WELCOME *To the*

2026 SYMPOSIUM

Association of Multimorbidity and Frailty with Vascular Access Outcomes

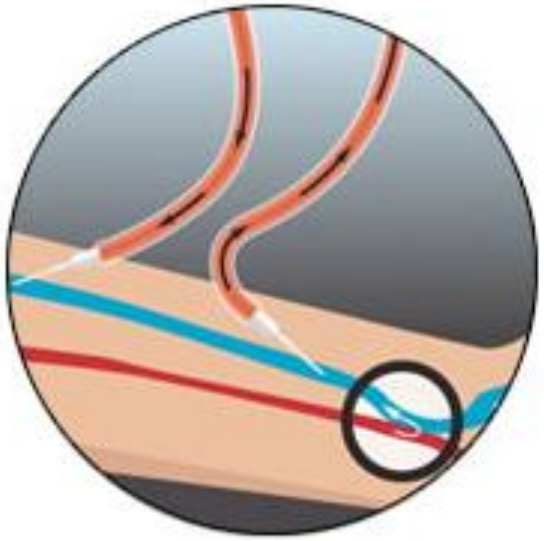
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Disclosures

- None

Hemodialysis Arteriovenous (AV) Access

- Arteriovenous fistula (AVF) traditionally considered ideal
- Achieving functional AVF use variable
- 2019 K-DOQI guideline update
  - ESKD Life Plan
  - Individualized dialysis access planning
- Limited reliable predictors of access outcomes



Frailty



- Increased vulnerability to stressors
  - Age-related decline
  - 30-40% of dialysis patients
  - Predictor of postoperative complications

- Increased frailty = ↑ time to functional access use*

* Woo, et al. *Am J Kidney Dis.* Volume 80: Pg. 30-45

Multimorbidity



- Presence of 2 or more chronic conditions
  - > 70% of dialysis patients
- Multimorbidity Weighted Index (MWI)*
  - More comprehensive measure of disease burden
  - Assigns weights based on impact on physical function
- Higher MWI
  - ↑ mortality
  - ↓ likelihood of AVF use within 6 months

* Wei, et al. *Am J Epidemiol*. 2018. Volume 187: Pg. 103-112

Intersection of Frailty and Multimorbidity

- Multimorbidity ≠ Frailty
- Both independently associated with AV access outcomes
  - Combined effect not examined

Objective

To compare the association between multimorbidity, frailty, and the combination of the two factors with AV access abandonment

Study Design and Data

- Retrospective cohort analysis
  - Private sector health data
  - > 350 payers
  - 2014 - 2023



Study Cohort

- **Identification of HD dependent patients undergoing first access**
- **Inclusion Criteria**
  - Age 18+
  - Arteriovenous access creation
  - Hemodialysis within 90 days after index access creation
  - Continuous enrollment for 12 months prior to index date
  - Chronic kidney disease diagnosis at/before access creation
- **Exclusion Criteria**
  - Revision surgery claim before access creation

Methods- Primary Exposures

- Multimorbidity
  - Measured by the MWI
  - Categorized into quartiles
- Frailty
  - Claims Based Frailty Index
  - Categorized as Normal, Pre-Frail, or Frail
- Combined exposure groups
  - MWI Q1 & Normal Frailty
  - MWI Q4 & Frail

Methods

Primary outcome = AV access abandonment

- Subsequent creation of a second access

  OR

- Placement of tunneled catheter without revision for at least two months

- Whichever came first

Methods

Group comparisons

- MWI Q1 (LOWMORBID) vs MWI Q4 (HIGHMORBID)
- Non-frail (NONFRAIL) vs frail (FRAIL)
- Combined
  - MWI Q1 & non frail (LOWMORBID-NONFRAIL)
    vs
  - MWI Q4 & frail (HIGHMORBID-FRAIL)

Statistical approach

- Cox proportional hazards

Clinical Characteristics of MWI Subgroups

Total cohort: 11,835	LOWMORBID N = 2,843	HIGHMORBID N = 3,006	P-value
Age, mean (SD)	56.4 (15.3)	67.0 (12.0)	<0.001
Sex, n (%) Male Female	 1810 (63.7) 1033 (36.3)	 1807 (60.1) 1199 (39.9)	0.005
Access Type, n (%) Fistula Graft	 2417 (85) 426 (15)	 2325 (77.3) 681 (22.7)	<0.001
MWI Score, mean (SD)	8.0 (1.7)	24.3 (4.7)	<0.001

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Clinical Characteristics of Frailty Subgroups

