# Risk Assessment and Comparative Effectiveness of Left Ventricular Assist Device and Medical Management in Ambulatory Heart Failure Patients (ROADMAP) – 2 Year Results

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**ISHLT 2016**

Cleveland Clinic

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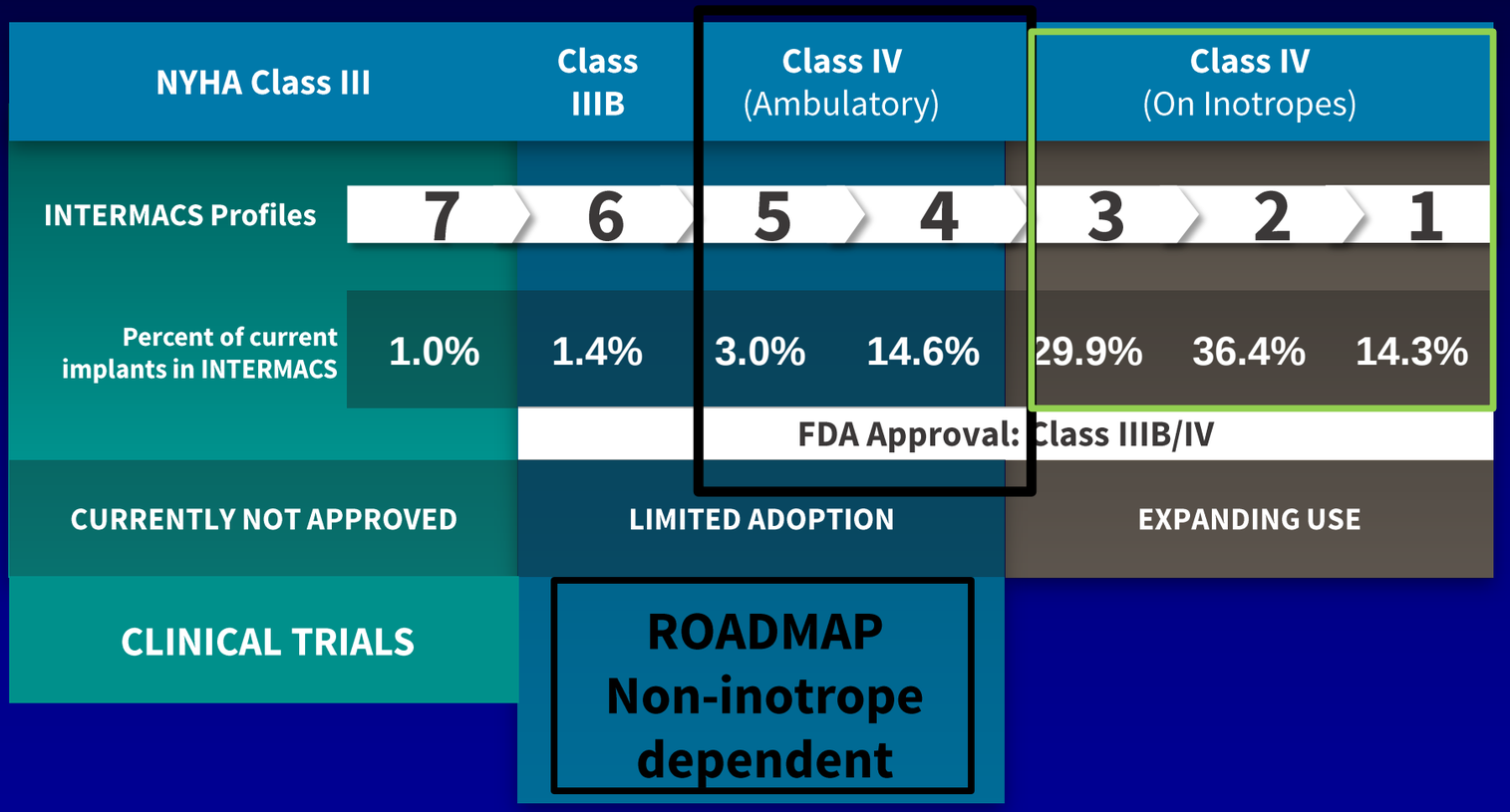
# INTRODUCTION
## *ROADMAP* Patient Population




