

**Late Breaking Science**

*Latest Science in Arrhythmias and Device Therapy*

# Nocturnal Heart Rate to predict Cardiovascular events

*- WEARIT-France Study -*

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*- On Behalf of the WEARIT-France Investigators -*

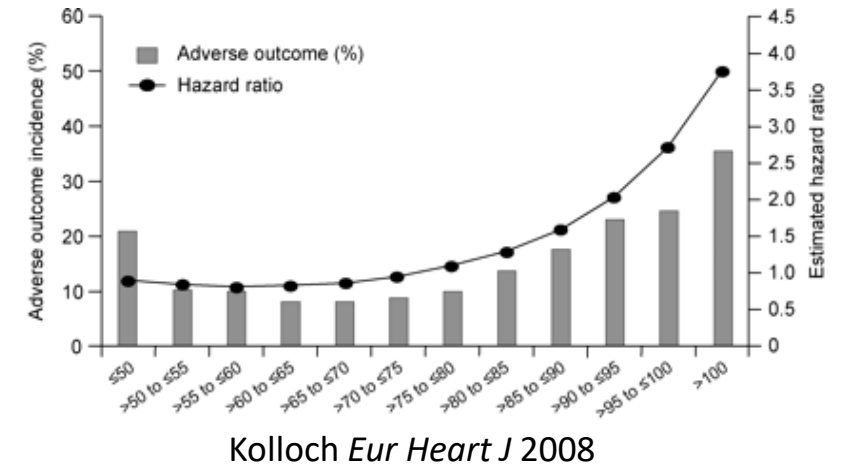
Friday 27 Aug 2021

# Rationale

## Association between HR and CV events

- HR measured at specific time point
- non-automatically collected

Wide spread use of non invasive connected devices



# Objective

To assess whether dynamic monitoring of nocturnal heart rate (NHR) could allow **timely identification of cardiovascular related events** in a population suffering from heart failure.

- Mid-term trajectories of NHR
- Short term dynamics of NHR

# Methods

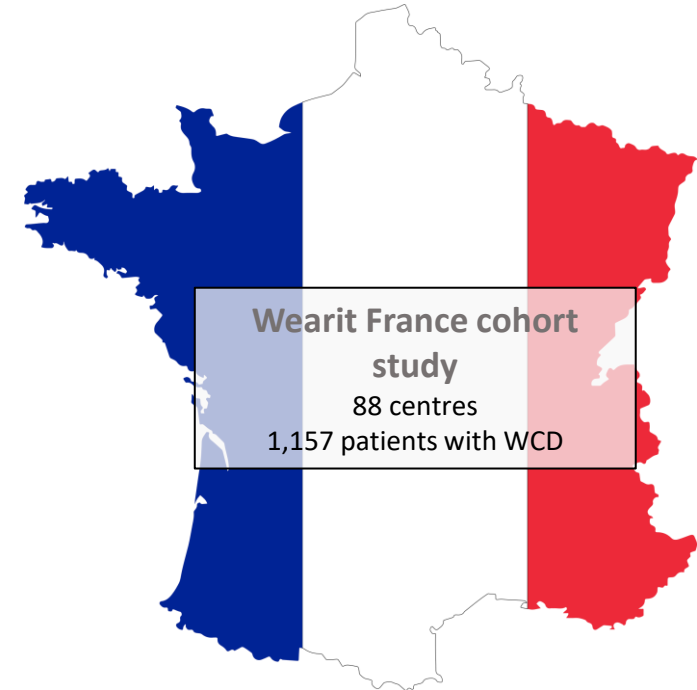
Observational cohort study : *Wearit France*

Patients with

- Wearable cardioverter defibrillator
- & **Heart failure**

Night Heart Rate

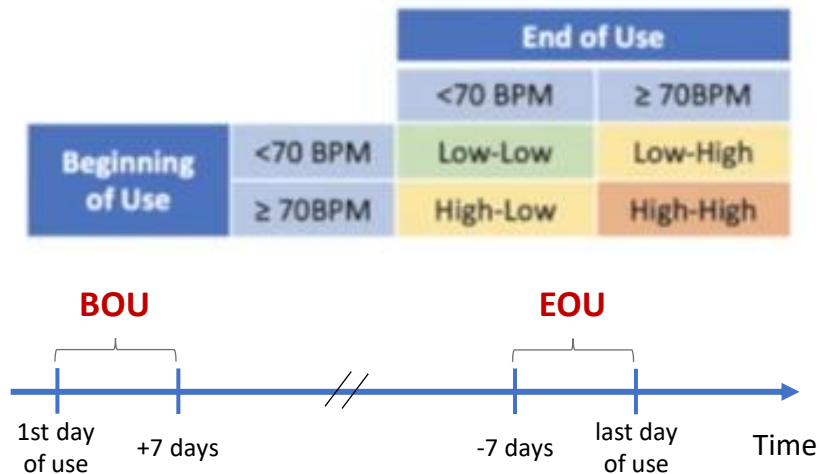
- From midnight to 7.00 a.m.
- Automatically collected
- **Remote monitoring**



