

# Low-Cost Predictor for 1-Year Heart Failure Readmission

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**Background:** Heart failure exacerbation is a leading cause of hospitalization, morbidity and mortality in the United States. Readmission rates are high, leading to increased health care utilization and poor patient outcomes. Early risk stratification may guide clinicians towards patients who require closer outpatient follow up, thereby reducing overall readmission rates and improving patient outcomes. The aim of this study was to determine if a low-cost reliable predictor for heart failure readmission at one year was present at the time of index hospitalization.

## Methods:

- Retrospective Analysis
- Dayton, OH
- Heart failure admission
- N=329
- 42.6% Male
- Average Age 73
- 1-year follow up
- Readmitted vs Non-Readmitted
  - Multivariate Analysis
- Exclusion
  - Sepsis
  - Hgb<10 g/dL
  - Transfusions (within 3 months)
  - ACS (within 3 months)
  - Malignancy

## Comparison of Baseline Characteristics by Readmission Status

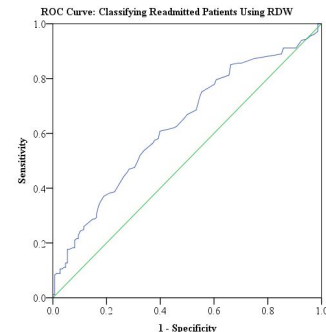
Variable	All Patients (N=329)	Readmitted within 1 year (n=181)	Not readmitted within 1 year (n=148)	p value
Age (years), median [IQR]	73 [19]	72 [19]	74 [20]	.225
Male sex, N (%)	152 (46.2)	86 (47.5)	66 (44.6)	.597
Body Mass Index >30, N (%)	160 (48.6)	89 (49.2)	71 (48.0)	.892
Hypertension, N (%)	306 (93.0)	171 (94.5)	135 (91.2)	.249
History of Myocardial Infarction, N (%)	129 (39.2)	80 (44.2)	49 (33.1)	.040
Atrial Fibrillation, N (%)	193 (58.7)	126 (69.6)	67 (45.3)	<.001
Left Ventricular Ejection Fraction (%), median [IQR]	20 [49.5]	20 [49.5]	20 [54.5]	.874
Mitral Regurgitation, N (%)	230 (69.9)	126 (69.6)	104 (70.7)	.823
Right Ventricular Dysfunction, N (%)	42 (12.8)	28 (15.5)	14 (9.5)	.109
Aortic Stenosis, N (%)	59 (17.9)	37 (20.4)	22 (15.0)	.199
Type II Diabetes Mellitus, N (%)	207 (62.9)	118 (65.2)	89 (60.1)	.345
Current Smoker, N (%)	198 (60.2)	117 (64.6)	81 (55.1)	.079
Heavy Alcohol Use, N (%) <sup>†</sup>	44 (13.4)	20 (11.0)	24 (16.2)	.171
Creatinine (mg/dL), median [IQR]	1.3 [0.7]	1.3 [0.7]	1.4 [0.8]	.797
Albumin (g/dL), median [IQR]	3.2 [0.7]	3.1 [0.8]	3.2 [0.7]	.060
Pacemaker, No. (%)	118 [35.9]	80 (44.2)	38 (25.7)	<.001
History of Inotrope Use, N (%)	48 (14.6)	34 (18.8)	14 (9.5)	.017
RDW (%), median [IQR]	15.5 [2.9]	16.2 [3.3]	15.1 [2.7]	<.001
Pro B-Type Natriuretic Peptide (pg/mL), median [IQR]	3730 [9245]	3687 [11613]	3804 [8371]	.337

**Conclusion:** This study found that any history of atrial fibrillation and an elevated RDW (>15%) were cost effective independent predictors for 1-year acute heart failure readmission when identified during index hospitalization. These metrics may potentially be used in the future to monitor progression of heart failure and/or predict an episode of acute decompensation.

**Results:** There was an increased incidence of atrial fibrillation, pacemaker placement, history of previous inotrope use, history of myocardial infarction and RDW ≥15% amongst patients readmitted within one year. On multivariate logistic regression analysis, any history of atrial fibrillation (p=0.002; OR 2.19, 95% CI 1.34, 3.58) and an RDW ≥15% on initial presentation (p=0.007; OR 1.18, 95% CI 1.05, 1.34) were associated with an increased rate of one year readmission. The RDW ≥15% had a satisfactory area under the receiver operating characteristic (ROC) curve (0.63).

## Multivariate Logistic Regression Analysis

Variable	Odds Ratio	95% Confidence Interval	p value
History of Myocardial Infarction	1.38	0.74, 2.56	.311
History of Atrial Fibrillation	2.19	1.34, 3.58	.002
Pacemaker Placement	1.47	0.87, 2.48	.148
History of Inotrope Use	1.61	0.79, 3.29	.192
RDW (>15%)	1.18	1.05, 1.34	.007



Area under ROC curve = 0.63



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