Rogers et al. Am Heart J 2015;169:205-10

# Risk Assessment and Comparative Effectiveness of Left Ventricular Assist Device and Medical Management in Ambulatory Heart Failure Patients

## Results From the ROADMAP Study

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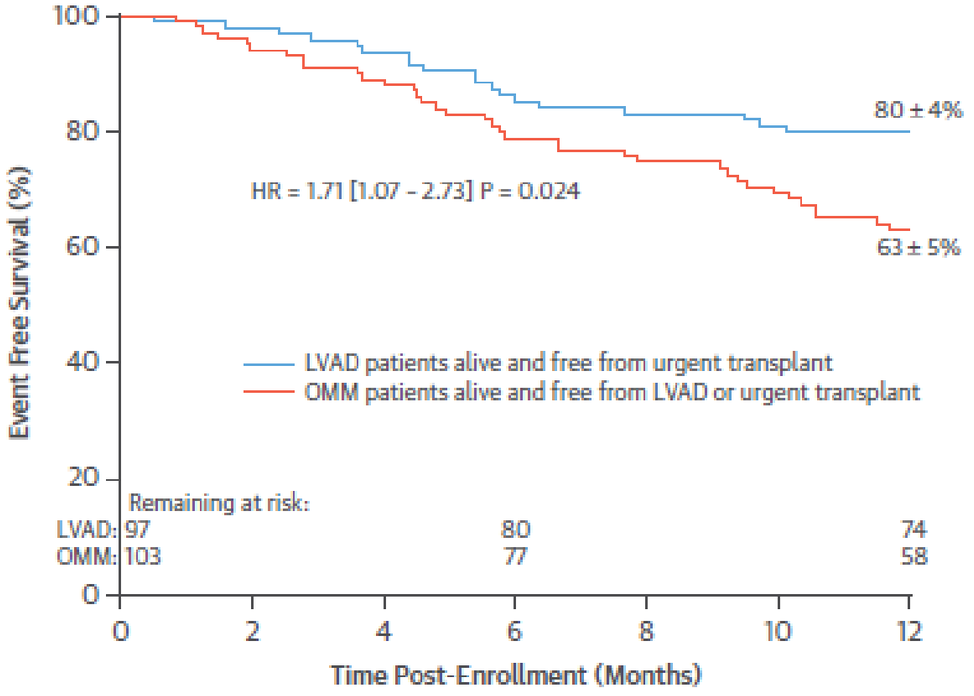
**FIGURE 2** Survival As-Treated




JACC 2015;vol 66:no 16

# Trial Design and Methods

- Primary endpoint
  - Composite of survival with improvement in 6MWD from baseline of ≥75 meters at 12 months
- Secondary endpoints
  - Actuarial survival
  - Health-related Quality of Life (HRQoL) using the EQ5D Visual Analog Scale (VAS)
  - Depression using Patient Health Questionnaire-9 (PHQ-0)
  - Functional status with 6MWD and NYHA classification
  - Adverse events
- Steering committee oversaw conduct of trial
- Independent biostatistician validated 1 yr study results