# Methods

## Mid-term trajectories

- 4 groups
- Cut-off mean NHR of 70 B.P.M. at the BOU versus EOU

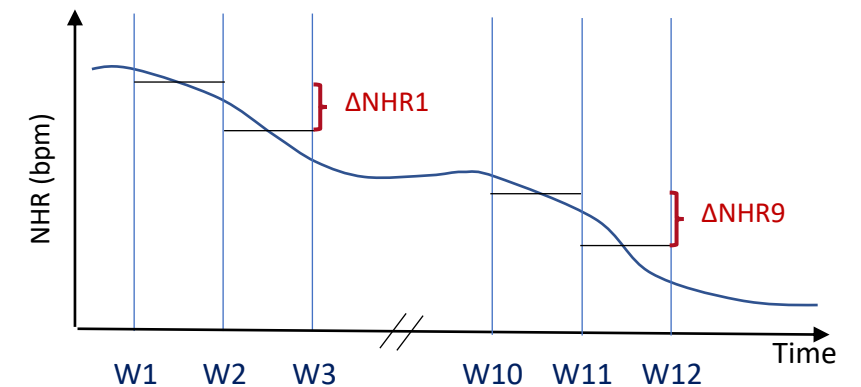


## Short term dynamics

- $\Delta$ NHR : difference between the weekly mean NHR and that of the preceding week for each subject

## Primary endpoint

- Composite of CV death and HF hospitalisation
- Centrally adjudicated



# Results *Baseline characteristics*

	All population (N=1,027)	Event (N=75)	No event (N=952)	P value
Age, yrs	60.1 ± 11.7	58.4 ± 14.3	60.2 ± 11.4	0.288
Female sex	165 (16.1)	13 (17.3)	152 (16.0)	0.756
NYHA class I-II	600 (58.4)	82 (51.4)	518 (59.7)	
Left ventricular ejection fraction	27.5 ± 9.0	26.1 ± 8.7	27.6 ± 9.0	0.172
Medical history				
Myocardial infarction	839 (81.7)	63 (84.0)	776 (81.5)	0.592
Atrial fibrillation	104 (10.1)	10 (13.3)	94 (9.9)	0.339
Renal disease	74 (7.2)	10 (13.3)	64 (6.7)	0.033
Medical Therapy				
Beta blockers	916 (89.2)	64 (85.3)	852 (89.5)	0.264
Diuretics	831 (80.9)	63 (84.0)	768 (80.7)	0.480
ACE-I/ARBs	892 (86.9)	57 (76.0)	835 (87.7)	0.004
Amiodarone	165 (16.1)	19 (25.3)	146 (15.3)	0.023

Data are presented as n (%) or mean ± SD. Abbreviations: ACE-I/ARB indicates angiotensin-converting enzyme inhibitor / angiotensin receptor blocker; BMI, body mass index; NYHA, New-York heart association

