

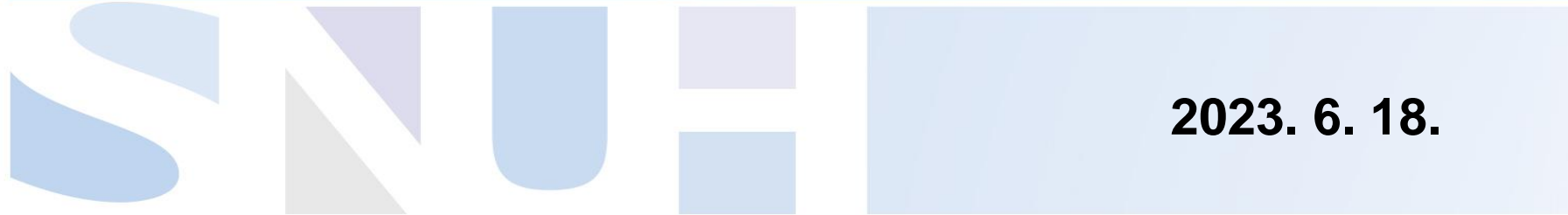


Korean Society of Cardiology @ HKCC: Advanced Heart Failure and Heart Transplantation



# Korean Heart Failure Registry

## : KorAHF (2011~2019) & KorHF-III (2018~ongoing)



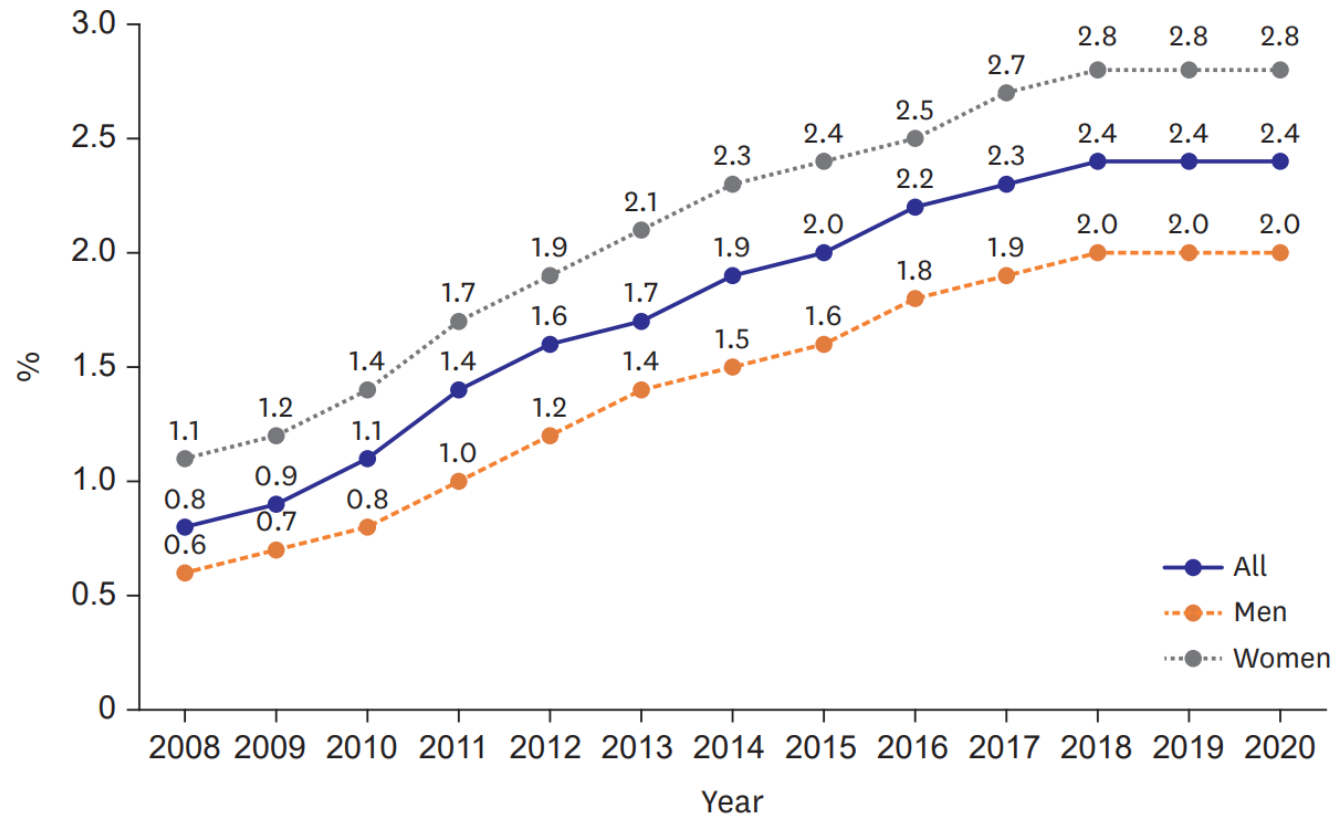
2023. 6. 18.

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Hyun-Jai Cho, M.D., Ph.D

# Increasing Prevalence of Heart Failure in KOREA

The prevalence of HF showed an increasing trend from **0.81% in 2008 to 2.38% in 2020**. In 2020, a total of **524,280 men and 733,695 women** with HF were identified



**Figure 1.** Temporal trends in heart failure from 2009 to 2020 in Korea using the Korean National Health Insurance Service claim data.

The crude **incidence** rate of HF was 453 in 2004 and it increased to **579 per 100,000 persons** in 2018 (an increase of 22%).

# We have been working on 3 Heart Failure registry in KOREA

- ✓ KorHF (2004-2009) (N=3,200)
  - ✓ **KorAHF (2011-2019) (N=5,625)**
  - ✓ **KorHF-III (2018-ongoing) (N=7,448)**
- hospitalized patients

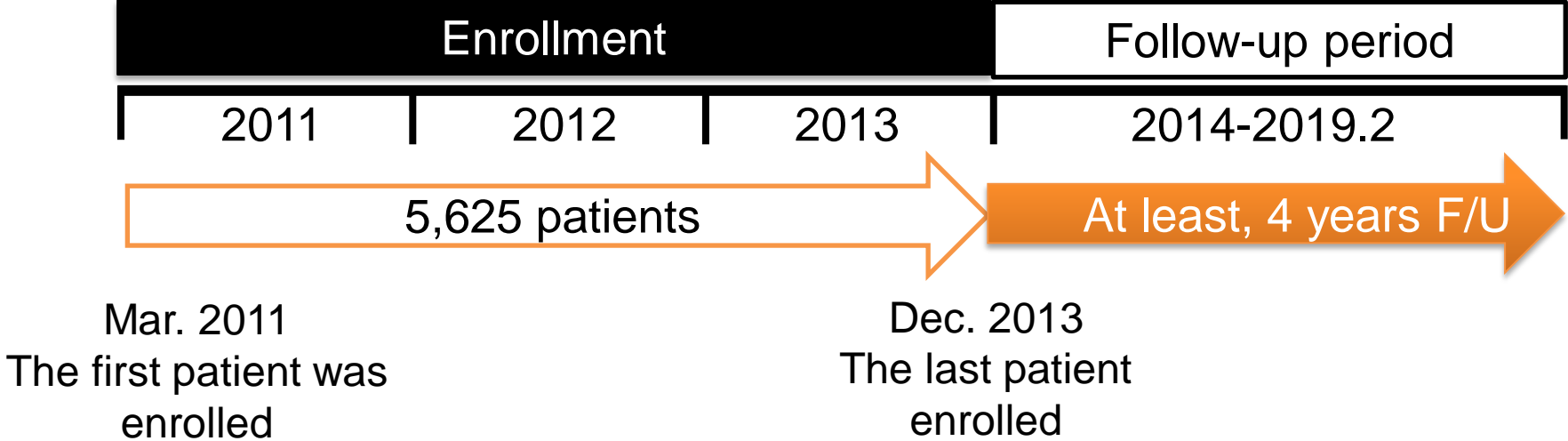
# KorAHF Registry had been followed up until 2019

## Criteria of enrollment

*Patients admitted for AHF with following criterion 1 and 2 and/or 3*

- 1. Symptoms and signs of heart failure**
- 2. Lung congestion**
- 3. Objective finding of LV systolic dysfunction or structural heart ds**

10 university hospitals



\*Korea CDC and NIH sponsored registry

# Variations in the clinical profiles of patients with acute HF

	Korea	Japan	U.S.A.	Europe	Africa	Asia-Pacific
Registry	<b>KorAHF</b>	ATTEND	ADHERE	EHFSII	THESUS-HF	ADHERE-Int
Years	2011.3~2014.2	2007.5-2011.12	2001.9-2004.1	2004.10-2005.8	2007.7-2010.6	2006.1-2008.12
Sample size	5,625	4,841	105388	3580/2981	1006	10,171
Follow-up duration	>3.0 years	>3 years	N/A	3-, 12-month	N/D	N/A
<b>Demographics</b>						
Age	<b>68 (14)</b>	73 (14)	72 (14)	70 (13)	52(18)	66[53-77]
Male	53%	58	48	61	49	57
<b>Comorbidities</b>						
HTN	<b>59%</b>	69	75	63	56	64
DM	36%	37	44	33	11	45
AF	<b>28%</b>	40	31	39	18	24
Chronic lung disease	11%	12	31	19	N/A	N/A
<b>Clinical status on admission</b>						
De novo HF	<b>52%</b>	63	24	37	N/A	36
Creatinine	1.5 (1.5)	1.4 (1.7)	1.8 (1.6)	N/A	1.4 (1.2)	N/A
Heart rate	93 (27)	99 (29)	N/A	median 95	104 (22)	N/A
SBP	<b>131 (30)</b>	146 (37)	144 (33)	median 135	130 (34)	N/A
EF <40%	<b>52%</b>	53	47	46	N/A	53

# Variations in the clinical profiles of patients with acute HF

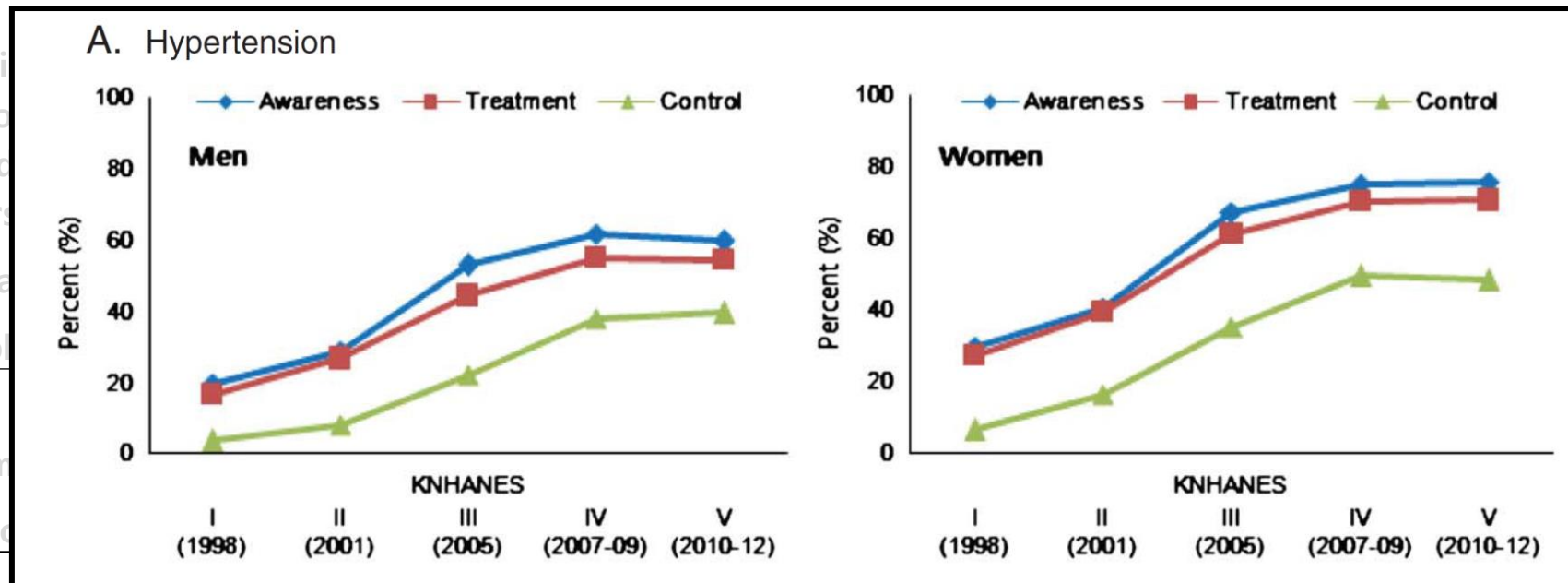
	<b>Korea</b>	Japan	U.S.A.	Europe	Africa	Asia-Pacific
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<b>Sample size</b>	5627	4,841	105388	3580/2981	1006	10,171
<b>Follow-up duration</b>	>3.0 years	>3 years	N/A	3-, 12-month	N/D	N/A
<b>Etiology</b>						
<b>Ischemic</b>	<b>37%</b>	<b>31</b>	<b>57</b>	<b>30</b>	<b>8</b>	<b>50</b>
<b>Hypertensive</b>	<b>4%</b>	<b>18</b>	<b>N/A</b>	<b>11</b>	<b>45</b>	<b>N/A</b>