	NONFRAIL N = 1,895 (16%)	FRAIL N = 761 (6.5%)	p-value
Age, mean (SD)	56.7 (15.4)	66.3 (12.3)	<0.001
Sex, n (%) Male Female	 1238 (65.3) 657 (34.7)	 415 (54.5) 346 (45.5)	<0.001
Access Type, n (%) Fistula Graft	 1604 (84.6) 291 (15.4)	 565 (74.2) 196 (25.8)	<0.001

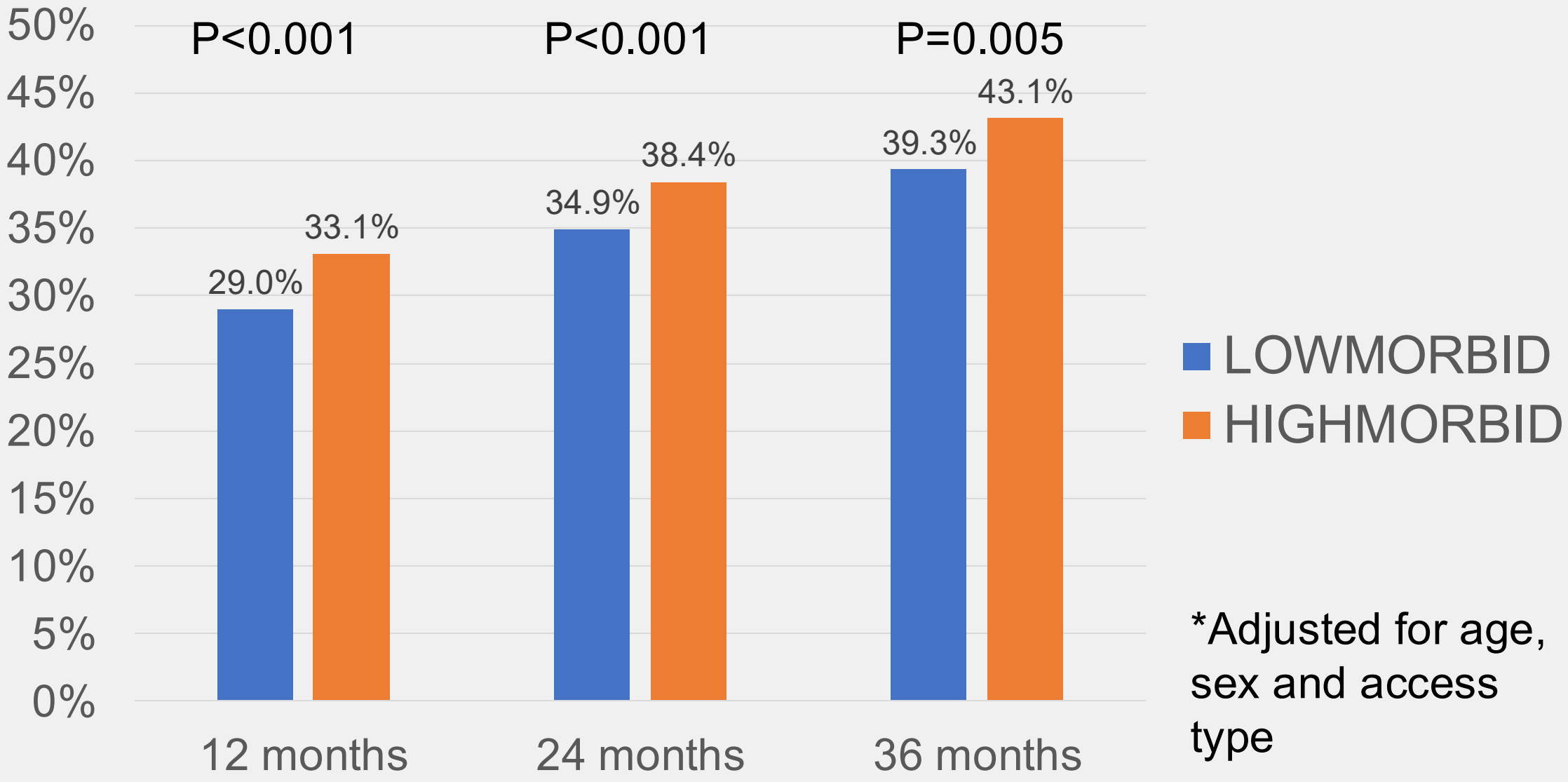
Combined Exposure Subgroups

		Frailty		
		Normal (N = 1,895)	Pre-Frail (N = 9,179)	Frail (N = 761)
MWI Quartiles	Q1 (N = 2,843)	1305 (11%)	1533	5
	Q2 (N = 2,992)	417	2532	43
	Q3 (N = 2,994)	143	2732	119
	Q4 (N = 3,006)	30	2382	594 (5%)