**PRE-SPECIFIED ENDPOINT**

**Evaluate primary and secondary endpoints at 2 years***

* Comparable to REVIVE-IT and FDA indication for DT

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# Baseline Data

| Characteristic | OMM (n=103) | LVAD (n=97) | P |
|---|---|---|---|
| Enrollment Age (yrs) | 66 (54-74) | 64 (55-70) | 0.269 |
| Male sex (%) | 71 (69%) | 75 (77%) | 0.204 |
| ACE Inhibitors or ARB (%) | 78 (76%) | 66 (68%) | 0.271 |
| Beta Blockers (%) | 99 (96%) | 84 (87%) | 0.021 |
| NYHA Class IIIB (%) | 77 (75%) | 47 (48%) | <0.001 |
| Class IV (%) | 26 (25%) | 50 (52%) | |
| INTERMACS Profile 4 (%) | 35 (34%) | 63 (65%) | <0.001 |
| Profile 5-7 (%) | 66 (66%) | 31 (35%) | |
| 6MWD (m) | 219 (157-269) (n=103) | 182 (122-259) (n=97) | 0.057 |
| EQ5D VAS | 55 (45-75) (n=99) | 50 (30-60) (n=93) | <0.001 |
| PHQ-9 | 7 (3-10) (n=101) | 10 (6-15) (n=96) | <0.001 |
| Moderately to extremely satisfied with current QoL | 53 (52%) | 20 (21%) | <0.001 |
| Not or slightly satisfied with current QoL | 48 (48%) | 75 (79%) | |

Median [Q1-Q3]

Estep et al. J Am Coll Cardiol 2015;66:1747-61

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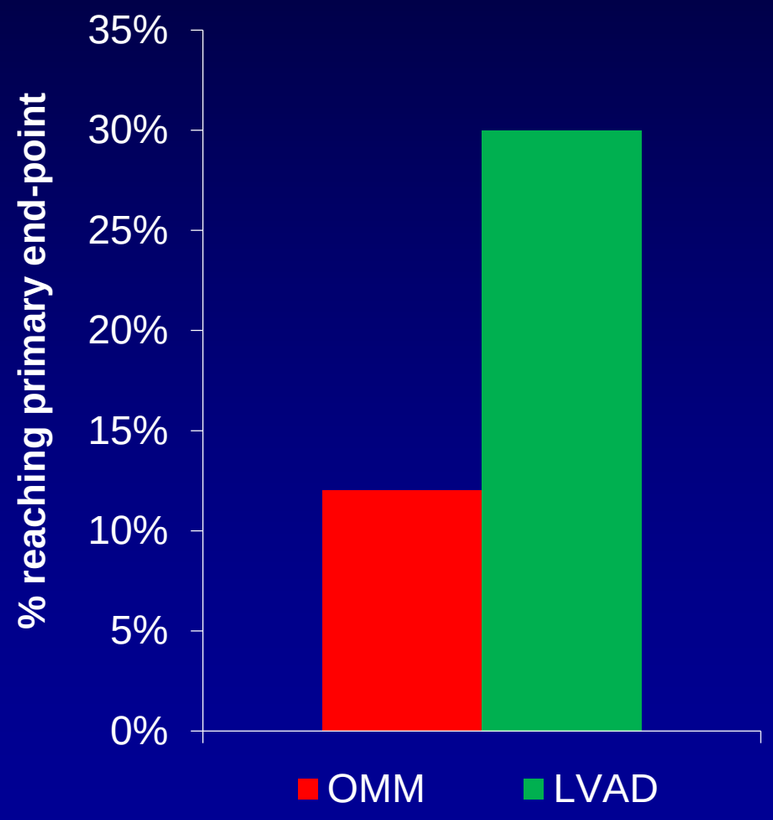
# Primary End-Point at 2 Years:

## Alive on original therapy with increase in 6MWD by 75 m

**O.R. = 3.2 (1.3-7.7) p=0.012**




| End Point | OMM (n=77)* | LVAD (n=67)* |
|---|---|---|
| Alive at 24 months on original therapy with increase in 6MWD by 75m | 9 (12%) | 20 (30%) |
| First event that prevented success: | N=68 (88%) | N=47 (70%) |
| Death | 31 (40%) | 25 (37%) |
| Urgent Tx | 1 (1%) | 3 (4%) |
| Delayed LVAD | 23 (30%) | NA |
| Delta 6MWT<75m at 2 yrs | 13 (17%) | 19 (28%) |