## Management

IV di  
IV inc  
IV vasoc  
ACE inhibitor  
Aldosterone anta  
Beta-b

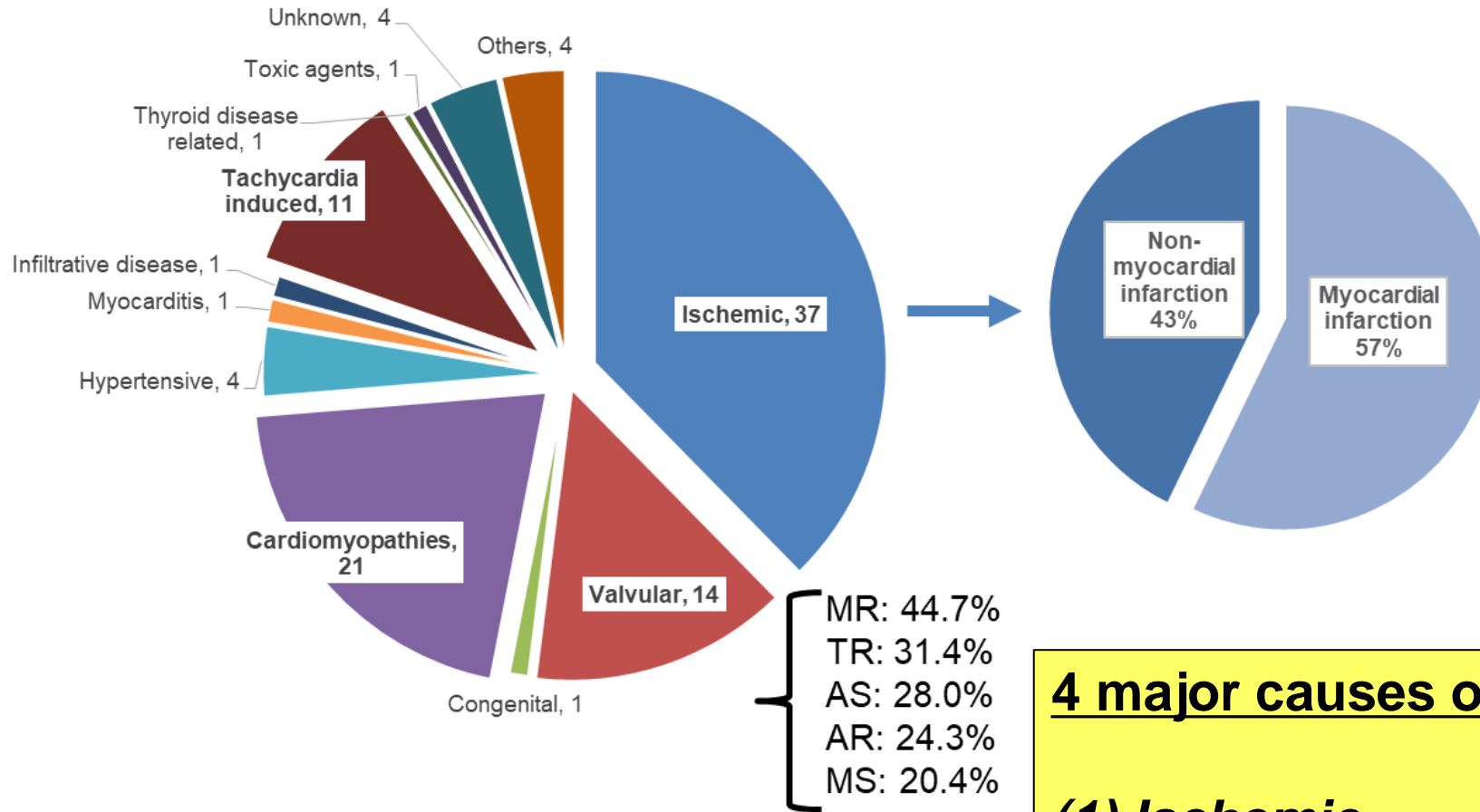
## Outcome

length of stay (m  
in-hospital mo



85  
15  
14  
63  
31  
41  
6  
4.8

# Etiology of heart failure in KorAHF registry



**4 major causes of heart failure (83.3%)**

- (1) Ischemic**
- (2) Cardiomyopathy (mainly, D-CMP)**
- (3) Valvular heart disease**
- (4) Tachycardia-induced (mainly, Af with RVR)**

# Aggravating factors in KorAHF registry

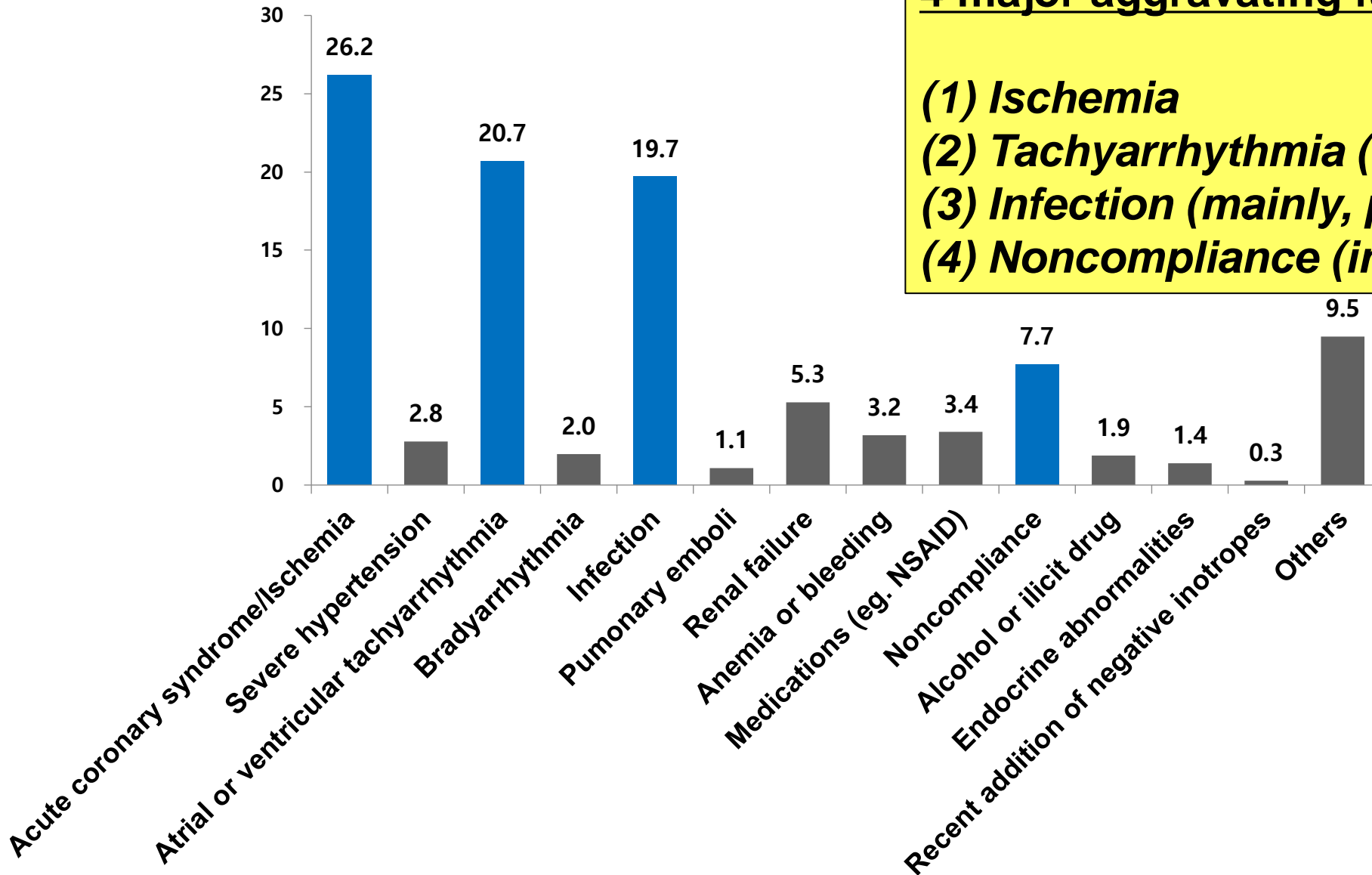
4 major aggravating factors (66.7%)

*(1) Ischemia*

*(2) Tachyarrhythmia (mainly, Af with RVR)*

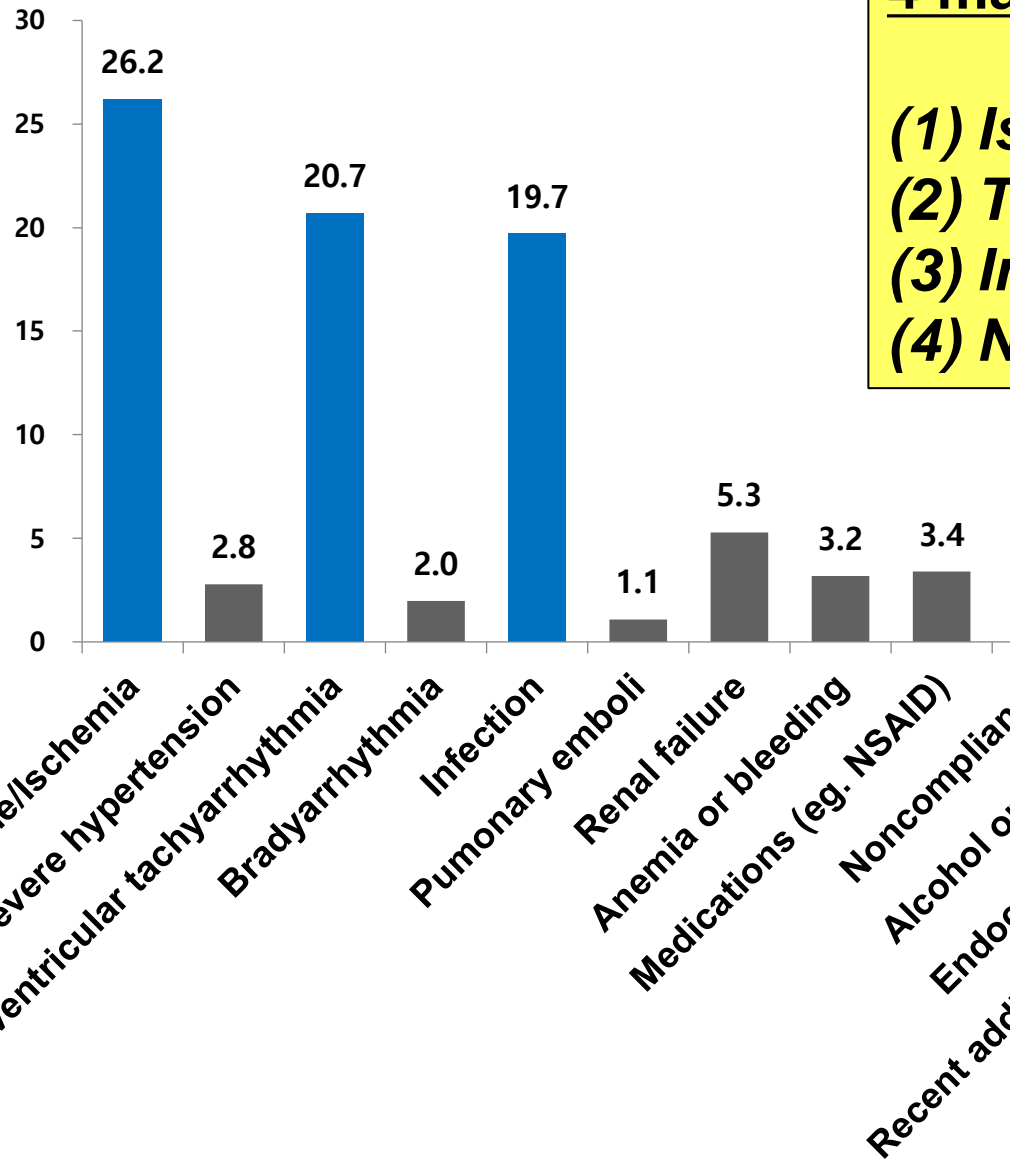
*(3) Infection (mainly, pneumonia)*

*(4) Noncompliance (including high salt diet)*



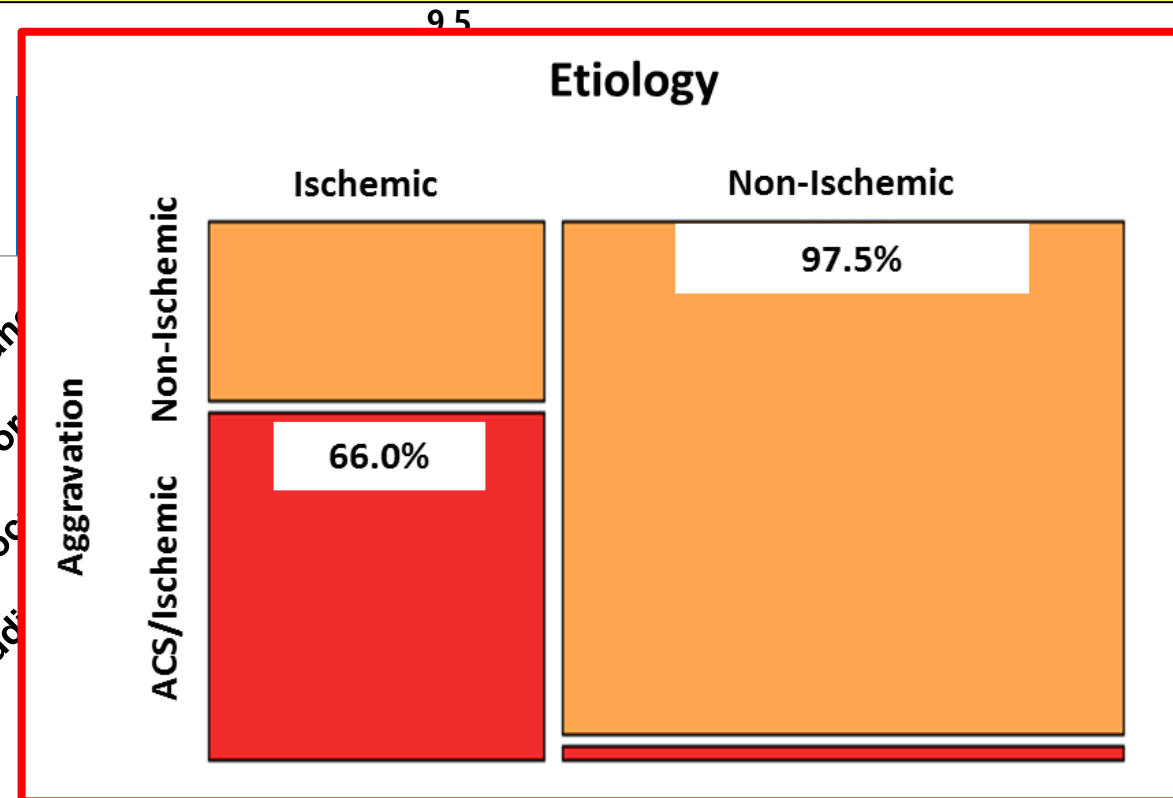


# Aggravating factors in KorAHF registry



**4 major aggravating factors (66.7%)**

- (1) Ischemia**
- (2) Tachyarrhythmia (mainly, Af with RVR)**
- (3) Infection (mainly, pneumonia)**
- (4) Noncompliance (including high salt diet)**

