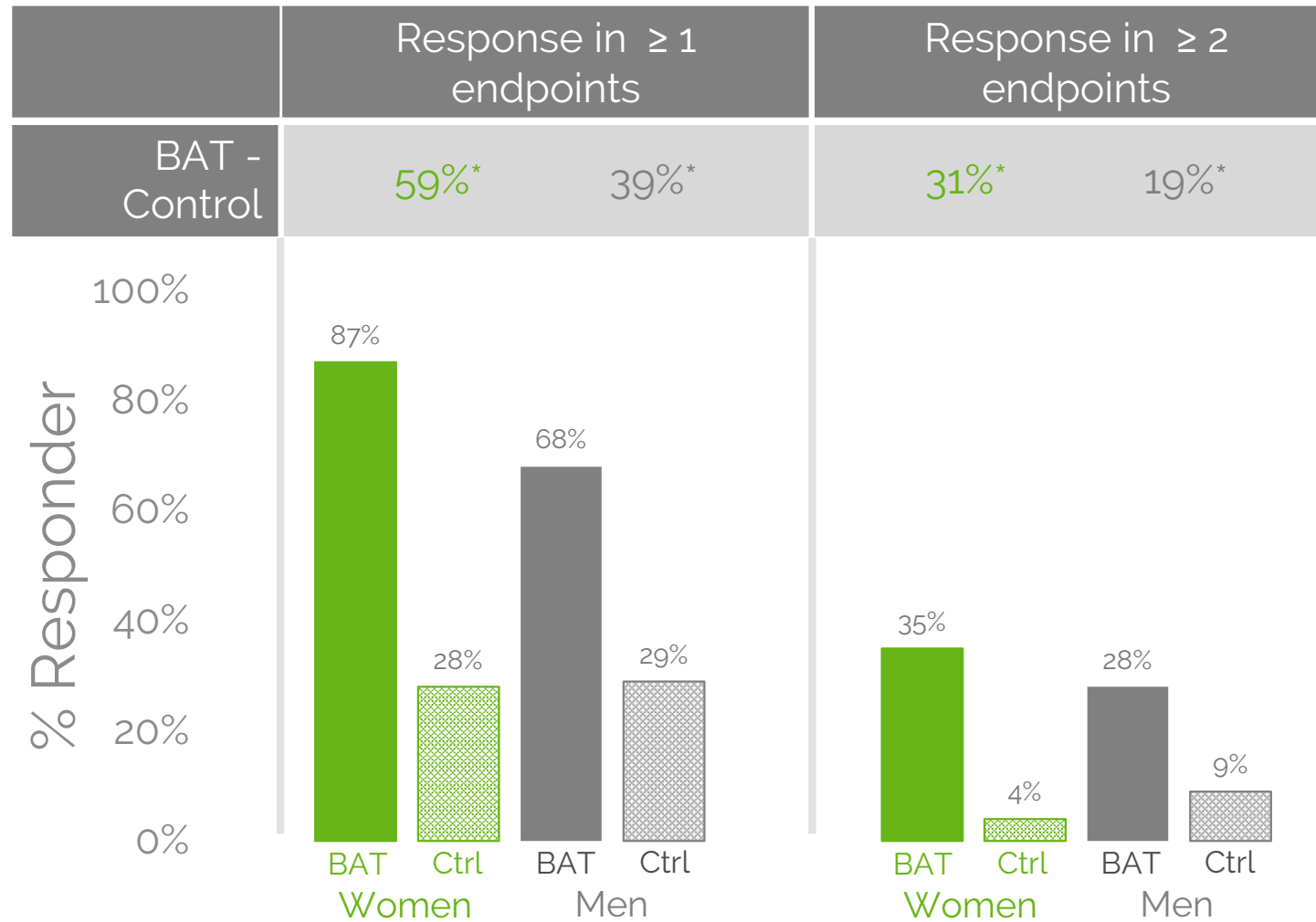
## Clinically Relevant Responder by Gender