* Excluded OMM pts: 13 withdrawn, 13 missing 6MWD
  Excluded LVAD pts: 4 withdrawn, 5 elective HTx/explant, 21 missing 6MWD

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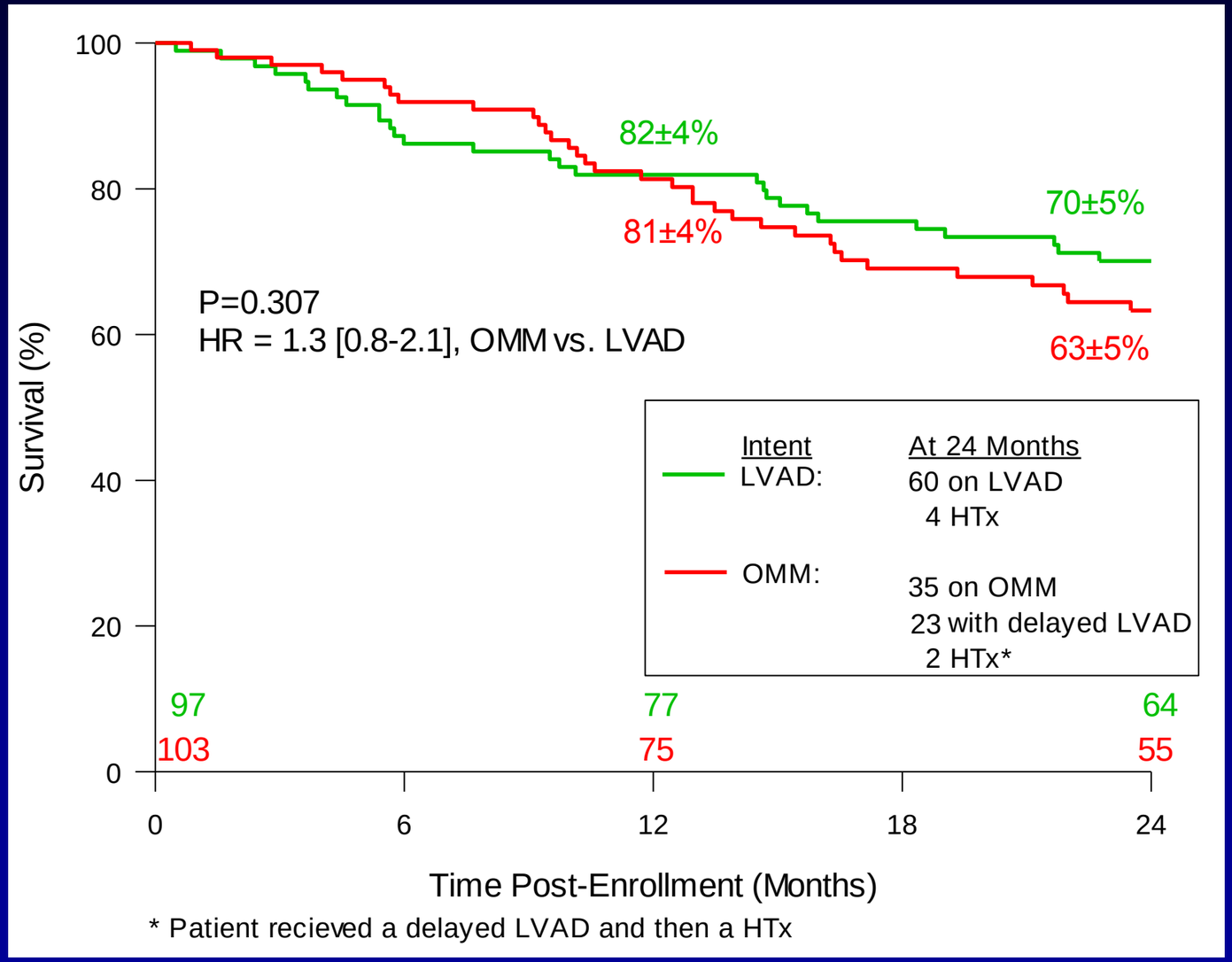
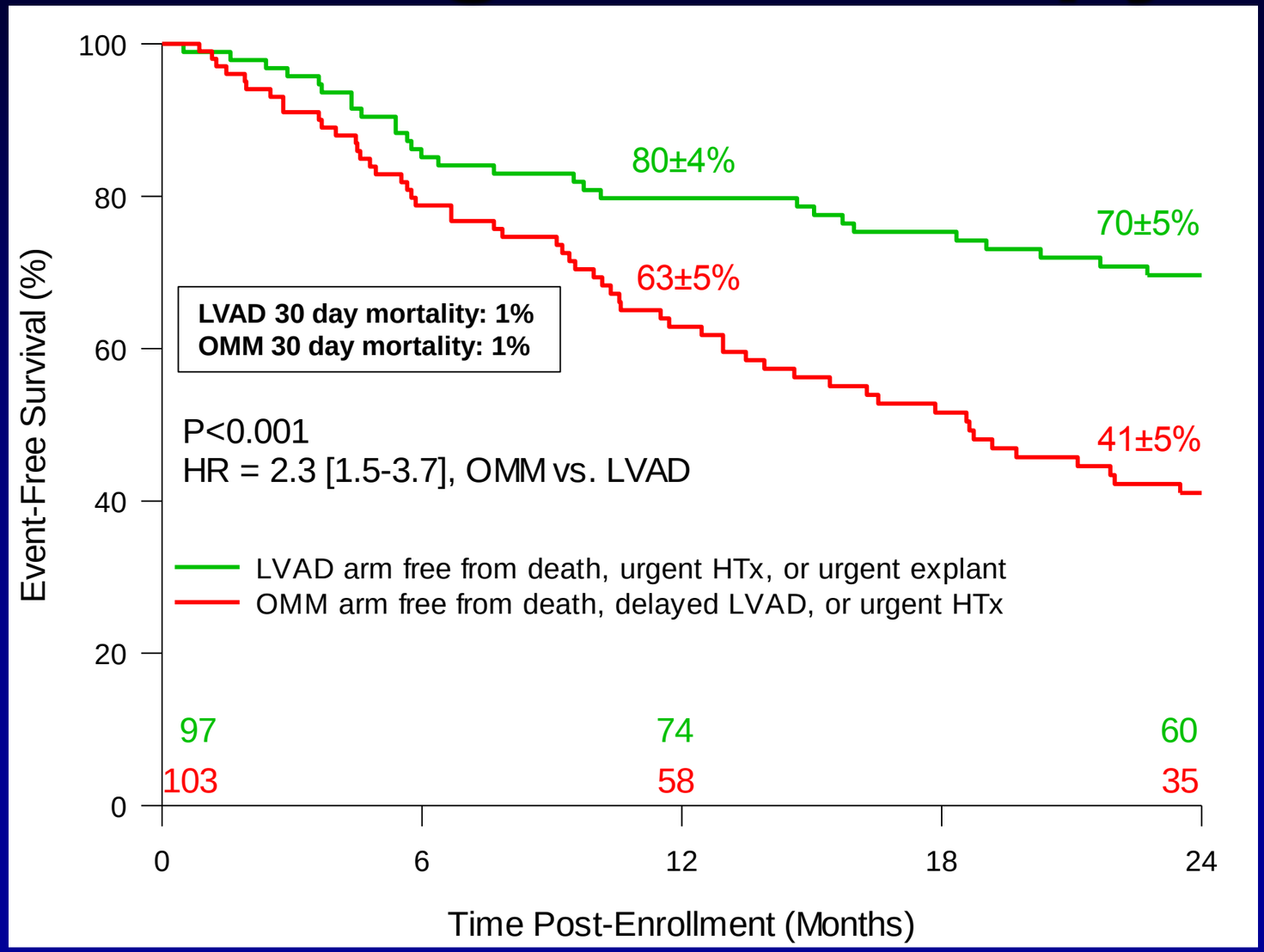
# Intention-to-Treat Survival