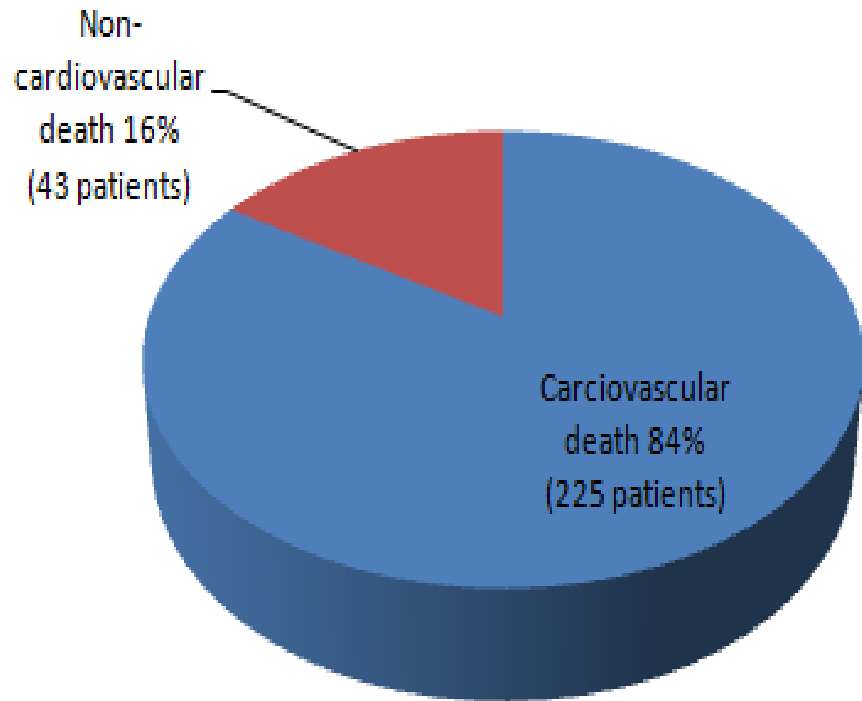


# Acute management & outcome at index hospitalization

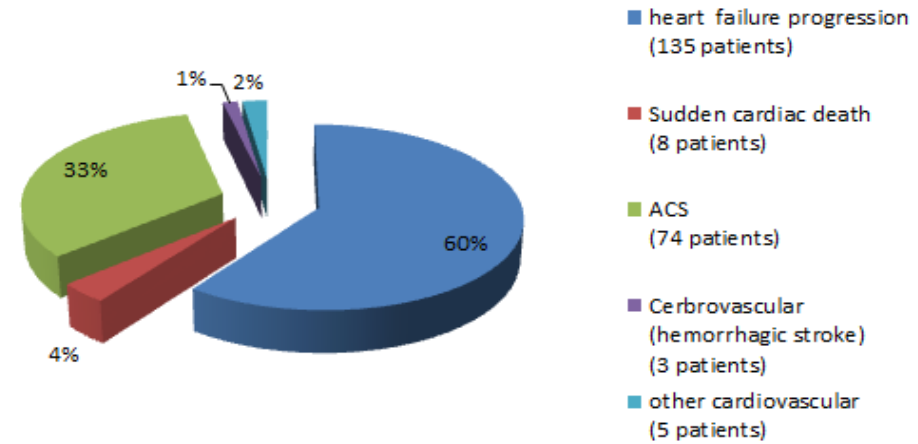
	<b>Korea</b>	<b>Japan</b>	<b>U.S.A.</b>	<b>Europe</b>	<b>Africa</b>	<b>Asia-Pacific</b>
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Hypertensive	<b>4%</b>	<b>18</b>	<b>N/A</b>	<b>11</b>	<b>45</b>	<b>N/A</b>
<b>Management</b>						
<b>IV diuretics</b>	<b>75%</b>	<b>76</b>	<b>87</b>	<b>84</b>	<b>93</b>	<b>85</b>
<b>IV inotropes</b>	<b>31%</b>	<b>18</b>	<b>8</b>	<b>&lt;29.8</b>	<b>~10.1</b>	<b>15</b>
<b>IV vasodilators</b>	<b>41%</b>	<b>78</b>	<b>7</b>	<b>38</b>	<b>7.0 (nitrates)</b>	<b>14</b>
ACE inhibitors /ARBs	<b>66%</b>	<b>N/A</b>	<b>67</b>	<b>80</b>	<b>80-90</b>	<b>63</b>
Aldosterone antagonist	<b>45%</b>	<b>N/A</b>	<b>20</b>	<b>48</b>	<b>60-70</b>	<b>31</b>
Beta-blockers	<b>50%</b>	<b>N/A</b>	<b>74</b>	<b>61</b>	<b>40-50</b>	<b>41</b>
<b>Outcome</b>						
<b>length of stay (median)</b>	<b>9 days</b>	<b>21</b>	<b>4.3</b>	<b>9</b>	<b>7</b>	<b>6</b>
<b>in-hospital mortality</b>	<b>4.9%</b>	<b>6.4</b>	<b>3.8</b>	<b>6.7</b>	<b>4.2</b>	<b>4.8</b>

# Cause of death during index hospitalization

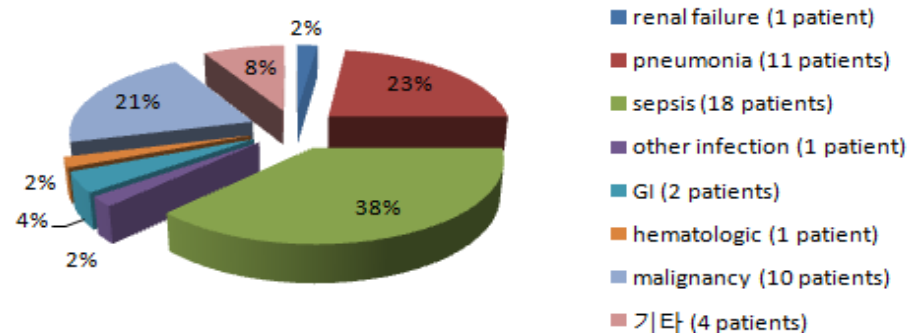
- 269 in-hospital death cases adjudicated



Cause of in-hospital death



Cause of cardiovascular death



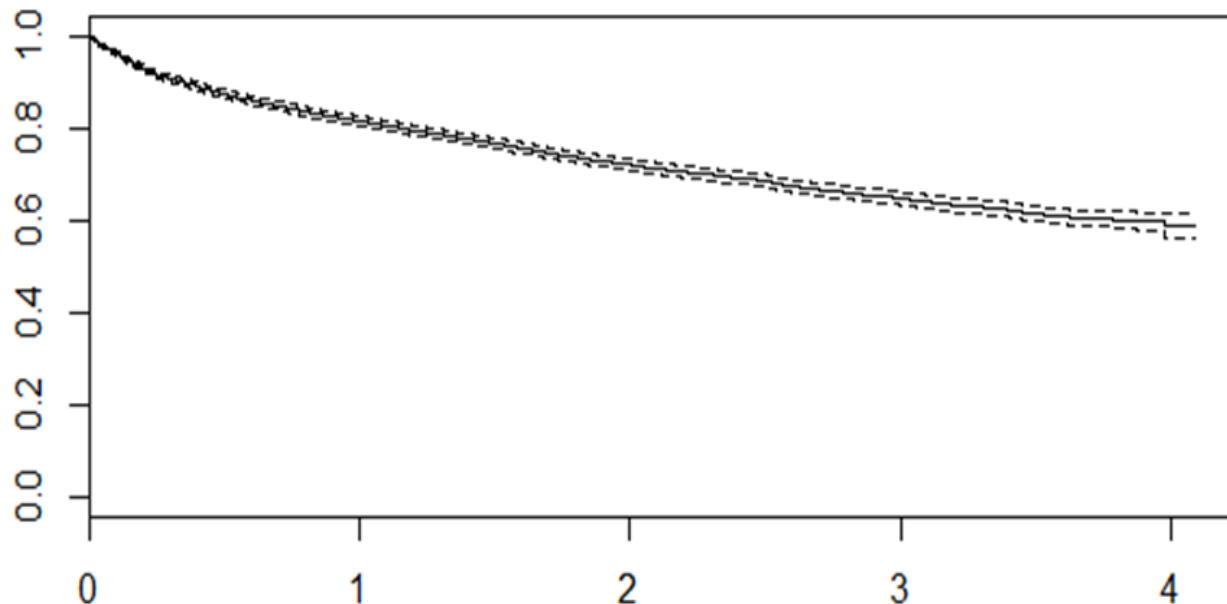
Cause of non-cardiovascular death

# Outcome during index hospitalization & after discharge

- In-hospital mortality rate: 4.9%
- Urgent heart transplantation rate: 1.3%
- Median hospital stay: 9 days
- Medical cost for an admission: about 9,000 US\$

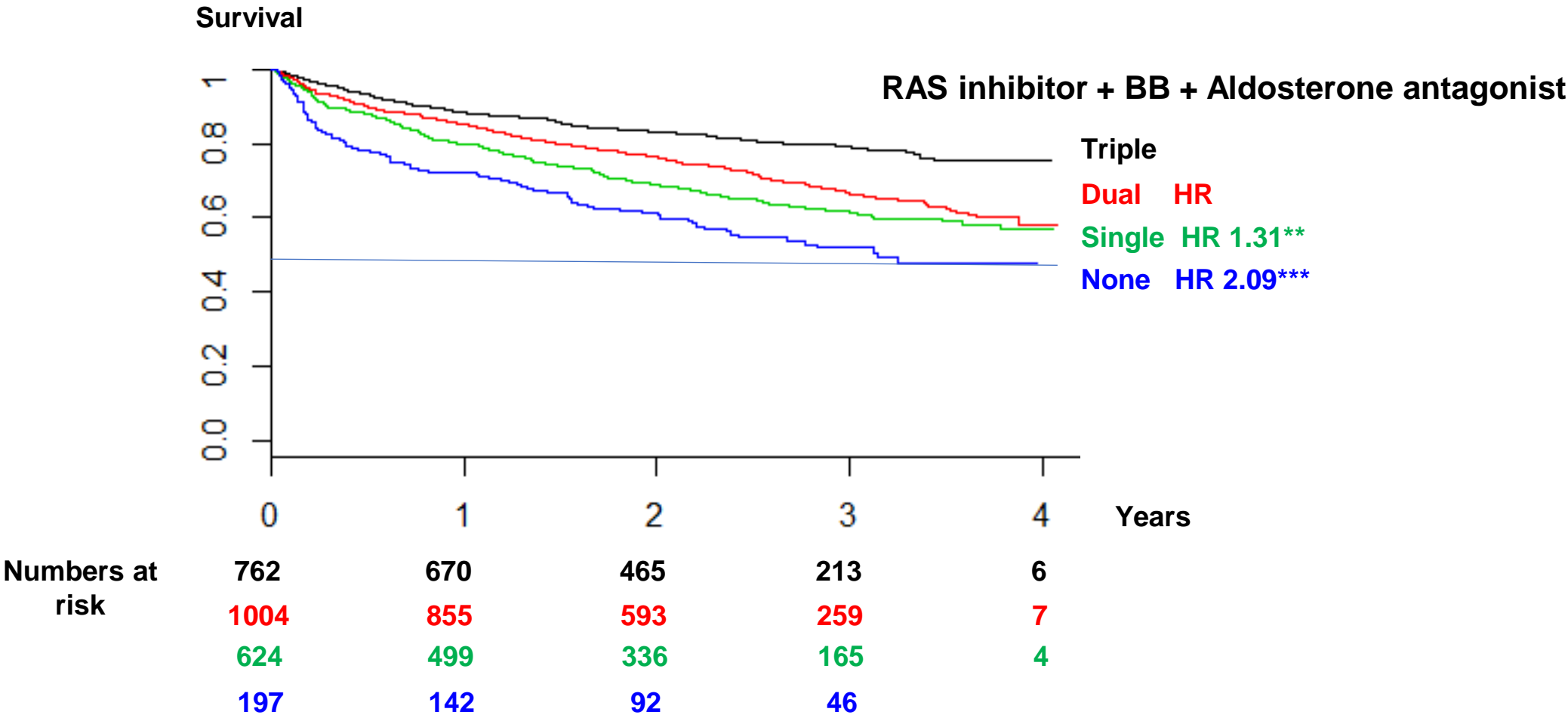
# Outcome during index hospitalization & after discharge

- In-hospital mortality rate: 4.9%
- Urgent heart transplantation rate: 1.3%
- Median hospital stay: 9 days
- Medical cost for an admission: about 9,000 US\$
- 90-day mortality & HF rehospitalization rate: 16.7%