Clinical Characteristics of Combined Exposure Subgroups

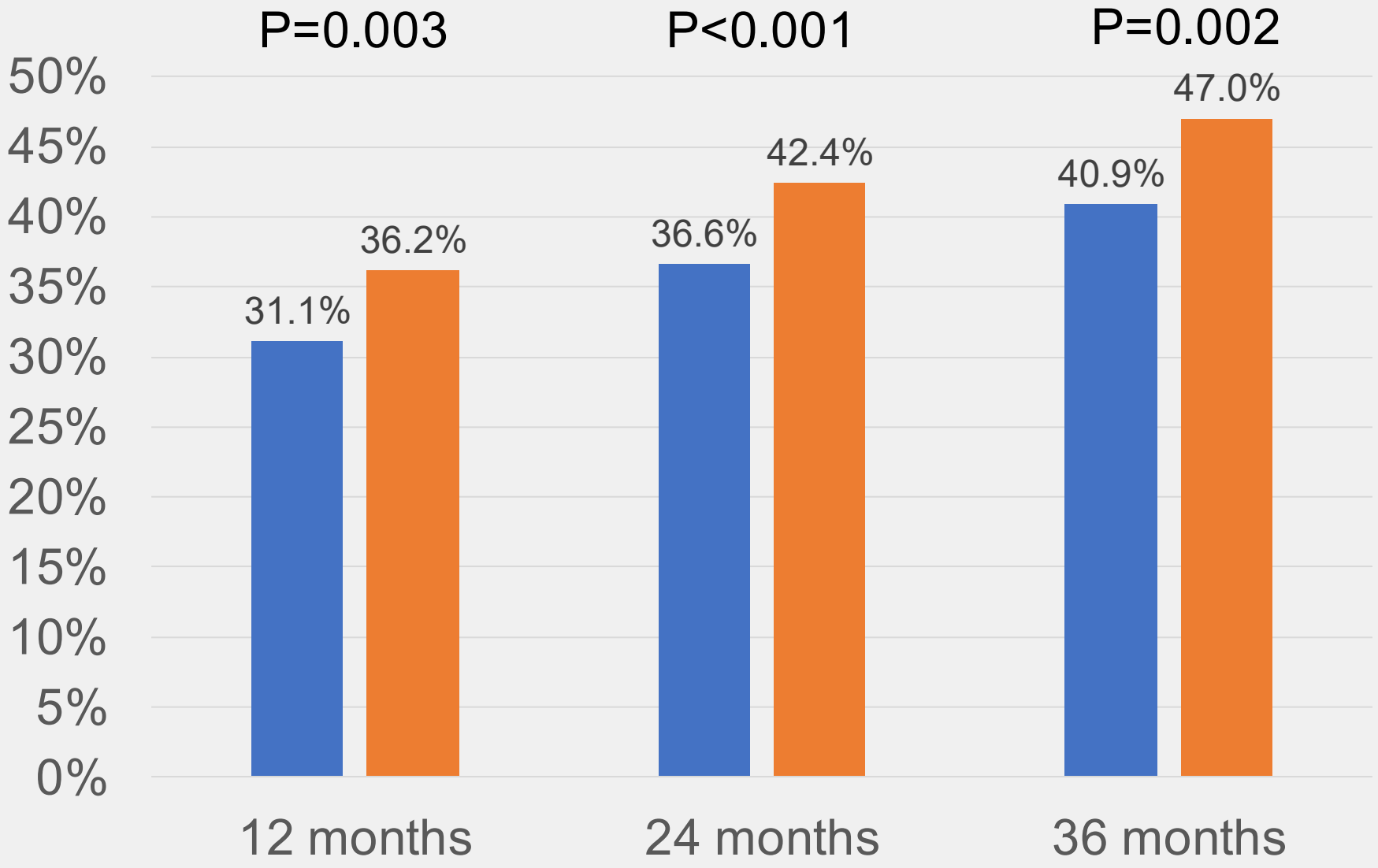
	LOWMORBID-NONFRAIL N = 1,305 (11%)	HIGHMORBID-FRAIL N = 594 (5%)	p-value
Age, mean (SD)	54.88 (15.4)	66.69 (11.9)	<0.001
Sex, n (%) Male Female	 859 (65.8) 446 (34.2)	 334 (56.2) 260 (43.8)	<0.001
Access Type, n (%) Fistula Graft	1105 (84.7) 200 (15.3)	433 (72.9) 161 (27.1)	<0.001