\* p-value < 0.05; \*\* p-value < 0.10

# BeAT-HF Phase II

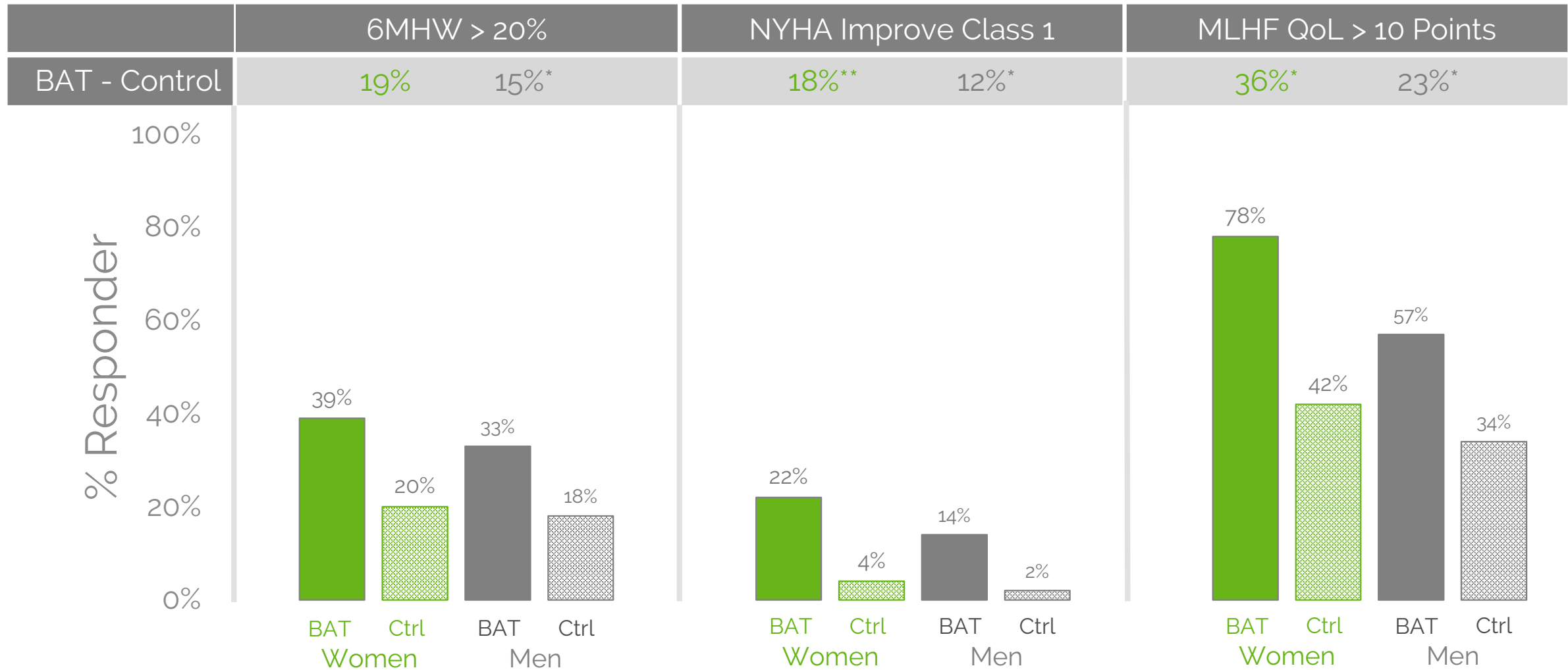
## Clinically Relevant Responder by Gender