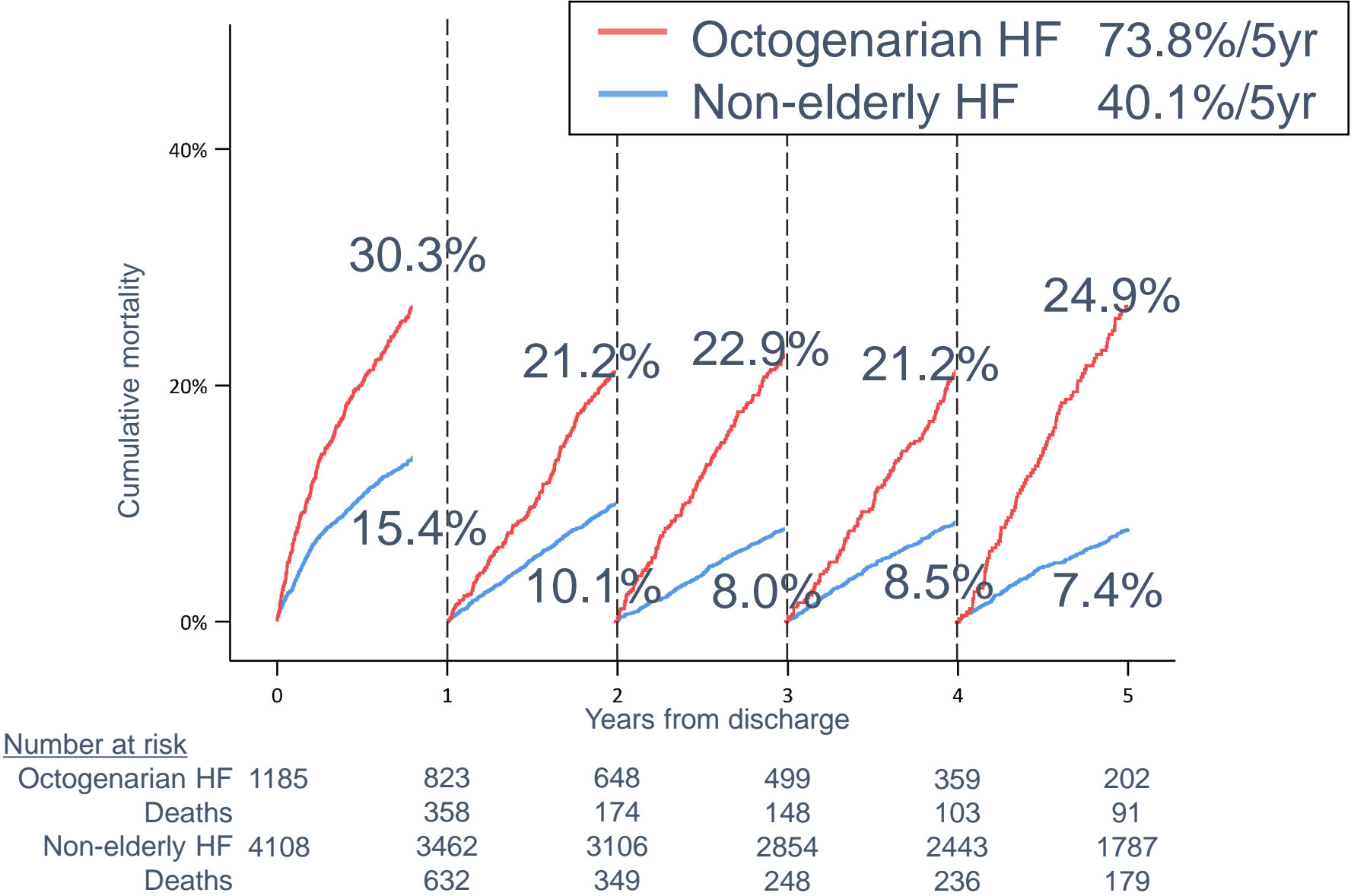
Hospitalized AHF cumulative death rate	
30 days:	3.3%
90 days:	8.5%
180 days:	12.5%
1 years:	18.5%
2 years:	27.9%
<b>3 years:</b>	<b>35.1%</b>

# Better survival according to guideline-directed therapy

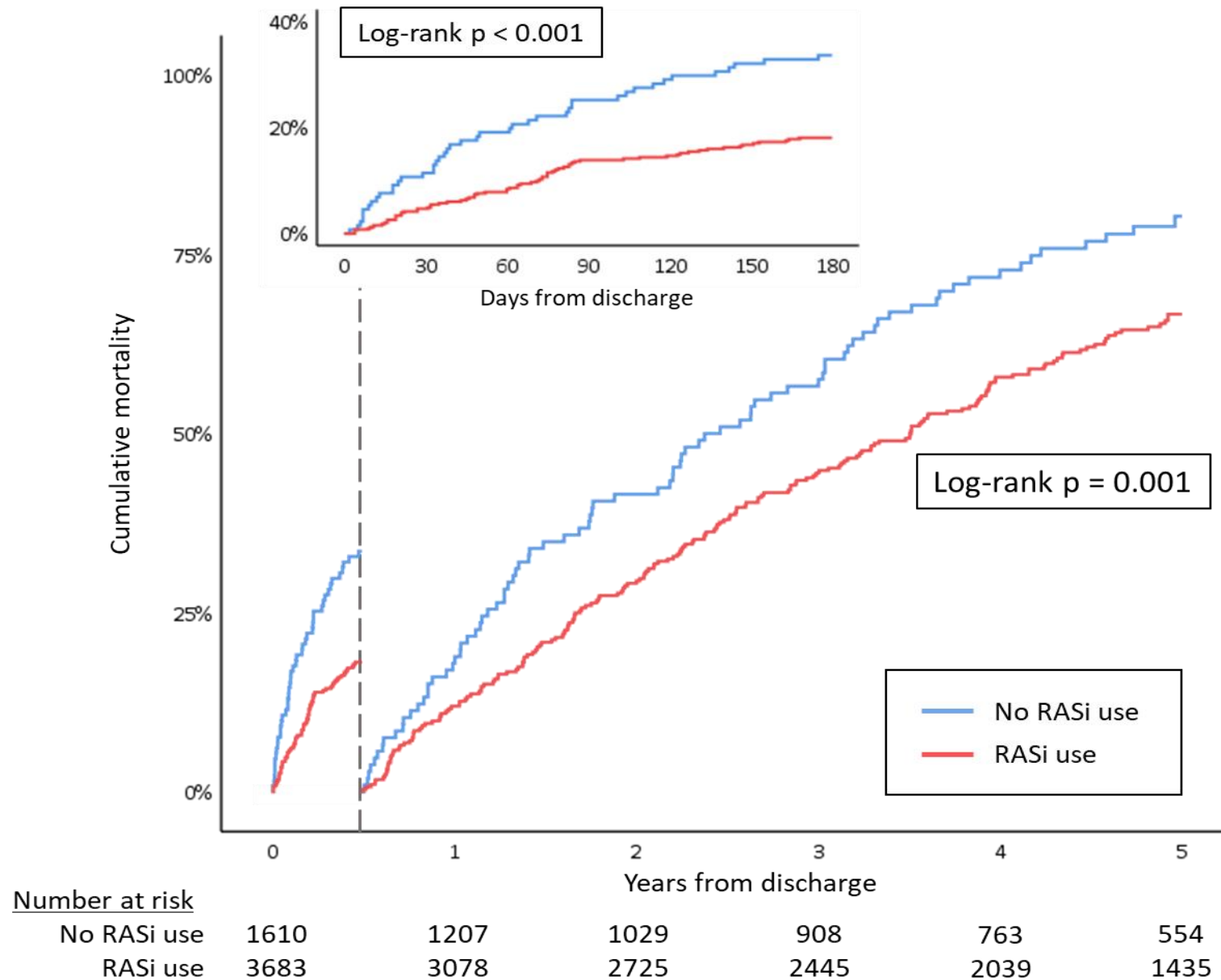


\* Multivariate Cox analysis

# Shocking mortality in elderly heart failure patients

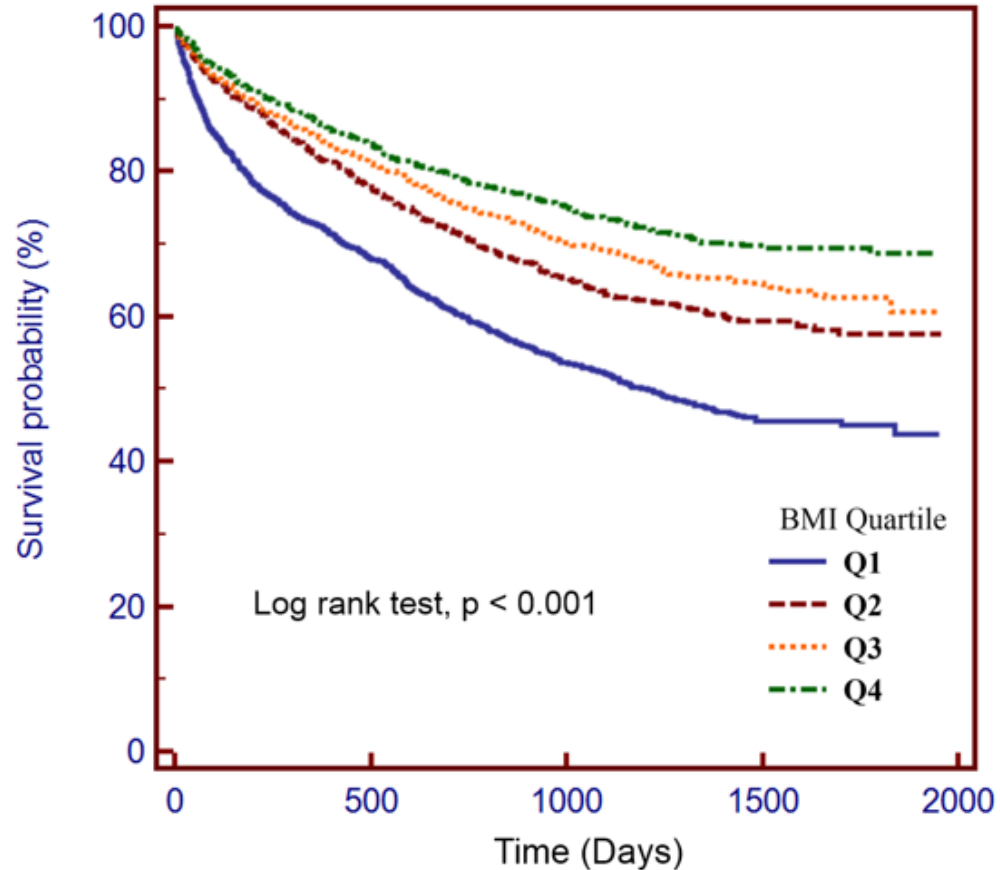


# Standard treatment improves survival in elderly patients





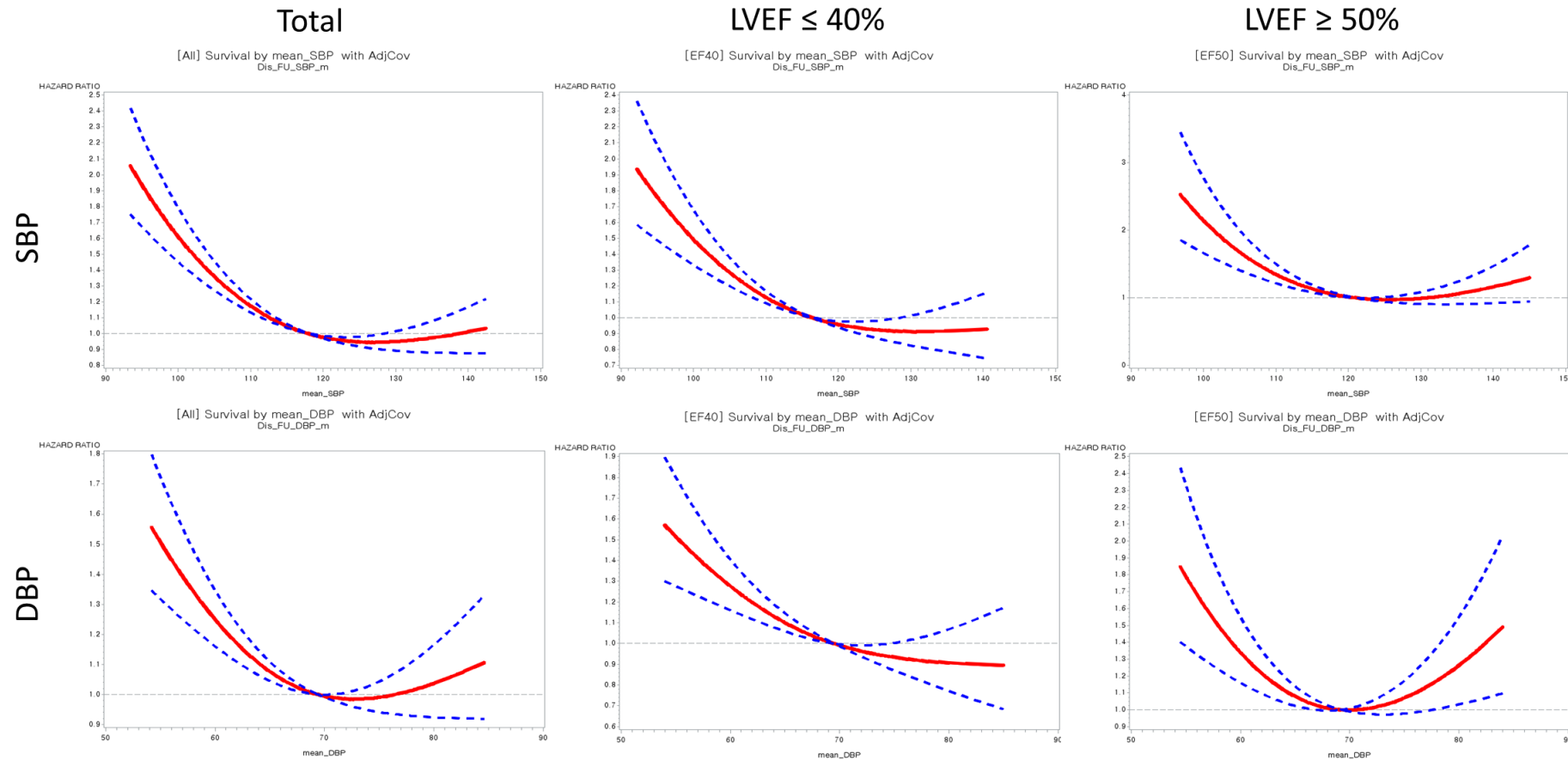
# Obesity paradox, confirmed



Number at risk					
Q1	1214	765	506	168	0
Q2	1209	834	583	220	0
Q3	1239	907	639	254	0
Q4	1188	886	669	273	0

Obesity paradox confirmed  
by correcting multiple confounding factors

# Blood pressure at discharge and long-term outcome : Cox PH model with restricted cubic splines



- **There is J-curved relationship between BP and all-cause mortality in AHF Pts.**
  - The J-curve relationship is most obvious in patients with HFpEF
  - **SBP < 110mmHg or DBP < 60mmHg** might be dangerous

# HFpEF and HFmrEF in KorAHF Registry

## Assessment of LV ejection fraction (LVEF)

Based on representative echocardiographic examination with quantitatively determined LVEF within 1 month of AHF diagnosis

LVEF available			LVEF not available
HFrEF	HFmrEF	HFpEF	
EF ≤ 40%	EF 40~50%	EF ≥ 50%	
3218 (57.2%)	794 (14.1%)	1360 (24.2%)	255 (4.5%)