Incidence of Abandonment - MWI



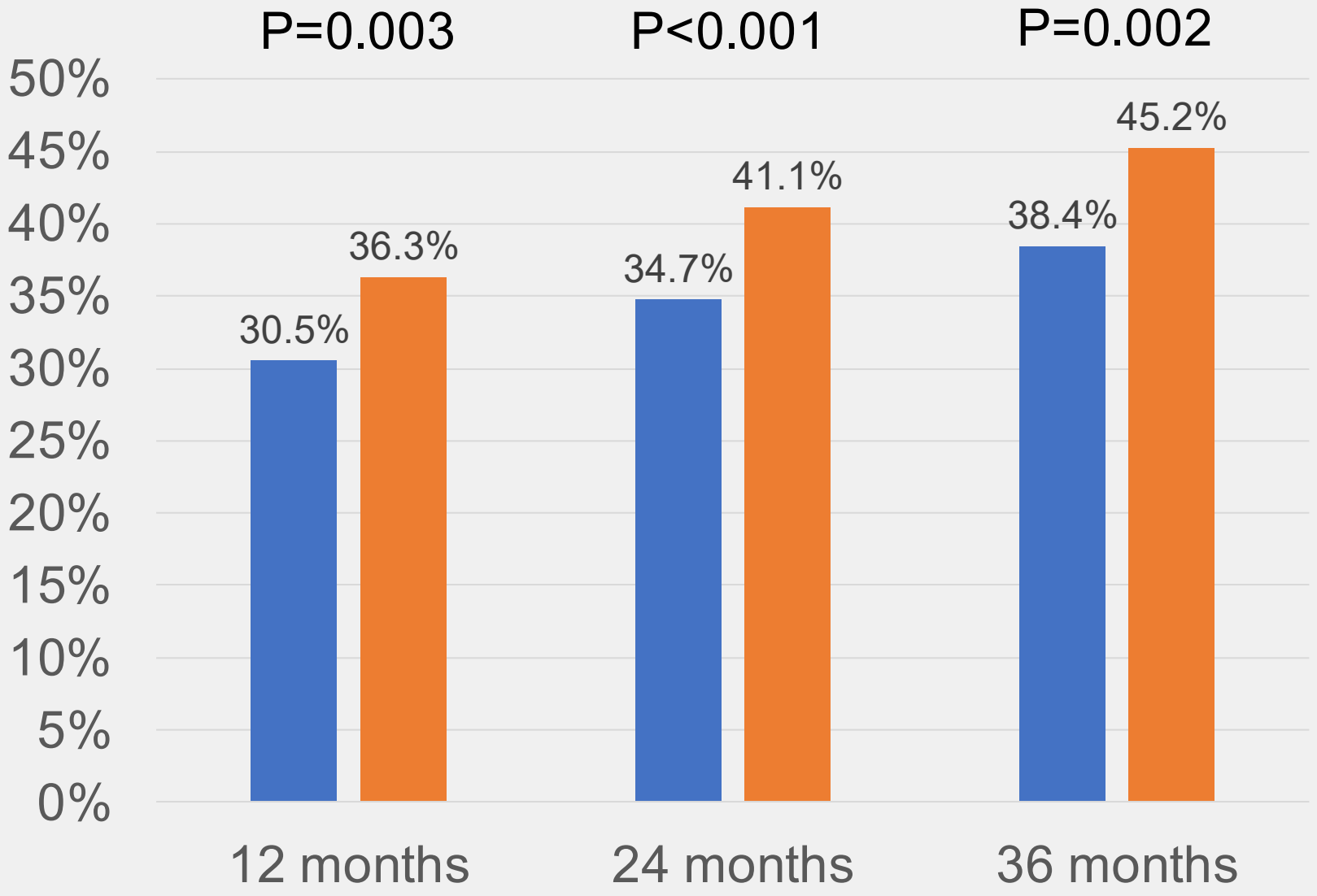
*Adjusted for age, sex and access type

Incidence of Abandonment - Frailty



*Adjusted for age, sex and access type

Incidence of Abandonment - Combined



*Adjusted for age, sex and access type

Multivariable Model: Abandonment

Group	Adjusted Hazard Ratio (95% CI)
LOWMORBID	Ref
HIGHMORBID	1.13 (1.03 - 1.24)
NONFRAIL	Ref
FRAIL	1.21 (1.04 - 1.40)
LOWMORBID-NONFRAIL	Ref
HIGHMORBID-FRAIL	1.24 (1.04 - 1.48)

*Adjusted for age, sex and access type

Limitations

- Privately insured cohort
  - Lower frailty incidence than the general ESKD population
  - Suggests a healthier baseline group
- Claims based frailty and MWI both rely on codes
  - Significant overlap
  - Clinical assessment of frailty may differ

Conclusions

- Combination of high multimorbidity and frailty independently associated with increased risk of HDVA abandonment
- Highest magnitude of risk = high multimorbidity and frailty combination
- May be indicator of who is least likely to benefit from HDVA and inform shared decision-making