# Survival As-Treated on Original Therapy

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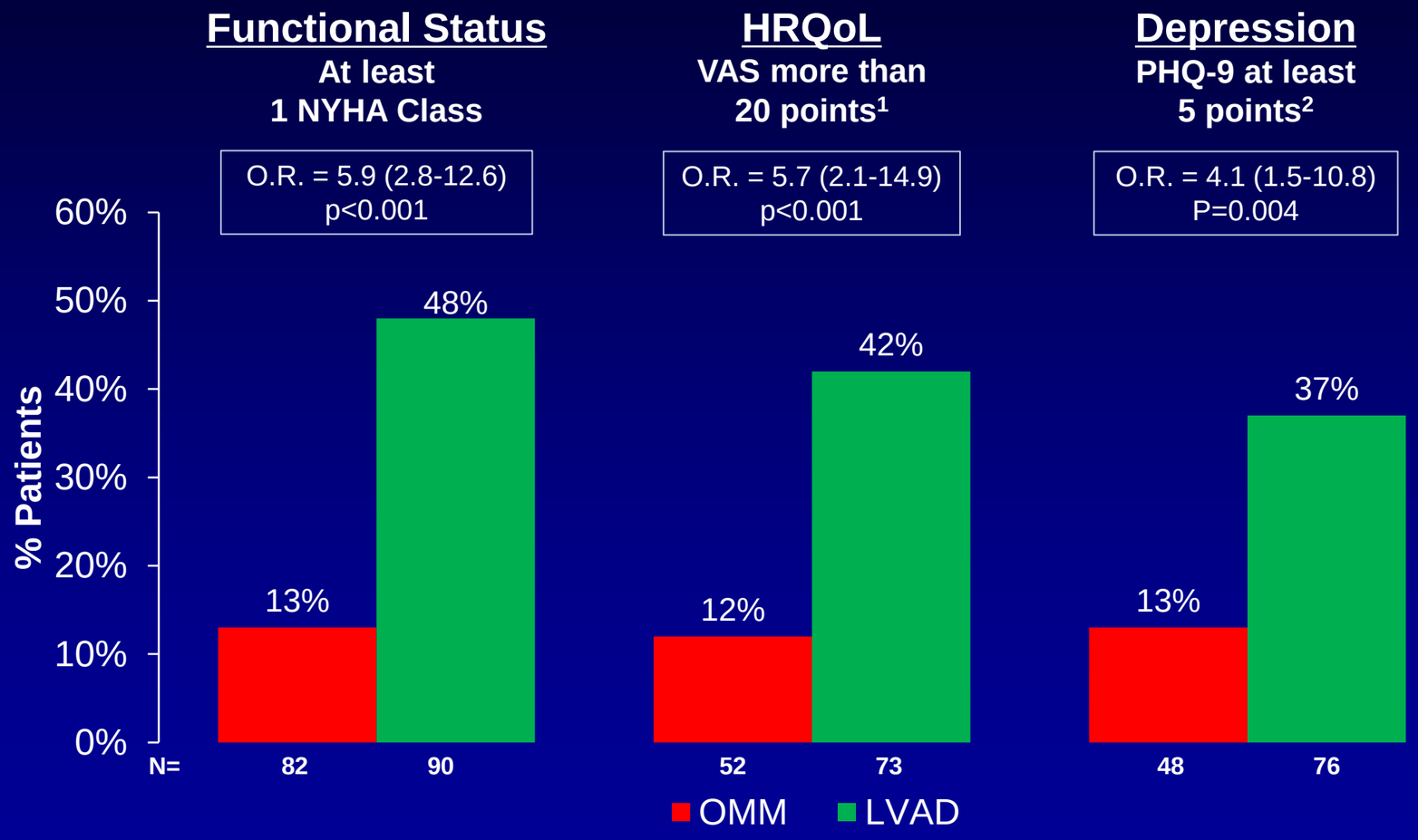
# Functional and QOL Outcomes