# HFpEF and HFmrEF in KorAHF Registry

	HFrfEF n = 3,216	HFmrEF n = 795	HFpEF n = 1,364	p value *
<b><i>Demographics</i></b>				
Age, years (mean±SD)	66.5±14.7	70.8±13.3	<b>72.0±13.4</b>	< 0.001
Female	39.2%	51.4%	<b>61.3%</b>	< 0.001
BMI, kg/m <sup>2</sup>	23.1±3.8	23.5±3.8	<b>23.8±4.1</b>	< 0.001
Current smoker	21.3%	13.6%	12.4%	< 0.001
Excessive alcohol use	7.5%	5.5%	5.7%	0.024
<b><i>Medical History</i></b>				
Ischemic heart disease	30.3%	29.3%	21.9%	< 0.001
Hypertension	56.0%	63.9%	<b>64.3%</b>	< 0.001
DM	37.4%	36.4%	29.9%	< 0.001
Atrial fibrillation	22.8%	29.1%	<b>36.4%</b>	< 0.001
Chronic kidney disease	14.3%	15.9%	12.0%	0.035
Cerebrovascular disease	14.6%	15.1%	<b>15.9%</b>	0.270

# Initial laboratory findings

	HFrEF n = 3,216	HFmrEF n = 795	HFpEF n = 1,364	p value *
<b>Laboratory Findings</b>				
LVEF, % (mean±SD)	<b>27.0±7.7</b>	44.8±2.6	<b>59.4±6.7</b>	< 0.001
WBC, /mCL (mean±SD)	<b>8820±4040</b>	8950±4270	<b>8220±3570</b>	< 0.001
Hb, g/dL	<b>12.7±2.3</b>	12.0±2.4	<b>12.0±2.2</b>	< 0.001
Na, mmol/L	<b>137.5±4.7</b>	137.9±4.6	<b>137.5±5.0</b>	0.953
BUN, mg/dL	<b>26.5±16.5</b>	26.2±16.6	<b>24.7±15.2</b>	< 0.001
Cr, mg/dL	<b>1.52±1.48</b>	1.58±1.69	<b>1.31±1.20</b>	< 0.001
Glucose, mg/dL	<b>159.2±79.5</b>	156.2±76.9	<b>146.5±70.4</b>	< 0.001
CRP, mg/dL	<b>2.32±4.17</b>	2.71±4.55	<b>2.54±4.28</b>	0.261
cTnl ≥0.1ng/mL	<b>41.3%</b>	44.1%	<b>27.8%</b>	< 0.001
BNP ≥500pg/mL or NTproBNP ≥1000pg/mL	<b>88.8%</b>	80.8%	<b>71.3%</b>	< 0.001

\* HFrEF vs HFpEF

# Etiology and Aggravating factors of HF

	HFrEF n = 3,216	HFmrEF n = 795	HFpEF n = 1,364	p value *
<b><i>Etiology of HF</i></b>				
Ischemic heart disease	<b>42.9%</b>	44.5%	<b>21.7%</b>	< 0.001
Cardiomyopathy	<b>29.1%</b>	10.3%	<b>7.7%</b>	< 0.001
Valvular heart disease	7.4%	13.6%	<b>30.7%</b>	< 0.001
Tachycardia induced	8.3%	14.5%	<b>13.4%</b>	< 0.001
Hypertension	3.1%	4.2%	<b>6.0%</b>	< 0.001
<b><i>Aggravating factor of HF</i></b>				
Acute coronary syndrome	<b>28.9%</b>	33.8%	<b>16.6%</b>	< 0.001
Tachyarrhythmia	<b>19.2%</b>	23.2%	<b>22.5%</b>	0.012
Infection	<b>20.7%</b>	17.9%	<b>18.1%</b>	0.046
Noncompliance	7.9%	6.5%	<b>7.3%</b>	0.477
Renal failure	<b>4.8%</b>	5.5%	<b>6.1%</b>	0.073

\* HFrEF vs HFpEF

# In-hospital outcomes of HFrEF, HFmrEF and HFpEF

	HFrEF n = 3,216	HFmrEF n = 795	HFpEF n = 1,364	p value *
Total mortality, N (%)	<b>166 (5.2%)</b>	25 (3.1%)	<b>42 (3.1%)</b>	0.002
Urgent heart TPL, N (%)	<b>64 (2.0%)</b>	0 (0.0%)	<b>2 (0.1%)</b>	< 0.001
Hospital stay, days #	<b>9 [7-16]</b>	9 [6-14]	<b>8 [6-14]</b>	< 0.001
CCU/ICU admission	<b>50.7%</b>	52.8%	<b>42.6%</b>	< 0.001
Total cost, \$ (mean)	<b>958.5</b>	786.9	<b>803.5</b>	0.020

\* HFrEF vs HFpEF

# median [interquartile range]

- Preserved systolic function as a **negative** mortality risk factor

**Unadjusted OR 0.586** (95% CI 0.415-0.827), p= 0.002

**Adjusted\* OR 0.674** (95% CI 0.463-0.980), p= 0.039

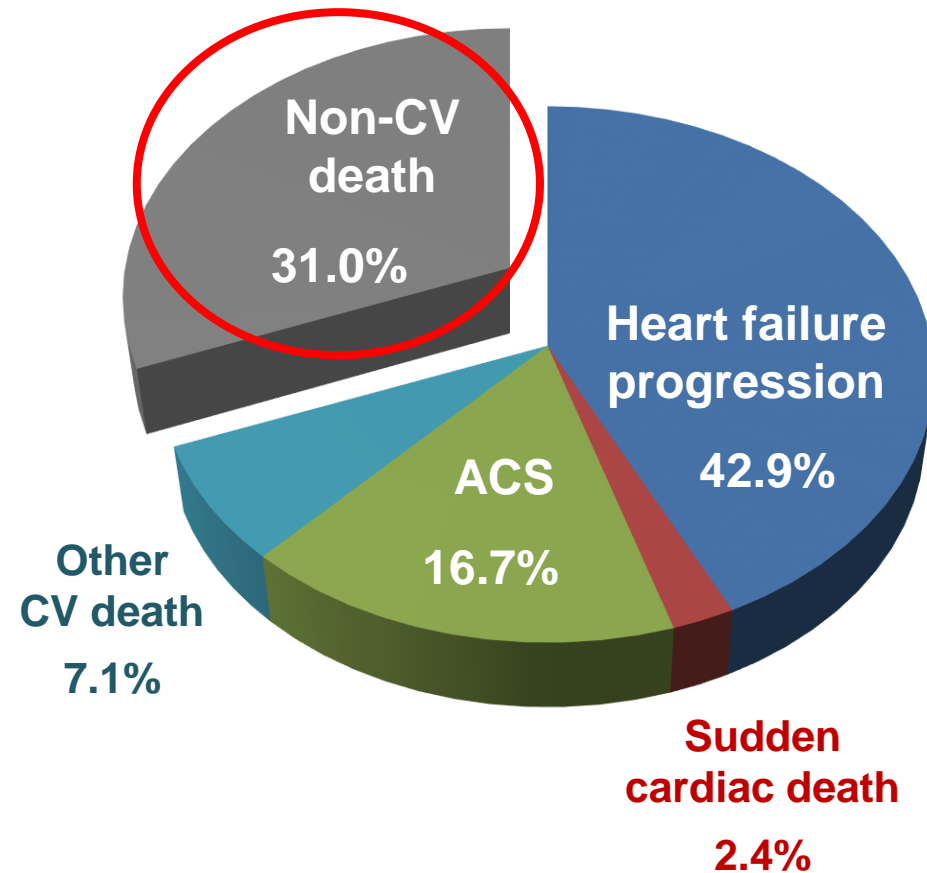
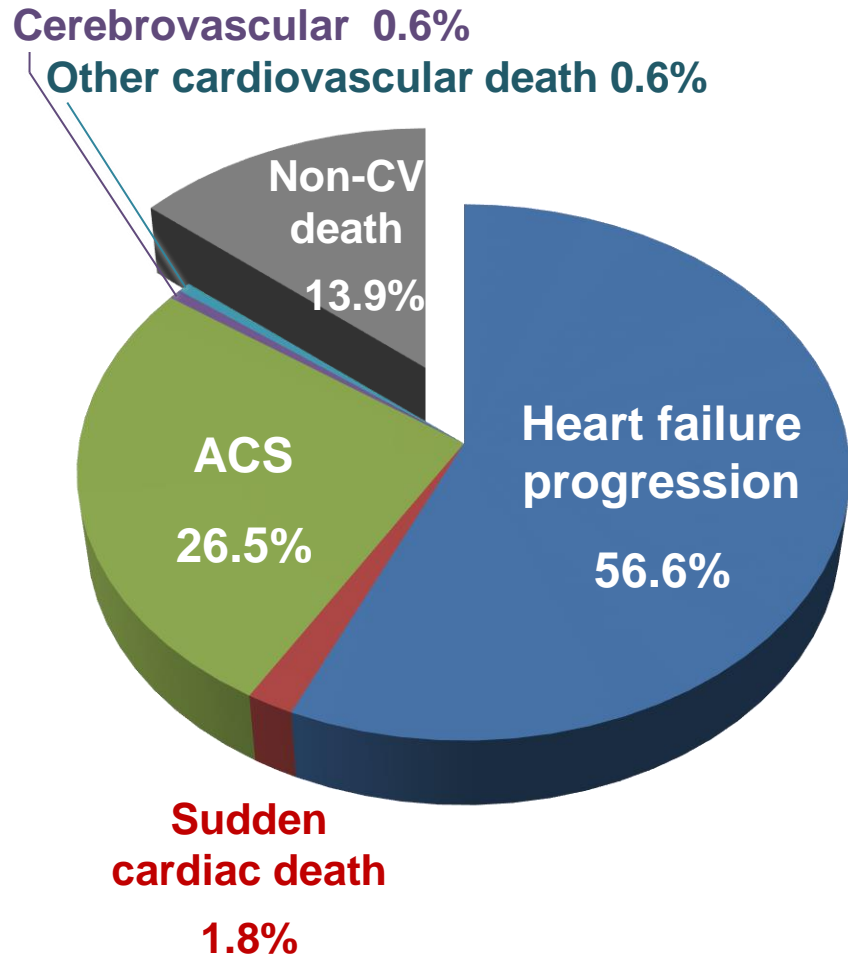
\* Adjusted for age, gender and variables found to be statistically significant in the univariable analysis (p<0.2), except variables with frequent missing values or variables with multicollinearity problem

: age, gender, lung congestion, BMI < 25, SBP < 100, NYHA Fc III/IV, Q wave in ECG, RBBB in ECG, other intraventricular conduction delay in ECG, WBC≥10000, Na<135, Cr≥2.0

# In-hospital mortality of HFrEF and HFpEF

HFrEF (5.2%, 166 patients)

HFpEF (3.1%, 42 patients)

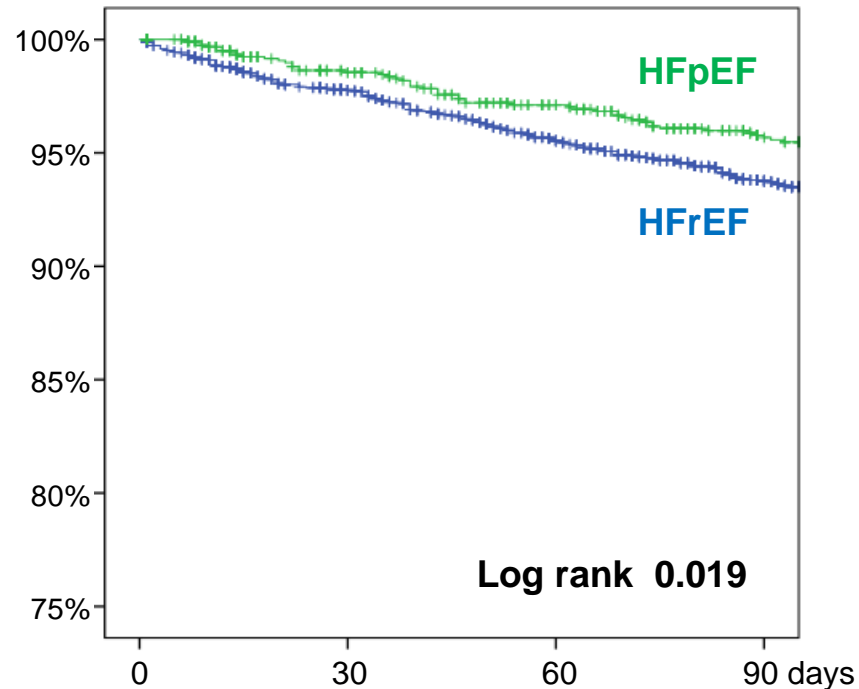




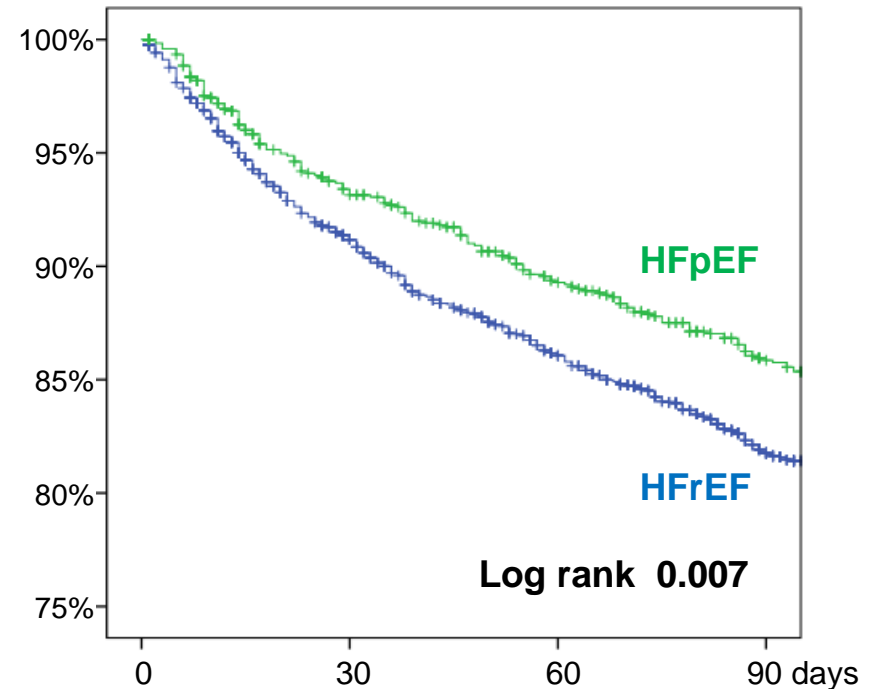
# 90-day Follow-up Outcomes

	<b>HFrEF</b> n = 3052	<b>HFmrEF</b> n = 769	<b>HFpEF</b> n = 1318	<b>p value</b>
Total mortality, N (%)	<b>166 (6.2%)</b>	<b>34 (4.4%)</b>	<b>48 (4.3%)</b>	0.019
HF re-hospitalization and total mortality, N (%)	<b>494 (18.2%)</b>	<b>113 (14.7%)</b>	<b>160 (14.1%)</b>	0.007