# Results

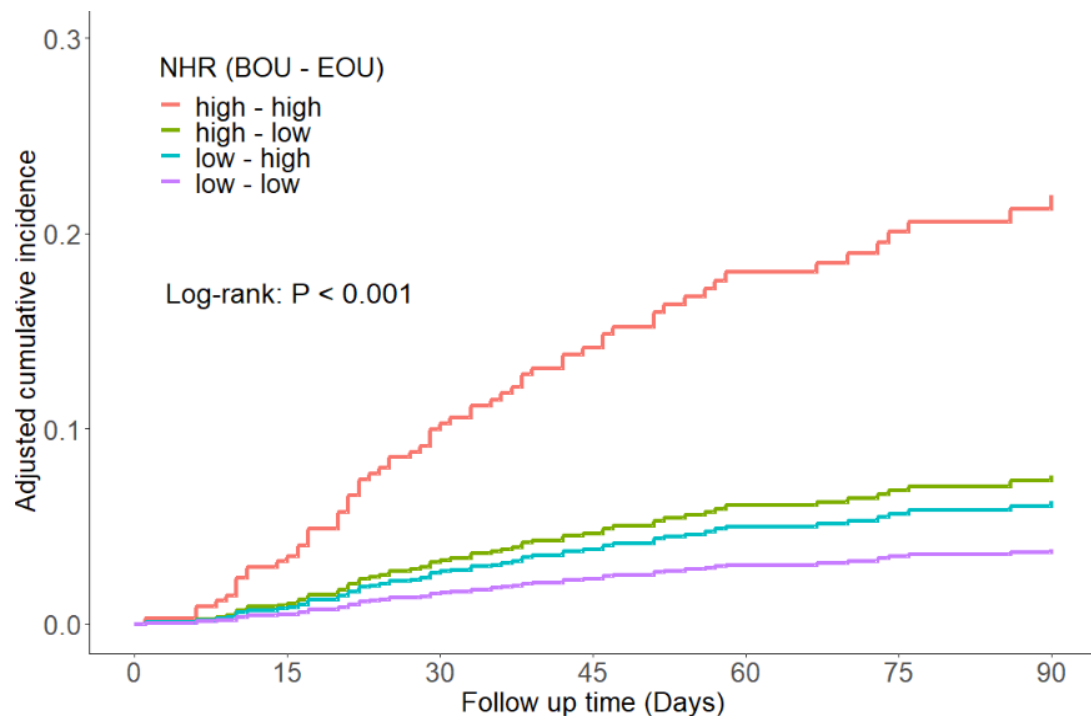
## Events N=79

Mean WCD usage period  $80 \pm 53$  days

	Patients, N (%)	Events, N
<b>Death</b>	12 (1.2)	12
Cardiovascular cause	7 (0.6)	7
Non-cardiovascular cause	5 (0.5)	5
<b>Hospitalization</b>	133 <sup>a</sup> (13.0)	155
CV hospitalization	100 (9.7)	116
Hospitalization for HF	64 (6.2)	72
Other CV hospitalization	42 (4.2)	44
non CV hospitalization	38 (3.7)	39

Data are presented as n (%) for patients and n for events. <sup>a</sup>The total number of patients with hospitalization is not equal to sum of hospitalization subcategories because some patients had several hospitalizations.

# Results *Mid-term trajectories of NHR*



## Multivariate Cox Regression Final Model

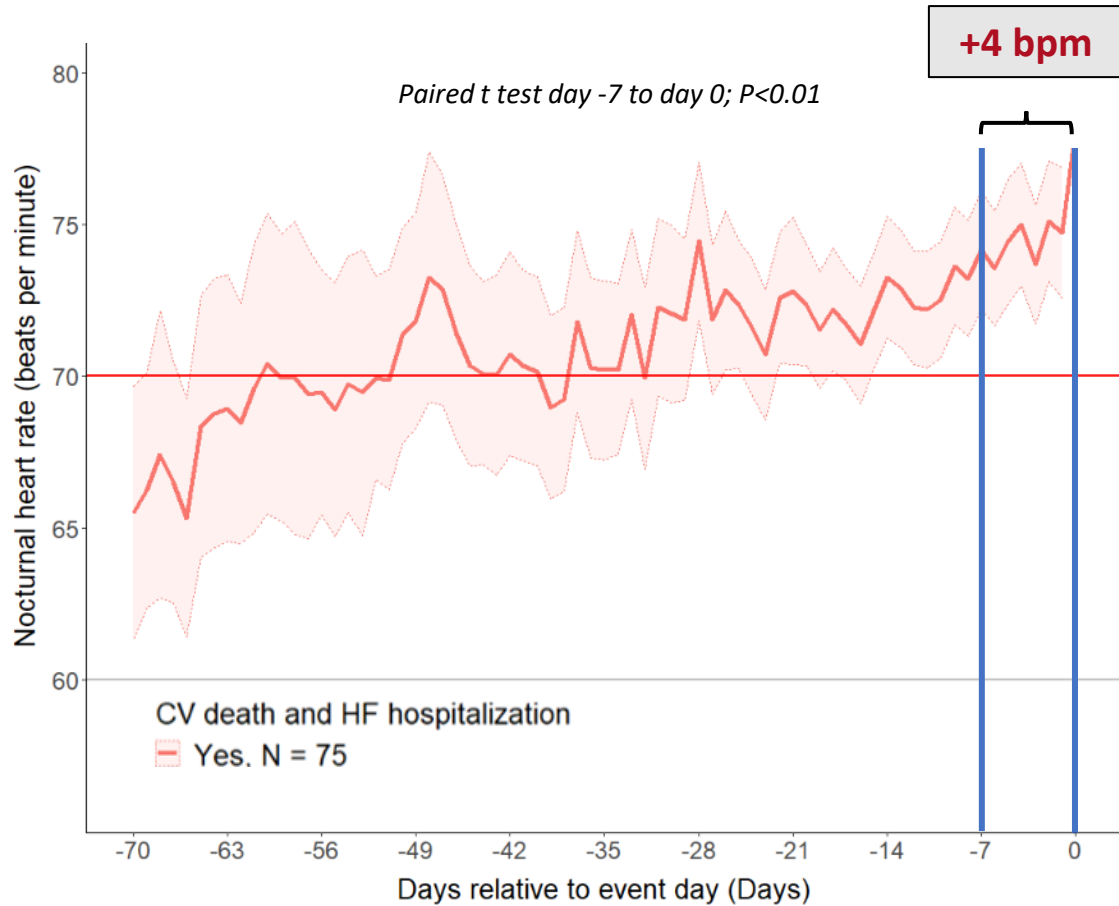
	Hazard Ratio	95% CI	P value
High-High trajectory (ref. L-L)	6.91	3.70 – 12.89	< 0.001
Heart failure hosp.	2.08	1.17–3.74	0.013
Myocardial infarction	3.58	1.02–12.51	0.046
Amiodarone	2.58	1.40–4.77	0.003
ACE-i/ARB	0.48	0.25–0.86	0.014