## 2-Year survival on original therapy with improvements in:




[1]In patients with VAS<68 (lowest 3 quartiles)
[2]In patients with PHQ-9≥5 (mild or worse severity of depression)

# Adverse Events

| Adverse Event | Year 1 OMM (n=103) Pt (%) eppy | Year 1 LVAD (n=94) Pt (%) eppy | Year 2 OMM (n=58) Pt (%) eppy | Year 2 LVAD (n=74) Pt (%) eppy |
|---|---|---|---|---|
| Bleeding | 2 (2%) 0.03 | 44 (47%) 1.49*** | 1 (2%) 0.02 | 20 (27%) 0.60*** |
| GI bleeding | 1 (1%) 0.01 | 29 (31%) 0.92*** | 1 (2%) 0.02 | 12 (16%) 0.39*** |
| Infection | 6 (6%) 0.09 | 48 (51%) 0.97*** | 4 (7%) 0.13 | 29 (39%) 0.68*** |
| Driveline Infection | NA | 10 (11%) 0.13*** | NA | 10 (14%) 0.17*** |
| Sepsis | 1 (1%) 0.01 | 17 (18%) 0.23*** | 0 | 8 (11%) 0.13* |
| Pump Thrombus | NA | 6 (6%) 0.07* | NA | 5 (7%) 0.09 |
| Stroke | 2 (2%) 0.025 | 8 (9%) 0.12* | 2 (3%) 0.04 | 3 (4%) 0.04 |
| Ischemic | 1 (1%) 0.013 | 5 (5%) 0.07 | 2 (3%) 0.04 | 3 (4%) 0.04 |
| Hemorrhagic | 1 (1%) 0.013 | 4 (4%) 0.05 | 0 | 0 |
| Arrhythmias VT/VF | 6 (6%) 0.10 | 17 (18%) 0.33** | 7 (12%) 0.16 | 4 (5%) 0.07 |
| Worsening Heart Failure | 39 (38%) 0.90 | 11 (12%) 0.16*** | 17 (29%) 0.62 | 4 (5%) 0.09*** |
| Re-hospitalizations | 65 (63%) 1.77 | 76 (81%) 2.67* | 24 (41%) 1.04 | 57 (77%) 2.40*** |
| "Composite" event rate[1] | 42 (41%) 1.05 | 62 (66%) 2.31*** | 20 (34%) 0.84 | 36 (49%) 1.06 |
| Relative Risk [95% CI] | OMM/LVAD: 0.46 [0.31-0.68]*** | | OMM/LVAD: 0.79 [0.46-1.36] | |

[1] sum of bleeding, driveline infection, thrombus, stroke, arrhythmias, and worsening HF