### Survival

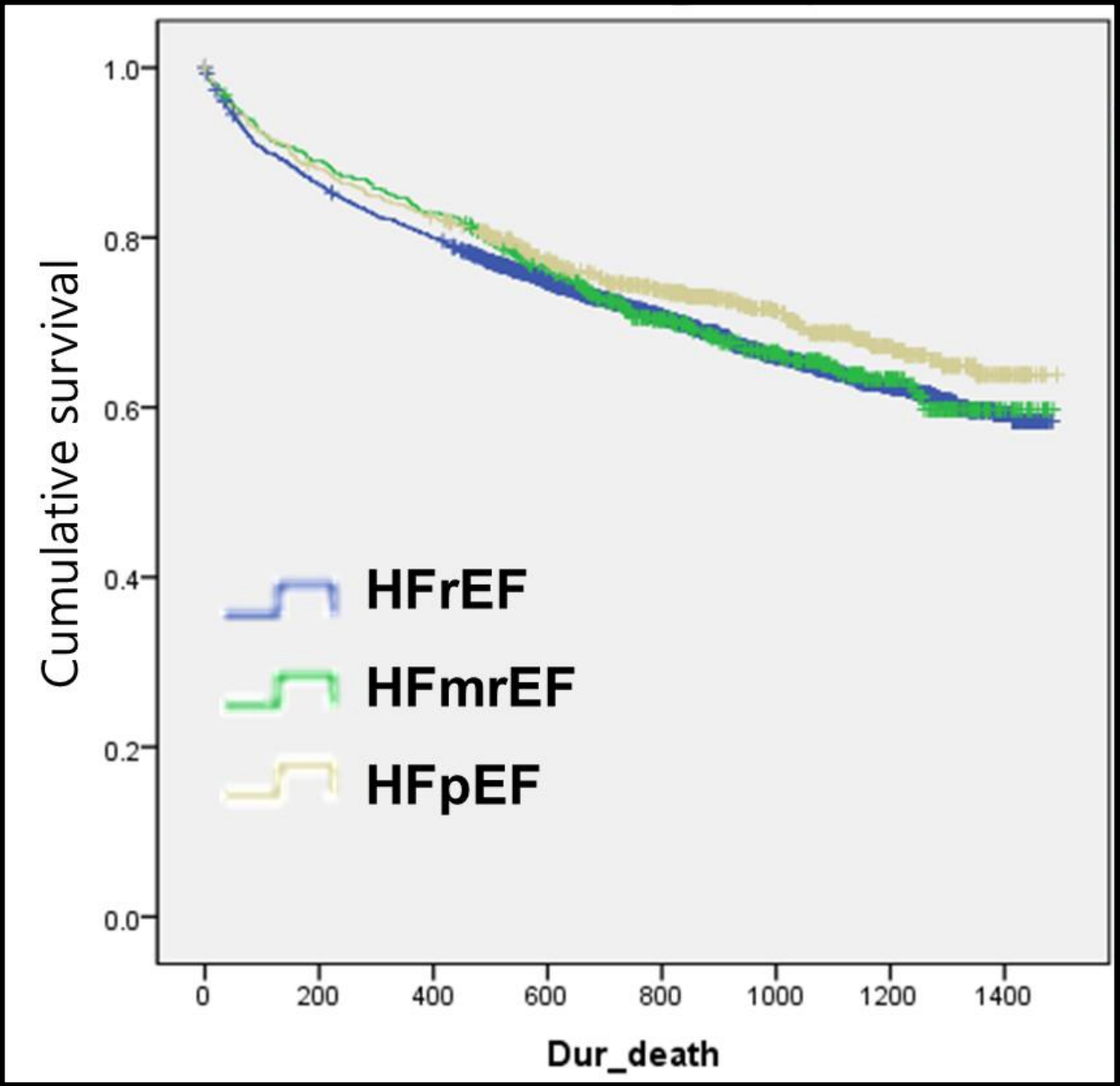
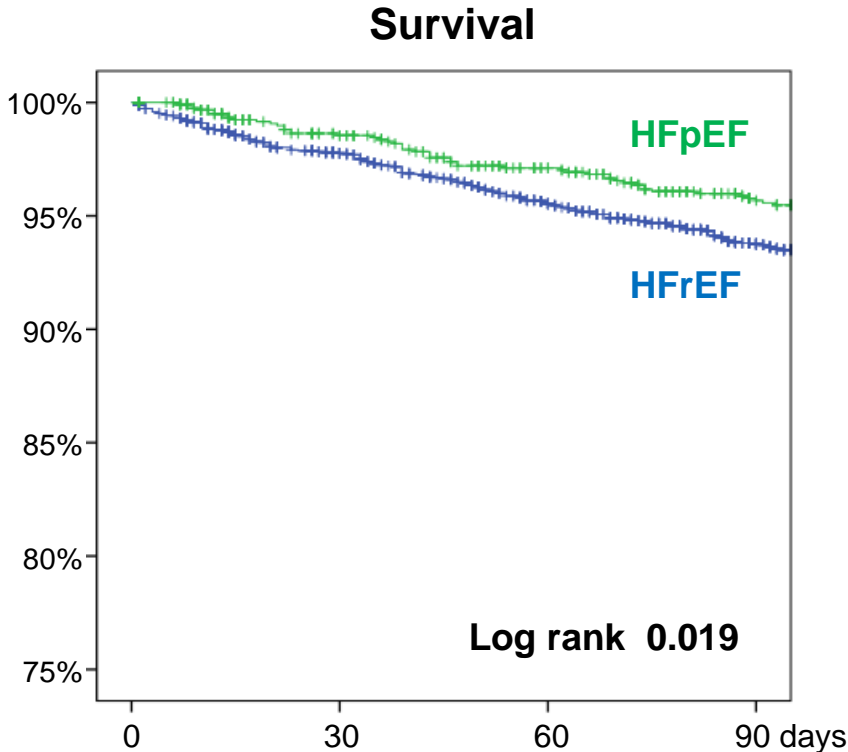


### HF-rehospitalization free survival



# Long-term Follow-up Outcomes

	<b>HFrEF</b> n = 3052
Total mortality, N (%)	<b>166 (6.2%)</b>
HF re-hospitalization and total mortality, N (%)	<b>494 (18.2%)</b>

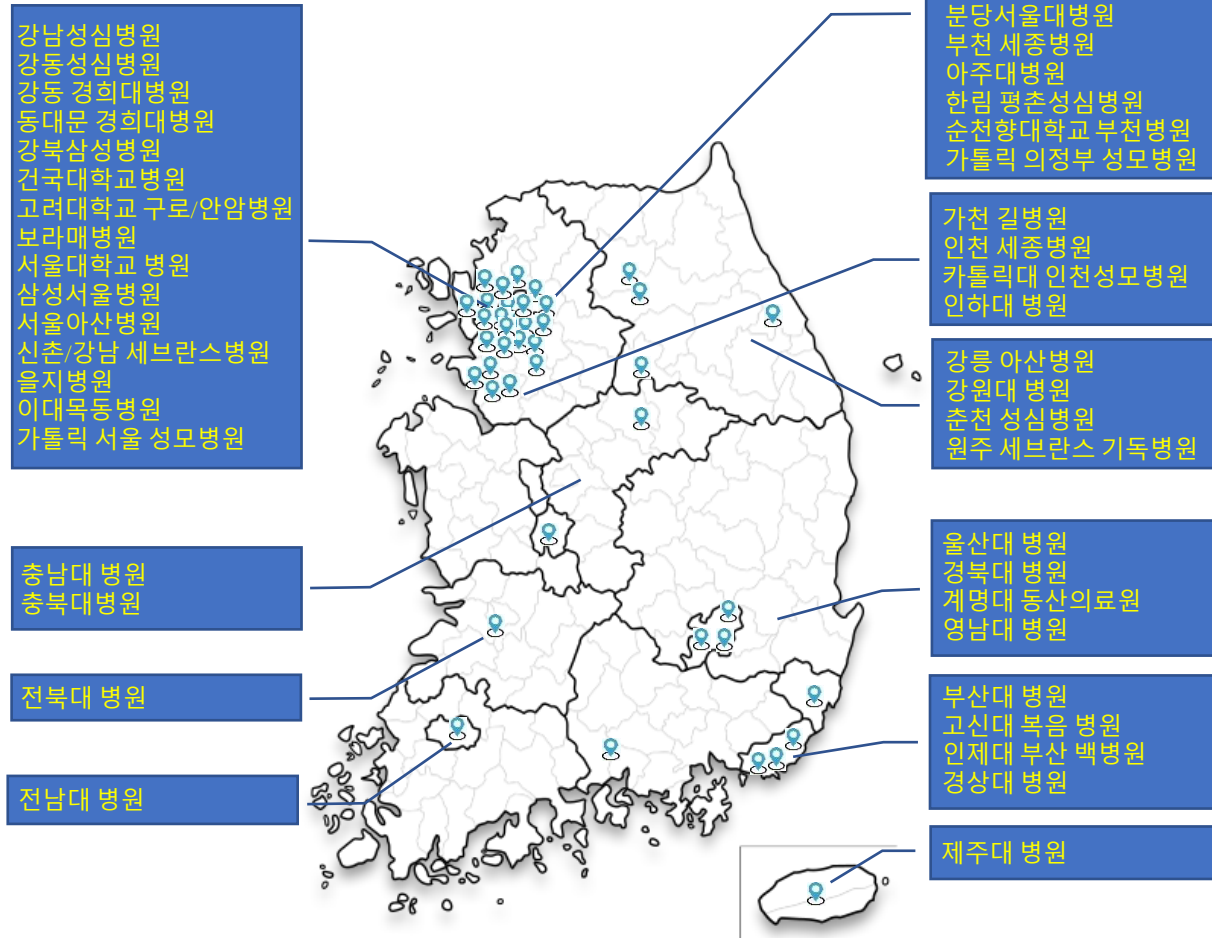


# We have been working on 3 Heart Failure registry in KOREA

- ✓ KorHF (2004-2009) (N=3,200)
  - ✓ **KorAHF** (2011-2019) (N=5,625)
  - ✓ **KorHF-III** (2018-ongoing) (N=7,448)
- hospitalized patients

# Nationwide distribution: KorHF-III (2018.3-2022.12 & F/U)

48 hospitals: **7,448 patients**

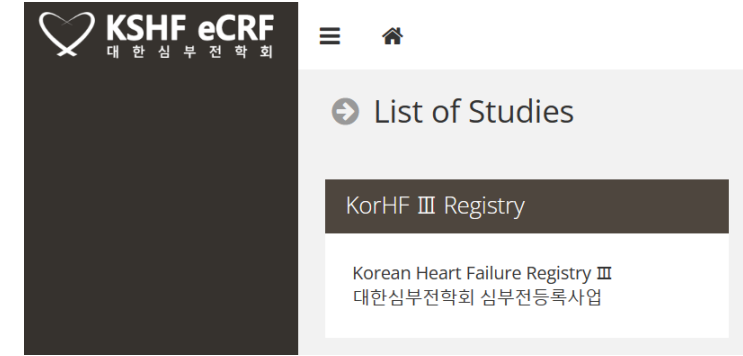


## ◆ Geographic distribution

Region	No. of patients (%)
Seoul	2,409 (32.3)
Incheon	568 (7.6)
Daejeon	230 (3.1)
Gwangju	75 (1.0)
Daegu	614 (8.2)
Ulsan	57 (0.8)
Busan	225 (3.0)
Gyeonggi-do	1,580 (21.2)
Gangwon-do	1,085 (14.6)
Chungcheong-do	280 (3.8)
Gyeongsang-do	231 (3.1)
Jeolla-do	35 (0.5)
Jeju-do	59 (0.8)
<b>Total</b>	<b>7,448</b>

Geographic distribution of the 50 hospitals participating in KorHF-III registry is shown.

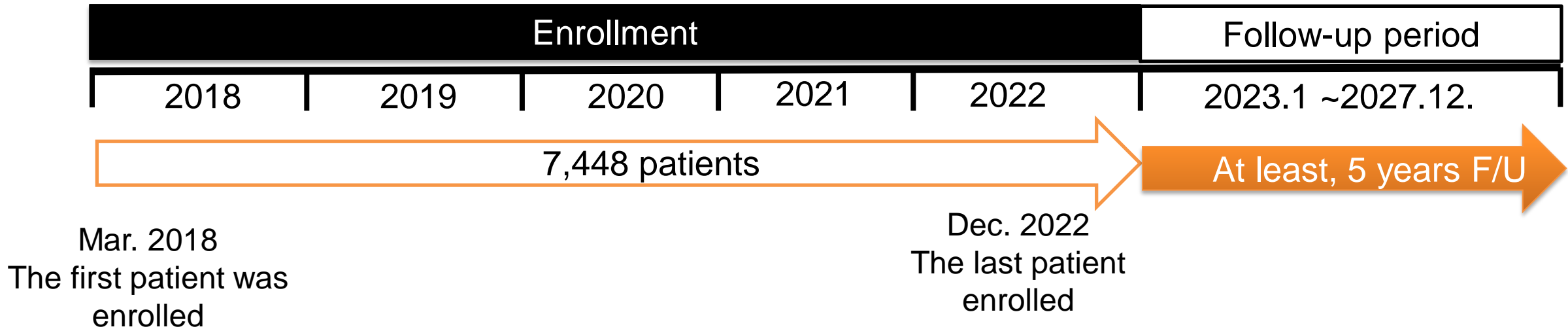
# KorHF-III (2018.3-2022.12 & 5 years F/U)



## Criteria of enrollment

*Patients admitted for HF with following criterion 1 and 2 and/or 3*

- 1. Symptoms and signs of heart failure**
- 2. Lung congestion**
- 3. Objective finding of structural or functional cardiac abnormality or isolated right heart failure**