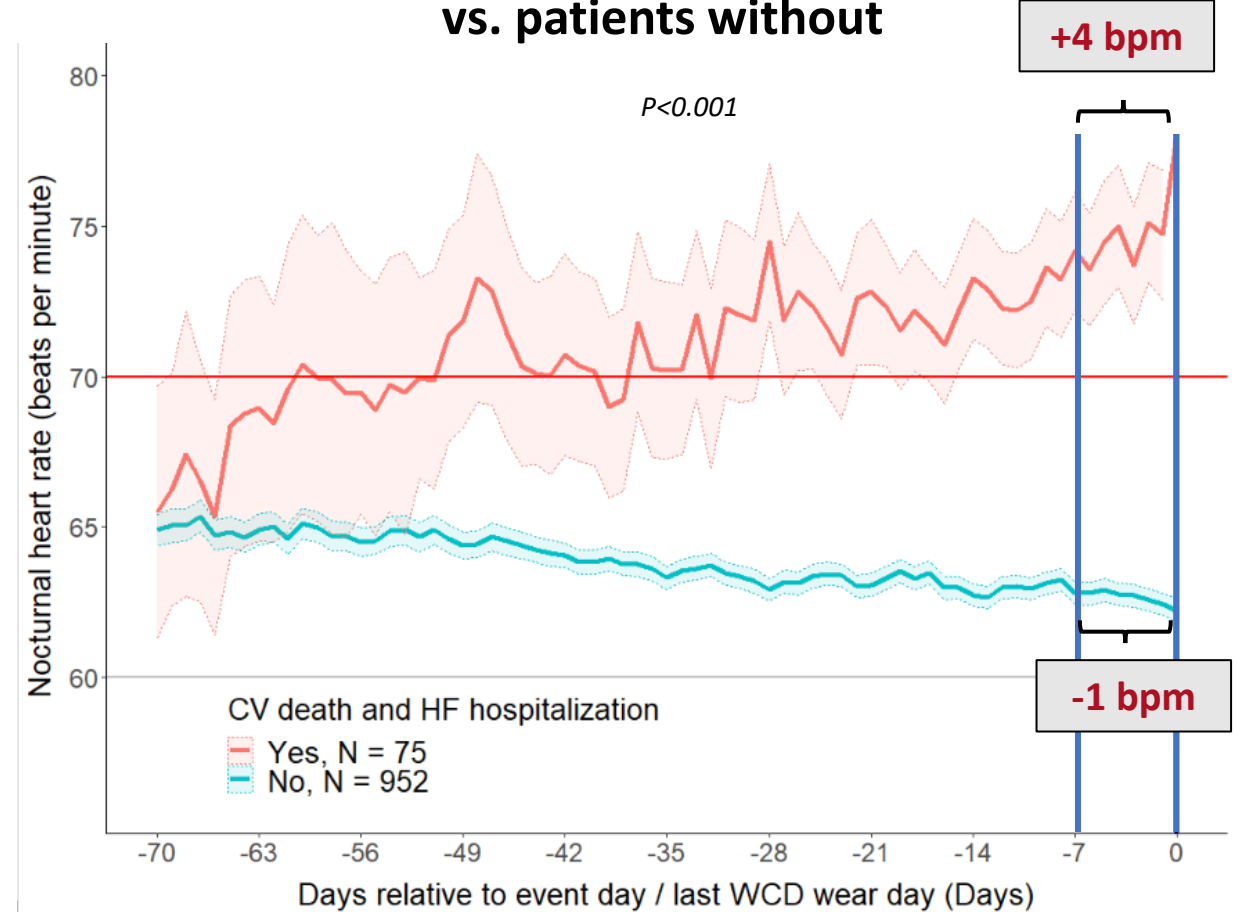
# Results

## Dynamics of NHR

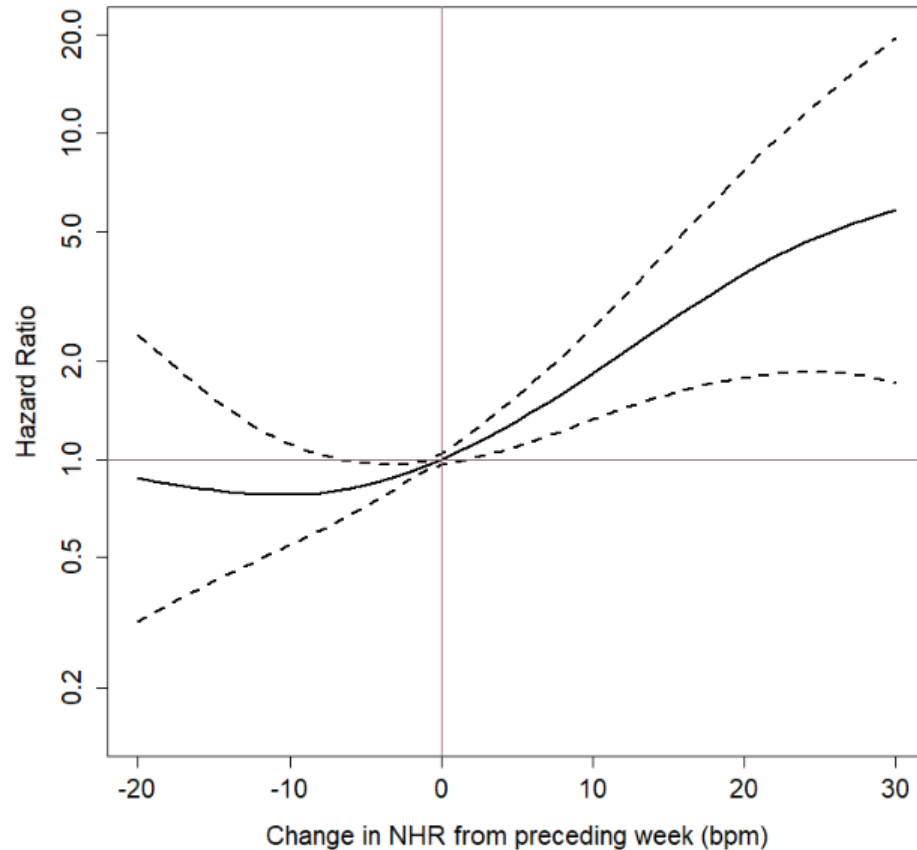
### Patients with Primary Endpoint



### Patients with Primary Endpoint vs. patients without



# Results *Short-term Dynamics of NHR*



NHR measured at a specific time point

Short-term dynamics of NHR

	NHR at first night (/5 bpm increase)			Δ NHR > 5 bpm increase			Δ NHR > 10 bpm increase		
	HR	95% CI	P-value	HR	95% CI	P-value	HR	95% CI	P-value
Primary endpoint	1.23	1.13 - 1.35	< 0.001	2.16	1.39 - 3.36	< 0.001	3.28	1.59 - 6.75	0.001
CV death	1.36	1.05 - 1.77	0.019	5.45	2.33 - 12.76	< 0.001	7.73	2.20 - 27.21	0.001
HF hospitalisation	1.19	1.09 - 1.31	< 0.001	2.07	1.33 - 3.24	0.001	2.87	1.33 - 6.18	0.007

# Conclusion

Study using **automatically** collected heart rate available with **remote monitoring**

**Weekly variations** of NHR was associated with CV death and hospitalisation for heart failure

Further research is needed to explore implementation in **Near-Term Prevention** of CV events