*p<0.05 , **p<0.01, ***p<0.001 LVAD vs OMM

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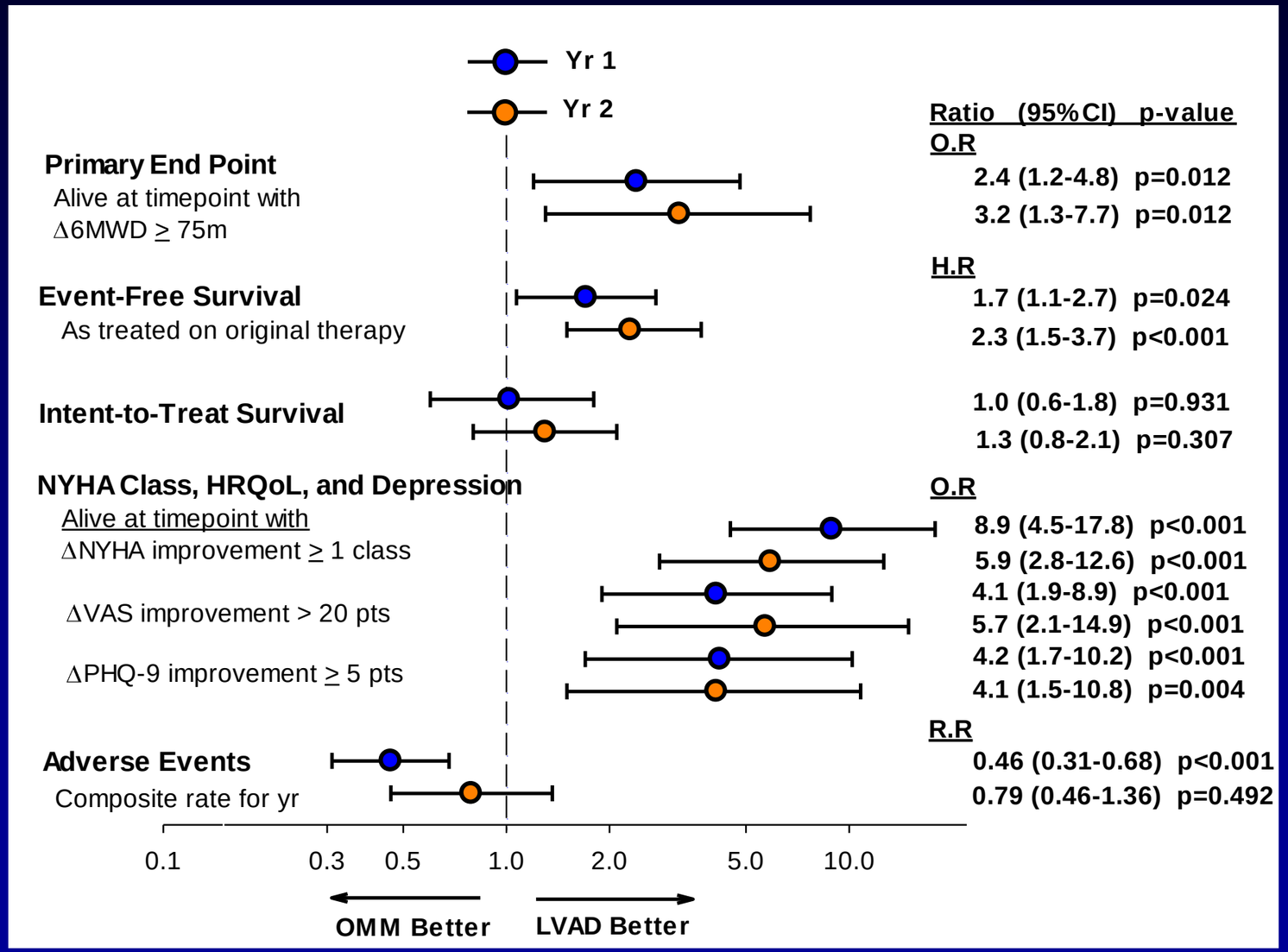
# Risk-Benefit Analysis




Yr 1: Estep et al. J Am Coll Cardiol 2015;66:1747-61

# Conclusions

- Survival with improved functional status, QoL, and less depression was observed with LVADs
- Delaying LVAD implant does not increase mortality
- The opportunity to improve QoL and functional status is delayed with OMM
- Trend for a reduction in LVAD adverse events in Year 2
- Shared decision making with the patient is important for weighing benefits and risks of LVAD therapy
  - TRADE OFF: improvement in QoL and functional capacity vs potential adverse events

Second year ROADMAP results **demonstrate the benefit** of HeartMate II LVAD in functionally limited non-inotrope dependent heart failure patients.

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