\*The Korean Society of Heart Failure sponsored registry

# Baseline characteristics of KorHF-III (1)

Characteristic	No. of patients (%)	Total data
<b>Demographics</b>		
Age, years $\pm$ SD	69 $\pm$ 15	6,960
Male-no. (%)	3,976 (57%)	6,979
Body-mass index (kg/m <sup>2</sup> )	24.5 $\pm$ 4.6	5,740
<b>Medical history-no. (%)</b>		
Hypertension	3,839 (59.5%)	6,454
Diabetes mellitus	2,560 (39.7)	6,453
Coronary heart disease	1,742 (29.8)	5,837
Previous MI	1,022 (17.5)	5,837
Previous PCI	1,064 (18.2)	5,837
Previous CABG	203 (3.5)	5,837
Atrial fibrillation	2,047 (31.7)	6,457
Cerebrovascular disease	665 (10.3)	6,451
Chronic kidney disease	1,030 (16.0)	6,448
Smoking	1,996 (32.7)	6,457
COPD	521 (8.1)	6,446

# Baseline characteristics of KorHF-III (2)

Characteristic	No. of patients (%)	Total data
<b>Etiology-no. (%)</b>		
Ischemic	<b>1,621 (25.8%)</b>	6,279
Cardiomyopathies	<b>1,469 (23.4)</b>	6,279
Tachycardia induced	<b>648 (10.3)</b>	6,279
Valvular heart disease	560 (8.9)	6,279
Hypertensive	452 (7.2)	6,279
<b>Clinical status on admission</b>		
De novo HF-no. (%)	<b>3,525 (55.5)</b>	6,349
Worsening of chronic HF	<b>2,824 (44.5)</b>	6,349
Heart rate (/min) $\pm$ SD	94.7 $\pm$ 28.3	6,651
SBP (mmHg) $\pm$ SD	133.6 $\pm$ 28.7	6,651
DBP (mmHg) $\pm$ SD	80.4 $\pm$ 19.0	6,651
<b>Chest X-ray-no. (%)</b>		
Pulmonary congestion or pleural effusion	<b>4,420 (68.8)</b>	6,421

# Baseline characteristics of KorHF-III (3)

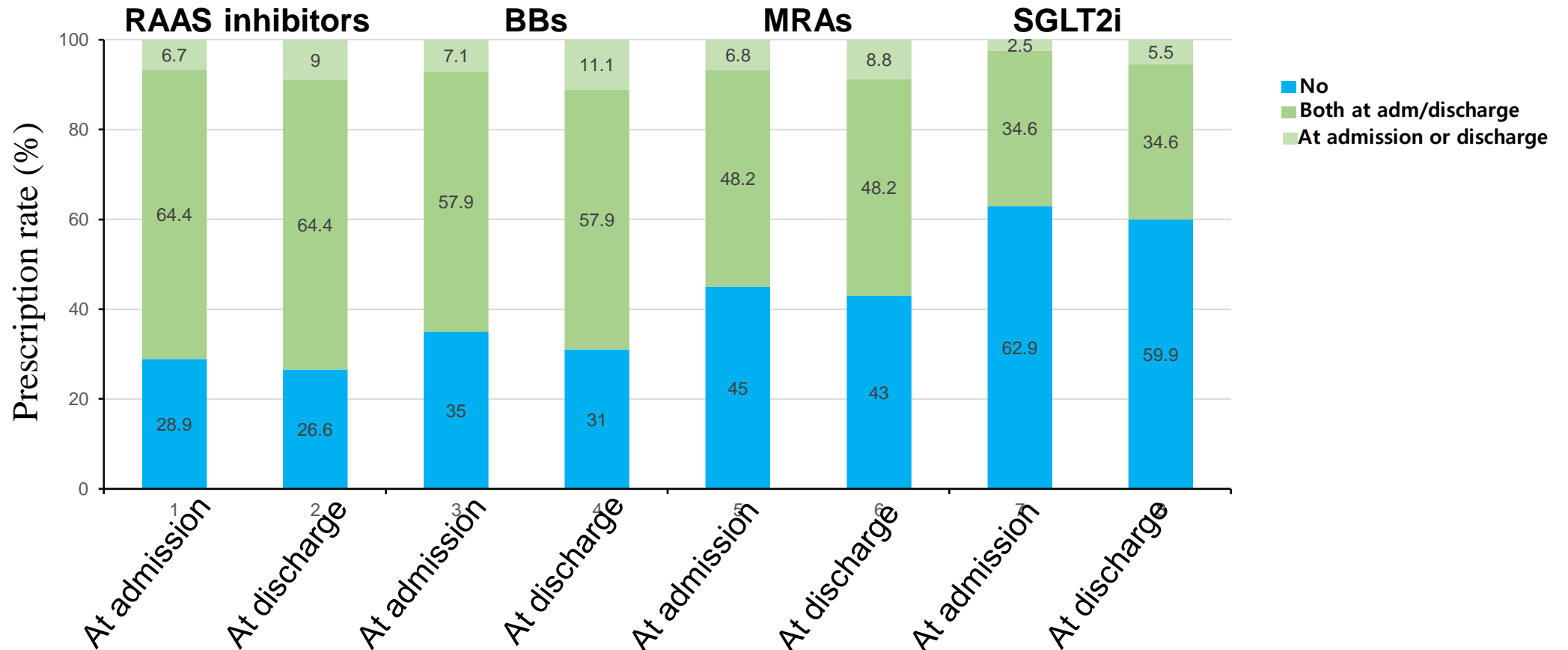
Characteristic	No. of patients (%)	Total data
ECG findings-no. (%)		
Tachycardia (HR >100)	2,393 (37.5)	6,380
Arrhythmia (AF/AFL)	2,049 (31.2)	6,571
LBBB	380 (6.0)	6,386
RBBB	487 (7.6)	6,386
Other IVCD	114 (1.8)	6,386
Echocardiographic parameters		
LVEF (%) [Median/IQR]	35.0 (25.0-50.0)	5,826
LVEDD (mm)	56.9± 11.1	5,937
LVESD (mm)	45.4± 13.4	5,903
HF classification-no. (%)		
HFrEF	3,600 (61.8)	5,826
HFmrEF	738 (12.7)	5,826
HFpEF	1,487 (25.5)	5,826



# Baseline characteristics of KorHF-III (4)

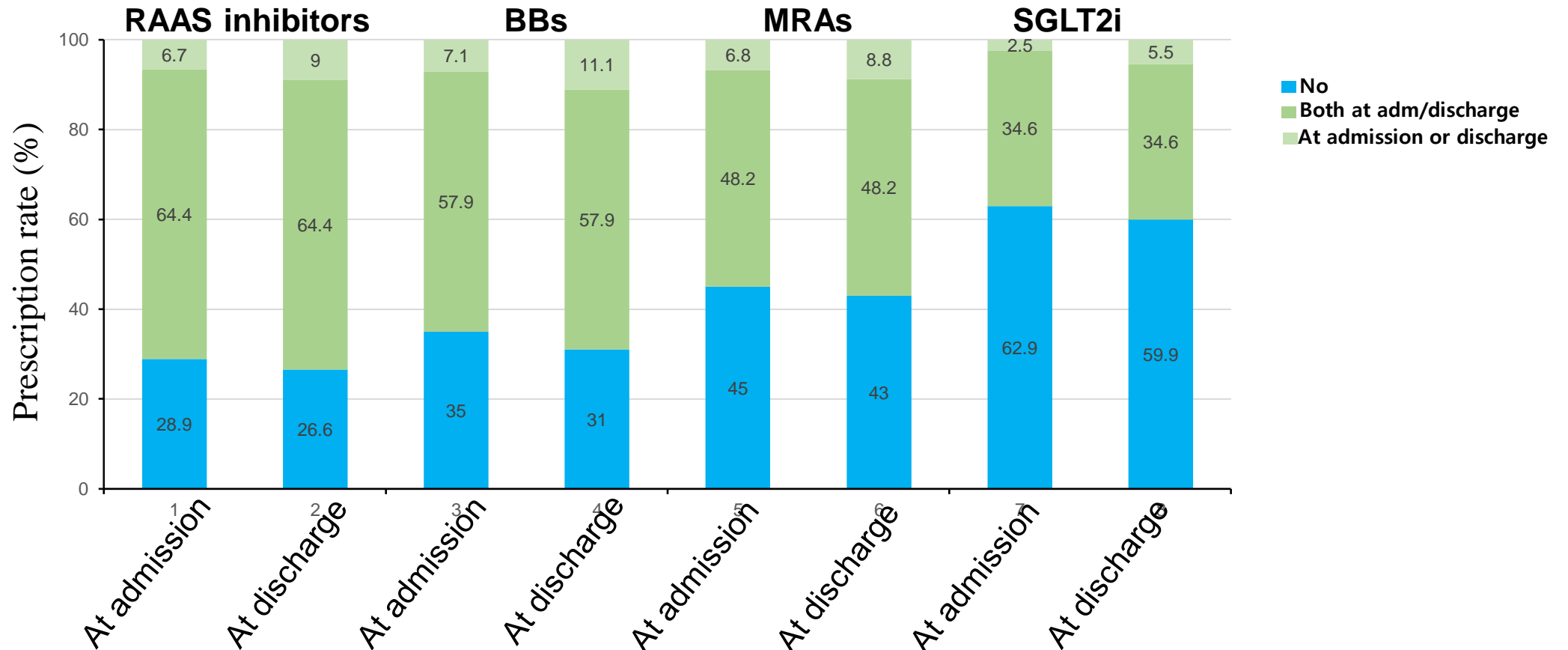
Characteristic	No. of patients (%)	Total data
<b>Lab findings</b>		
WBC (10 <sup>3</sup> /μL)	8.3 ± 3.6	6,591
Hemoglobin (g/dL)	12.4 ± 2.5	6,607
Platelet (10 <sup>3</sup> /μL)	215.7 ± 82.7	6,607
BUN (mg/dL)	26.2 ± 15.5	6,607
Cr (mg/dL)	1.4 ± 1.2	6,607
BNP (pg/mL) [Median/IQR]	<b>1,095 (560-2101)</b>	6,607
NT-proBNP (pg/mL) [Median/IQR]	<b>3,881 (1691.5-9404)</b>	6,606
<b>Medications at admission-no.(%)</b>		
ACEi/ARBs	<b>3,699 (57.9)</b>	6,398
ARNI	<b>1,010 (15.4)</b>	6,568
Beta-blockers	<b>4,217 (65.0)</b>	6,488
SGLT2 inhibitors	<b>811 (34.8)</b>	2,330
MRAs	<b>3,565 (55.0)</b>	6,487
Ivabradine	380 (5.8)	6,568
Nitrates	1261 (19.2)	6,568
Digoxin	932 (14.2)	6,568
Oral Diuretics	<b>4,505 (68.6)</b>	6,569

# Managements (GDMT at admission & discharge)



GDMT	GDMT at admission	GDMT at discharge
ACEi/ARB	3,699/6,398 (57.9%)	3,558/6,398 ( <b>55.6%</b> )
ARNI	1,010/6,568 (15.4%)	1,143/6,502 ( <b>17.6%</b> )
Beta-blockers	4,217/6,488 (65.0%)	4,484/6,488 ( <b>69.1%</b> )
MRAs	3,565/6,487 (55.0%)	3,640/6,487 (57.0%)
SGLT-2 inhibitors	811/2,330 (34.8%)	962/2,377 (40.5%)

# Managements (GDMT at admission & discharge)



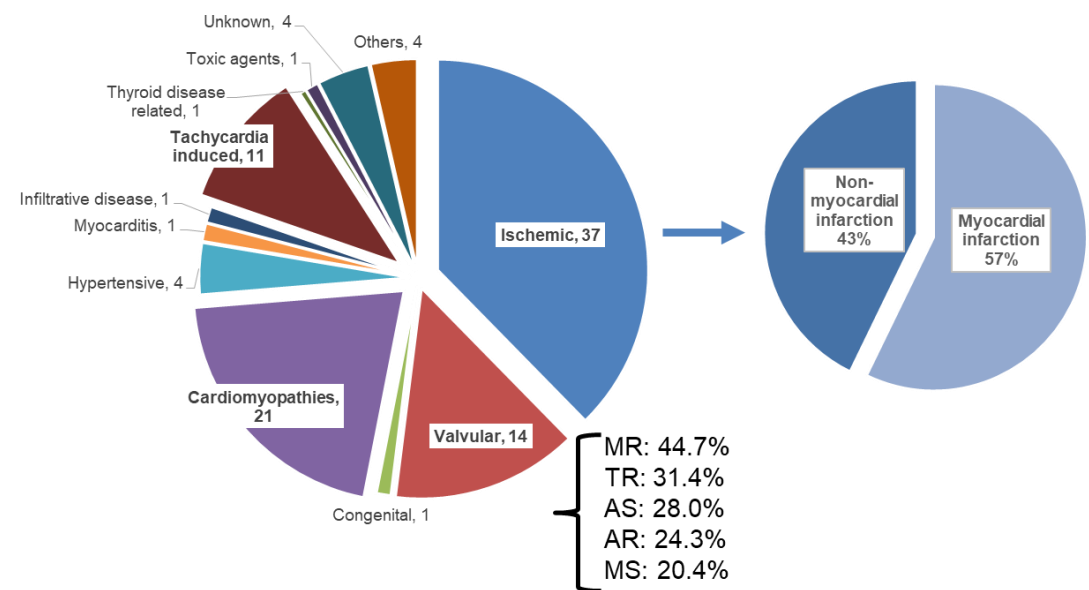
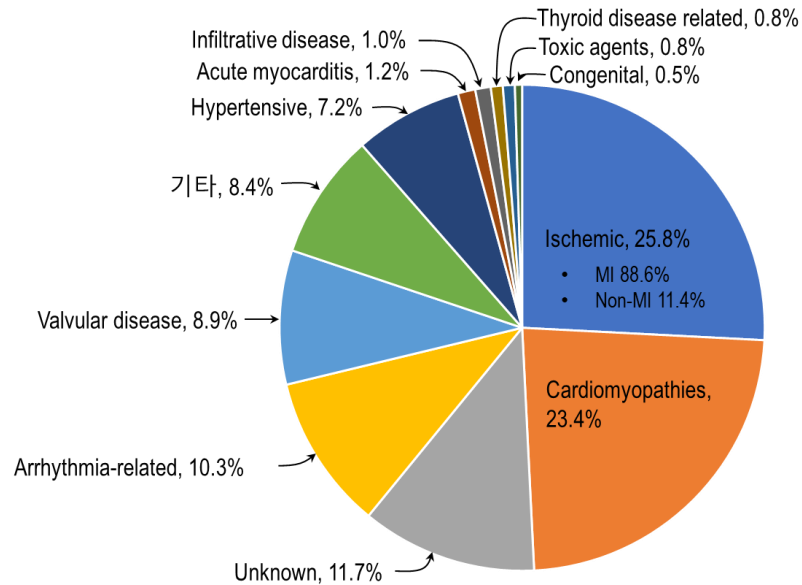
GDMT	GDMT at admission	GDMT at discharge
<b>RAAS inhibitors</b>	4,668/6,571 ( <b>71.0%</b> )	4,774/6,502 ( <b>73.4%</b> )
Beta-blockers	4,217/6,488 (65.0%)	4,484/6,488 (69.1%)
MRAs	3,565/6,487 (55.0%)	3,640/6,487 (57.0%)
<b>SGLT-2 inhibitors</b>	811/2,330 ( <b>34.8%</b> )	962/2,377 ( <b>40.5%</b> )