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# BeAT-HF Phase II

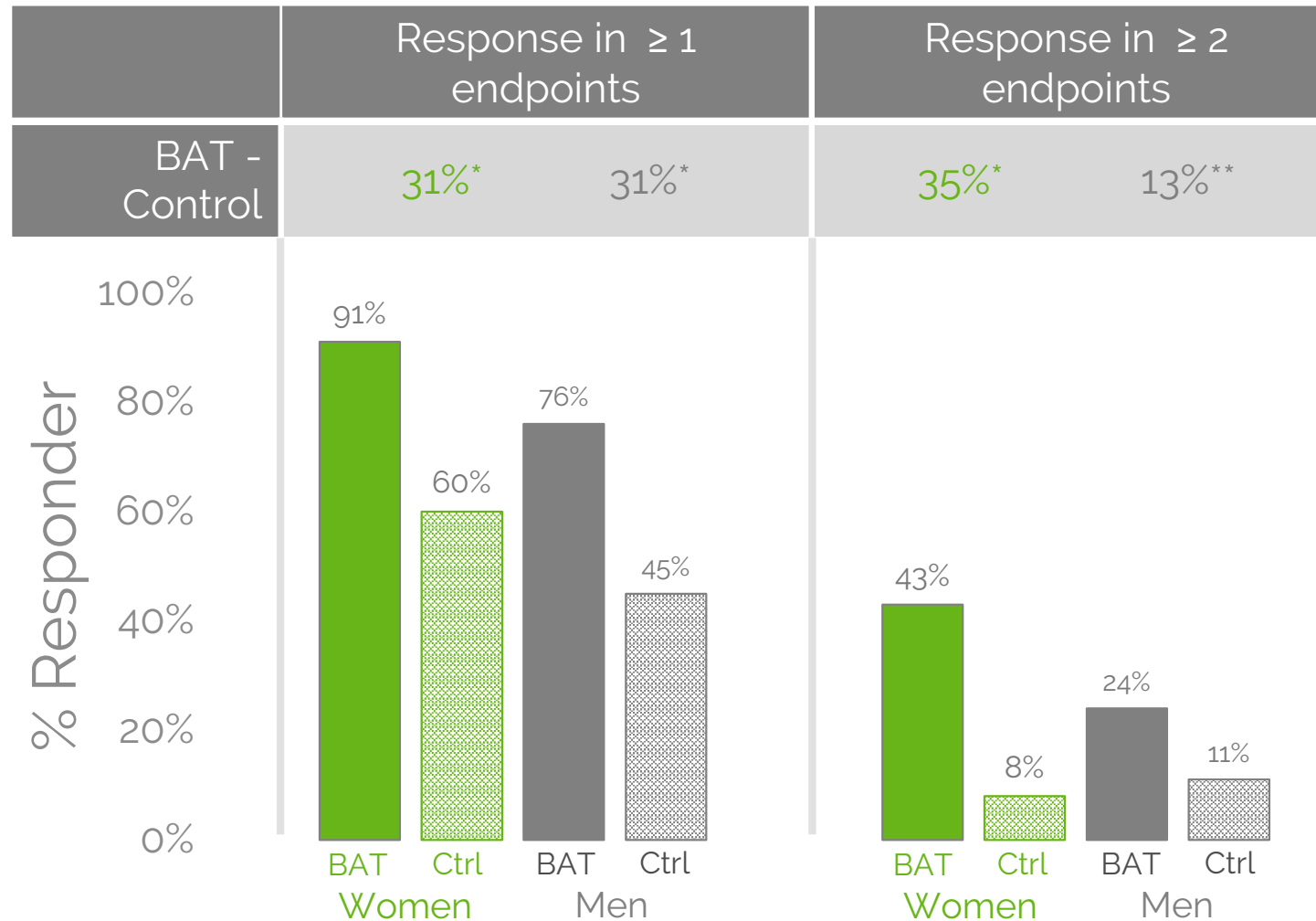
## Super Responder by Gender



\* p-value < 0.05; \*\* p-value < 0.10

# BeAT-HF Phase II

## Super Responder by Gender



\* p-value<0.05; \*\*p-value<0.10

# BeAT-HF Phase III | Conclusions

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- BAT provided significant improvement in 6MHW, NYHA class and QoL elements
- These improvements were observed in both women (n=49, 20%) and men (n=196, 80%)
- In symptomatic HFrEF patients, BAT improves multiple measures of functional status and is associated with very high responder rates in both women and men