# Managements and in-hospital outcomes

Managements	No. of patients (%)	Total data
IV diuretics	5,174 (78.7)	6,571
IV inotropes	1,126 (21.8)	5,172
IV vasodilators	1,836 (35.5)	5,172
Mechanical ventilation	284 (4.4)	6,391
ICD implantation	113 (1.8)	6,389
CRT-D/P implantation	74 (1.2)	6,389
ECMO/PCPS	60 (0.9)	6,389
LVAD	41 (0.6)	6,389
Heart transplantation	42 (0.6)	6,389
PCI	867 (13.6)	6,386
CABG	136 (2.1)	6,390
RFCA	45 (0.7)	6,388
Vale repair/replacement	52 (0.8)	6,387
<b>Outcomes</b>		
Median length of hospital stay (IQR)-days	9 (6-13)	6,598
ICU/CCU admission (%)	1,768 (27.1)	6,529
ICU/CCU length of stay (IQR)-days	4 (2-7)	6,529
In-hospital mortality (%)	104 (1.6%)	6,522

# KorHF-III (2018-ongoing) vs. KorAHF (2011-2019)

## Etiology of heart failure



### 5 major causes of heart failure (75.6%)

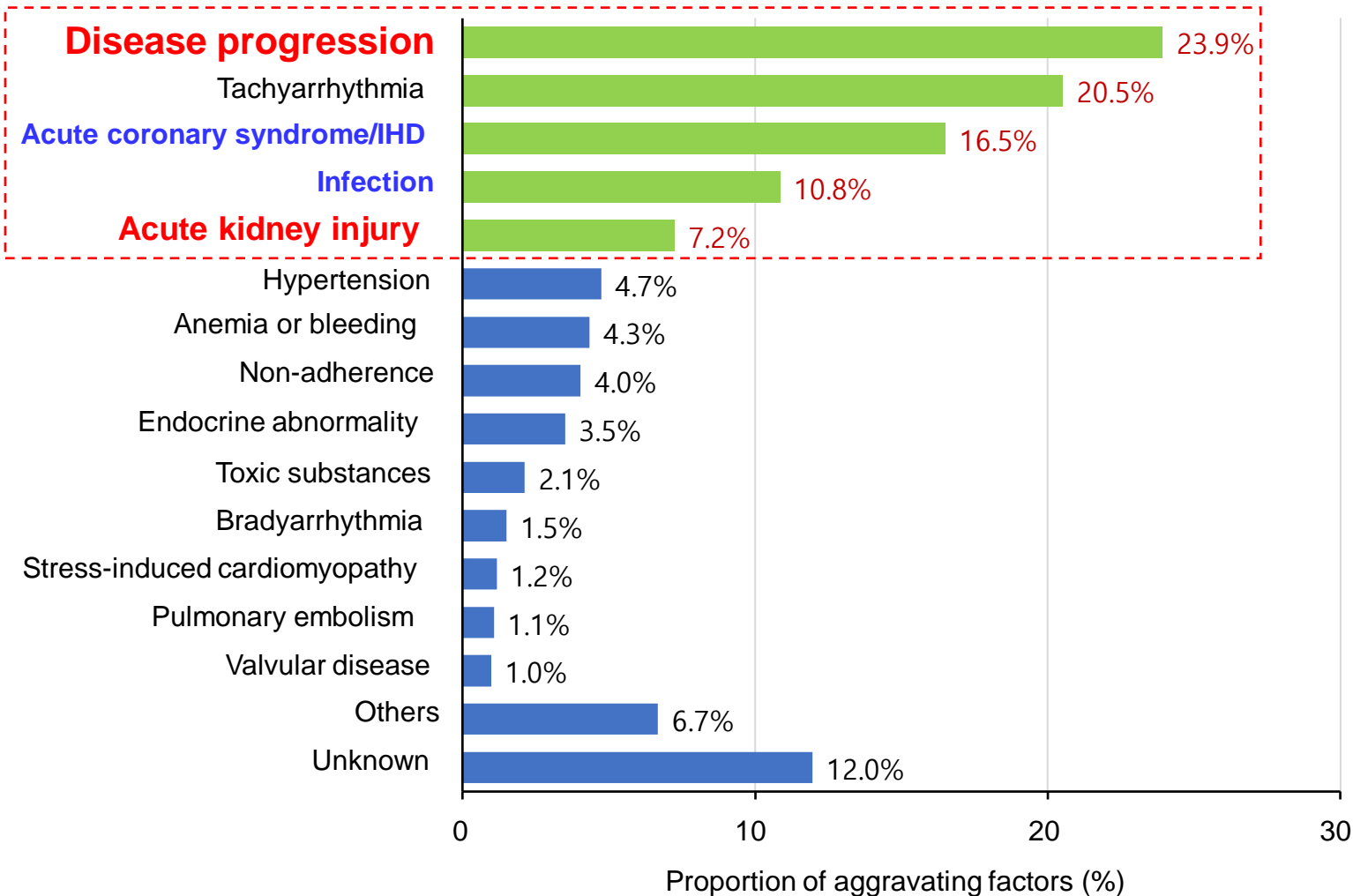
1. Ischemic (25.8%)
2. Cardiomyopathy (23.4%)
3. Arrhythmia-related (mainly Af.) (10.3%)
4. Valvular heart disease (8.9%)
5. Hypertensive (7.2%)

### 4 major causes of heart failure (83.3%)

- (1) Ischemic (37%)
- (2) Cardiomyopathy (mainly, D-CMP) (21%)
- (3) Valvular heart disease (14%)
- (4) Tachycardia-induced (mainly, Af with RVR)

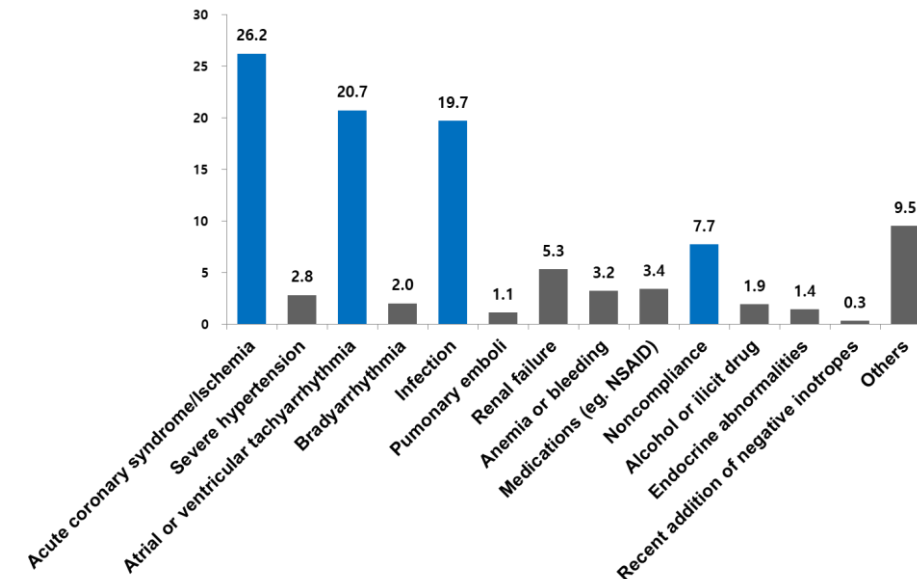
# KorHF-III (2018-ongoing) vs. KorAHF (2011-2019)

## Aggravating factors



**4 major aggravating factors (66.7%)**

- Ischemia**
- Tachyarrhythmia (mainly, Af with RVR)**
- Infection (mainly, pneumonia)**
- Noncompliance (including high salt diet)**



# KorHF-III, KorAHF, and KorHF comparisons (2)

	KorHF-III (2018-ongoing) (N=7,448)	KorAHF (2011-2019) (N=5,625)	KorHF (2004-2009) (N=3,200)
<b>Demographics</b>			
Age, years $\pm$ SD	<b>69 <math>\pm</math> 15</b>	68.5 $\pm$ 14.5	67.6 $\pm$ 14.3
Male (%)	<b>57.0</b>	53.2	50.0
Body-mass index (kg/m <sup>2</sup> )	24.5 $\pm$ 4.6	23.3 $\pm$ 3.9	23.2 $\pm$ 4.0
<b>Co-morbidities (%)</b>			
Hypertension	59.5	59.1	46.5
Diabetes mellitus	<b>39.7</b>	35.3	30.5
Previous MI	<b>17.5</b>	16.8	14.2
Previous HF history	<b>44.5</b>	43.7	29.6
Chronic lung disease	8.1	11.3	3.5
Cerebrovascular disease	10.3	15.2	18.9
Chronic kidney disease	<b>16.0</b>	14.3	9.2
<b>Etiology (%)</b>			
Ischemic	<b>25.8</b>	<b>37.6</b>	<b>52.3</b>
Cardiomyopathy	23.4	20.6	26.5
Hypertensive	7.2	4.0	36.7
<b>Aggravation (%)</b>			
Ischemia	<b>16.5</b>	<b>26.3</b>	<b>42.0</b>
Hypertension	4.7	2.8	7.0

# KorHF-III, KorAHF, and KorHF comparisons (2)

	KorHF-III (2018-2022) (N=7,448)	KorAHF (2011-2014) (N=5,625)	KorHF (2004-2009) (N=3,200)
<b>Medication at discharge (%)</b>			
ACEIs/ARBs	55.6	68.8	53.7
ARNI	17.6	-	-
Beta-blockers	69.1	52.2	58.6
SGLT2 inhibitors	40.5	-	-
Aldosterone antagonist	57.0	46.6	53.1
<b>Outcomes</b>			
Median length of hospital stay (IQR)-days	9 (6-13)	9 (1-311)	9 (1-403)
In-hospital mortality (%)	1.6	4.8	6.4



# Summary & Conclusions

- ◆ KorHF (2004-2009) (N=3,200)
- ◆ KorAHF (2011-2019) (N=5,625)
- ◆ KorHF-III (2018-ongoing) (N=7,448)

Based on 3 nationwide registries, Korean HF patients have shown...

- ✓ Getting older
- ✓ Higher prevalence of HTN, DM and CKD
- ✓ Still higher proportion of HFrEF (61.8% vs. 58.4% vs. 43.5%)
- ✓ Change of etiologies and aggravating factors of AHF
- ✓ Insufficient GDMT and early clinical application of new drug (SGLT2i)
- ✓ Decreased usage of iv inotropes, but still high
- ✓ Improved in-hospital survival
- ✓ Improved long-term survival ? (follow-up is ongoing)

# Heart Failure Seoul 2023 with CTC Asia 2023

The 20th Annual Scientific Meeting of the Korean Society of Heart Failure  
in conjunction with ESC-HFA/KSHF Clinical Trials in Heart Failure Course Asia 2023

Heart Failure Seoul 2023    CTC Asia 2023  
Sep. 21-23, 2023    Sep. 24, 2023

Grand Intercontinental Parnas Hotel, Seoul, Korea



◆ Deadline for Abstract Submission : June 30(Fri.), 2023 (23:59 KST)

The 67<sup>th</sup> Annual Scientific Meeting of  
The Korean Society of Cardiology

대한심장학회 제67차 추계학술대회

2023.10.13<sub>Fri.</sub> - 15<sub>Sun.</sub>

Grand Walkerhill , Seoul, Korea





# KorHF-III, KorAHF, and KorHF comparisons (2)

	KorHF-III (2018-ongoing) (N=7,448)	KorAHF (2011-2019) (N=5,625)	KorHF (2004-2009) (N=3,200)
<b>Clinical status on admission</b>			
De novo HF (%)	55.5	52.2	70.4
SBP (mmHg)±SD	133.6±28.7	131.2±30.3	130.5±30.2
DBP (mmHg)±SD	80.4±19.0	78.6±18.8	77.9±18.0
Heart rate (/min) ±SD	94.7 ± 28.3	92.6 ± 26.0	91.2 ± 25.4
AF at admission (%)	32.7	34.9	24.5
LVEF (%)	<b>34.5±14.1</b>	<b>37.7±15.6</b>	<b>38.5±15.7</b>
<b>HF classification (%)</b>			
HFpEF	25.5	25.2	26.1
HFmrEF	12.7	16.4	31.4
HFrEF	<b>61.8</b>	<b>58.4</b>	<b>43.5</b>
<b>Lab. findings at admission</b>			
Hemoglobin (g/dL)	12.4± 2.5	12.4±2.3	12.4±5.5
Serum sodium (mmol/L)	137.9±4.4	137.5±4.8	138.1±26.4
Serum creatinine (mg/dL)	1.4 ± 1.2	1.5±1.5	1.5±1.2

# KorHF-III, KorAHF, and KorHF comparisons (3)

	KorHF-III (2018-2022) (N=7,448)	KorAHF (2011-2014) (N=5,625)	KorHF (2004-2009) (N=3,200)
<b>Laboratory tests at admission</b>			
BNP (pg/mL)	1,737.5±2965.0	1335.1±1301.5	-
NT-proBNP (pg/mL)	7,939.0±10,529.3	9,239.6±10,802.4	8,461±96,002
LBBB at ECG (%)	6.0	7.1	-
RBBB at ECG (%)	7.6	5.2	-
<b>Management</b>			
Parenteral diuretics	78.7	74.9	68.1
Parenteral inotropes	<b>21.8</b>	31.1	21.7
Parenteral vasodilators	35.5	40.9	35.8
ECMO/PCPS	<b>0.9</b>	<b>2.8</b>	-
Heart transplantation	<b>0.6</b>	<b>1.2</b>	-