

# Corsano

## Continuous Cardiac Monitoring Anytime, Anywhere

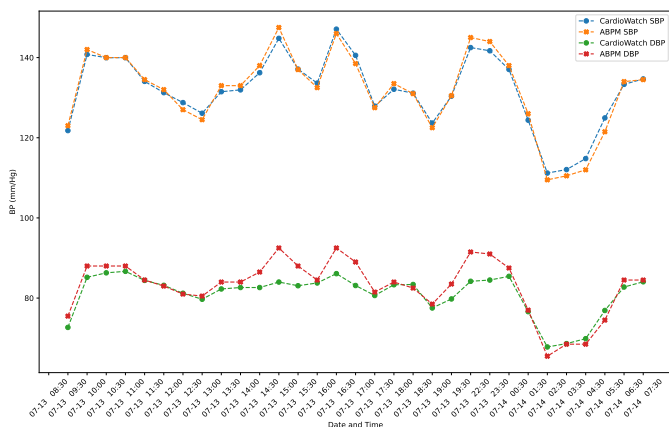
### Innovative Horizons in Hypertension Monitoring: Corsano's CardioWatch 287-2 System

Corsano's CardioWatch 287-2 is a transformative solution for hypertension monitoring, highlighting its potential to replace traditional 24-hour ABPM. The discreet wrist-worn device offers continuous monitoring of vital parameters, including blood pressure, and features advanced customization, enabling tailored patient experiences and prompt identification of deviations. Findings from a clinical trial demonstrate its accuracy and reliability, correlating with invasive measurements. The device's ability for homebased use, integrated data visualization, and timely intervention, positions it as a viable, less burdensome alternative, with implications for enhanced patient adherence and individualized healthcare.



#### ABPM vs Corsano NIBP (RECAMO Study)

SBP error: 1.27+/-0.9, DBP error: 2.42 +/- 2.34



The Corsano Cuffless Non-Invasive Blood Pressure algorithm was validated during MULTI-VITAL and RECAMO studies (ClinicalTrials.gov registered under NCT05566886 and NCT05899959) according to ESH Recommendations (based on ISO81060-2:2018 + Amd1:2020 & IEEE 1708+1708a standards).



# Background

Cardiovascular diseases (CVD) stand out as a global health crisis, being the primary cause of death worldwide, accounting for 32% of all global fatalities [1]. Unfortunately, the number of individuals afflicted by CVD continues to rise annually [1]. Among the known risk factors for CVD, high blood pressure (BP), also known as hypertension, holds the strongest causal association and is prevalent across a large portion of the population [2]. Globally, an estimated 1.28 billion individuals suffer from hypertension, underscoring its widespread impact [1].

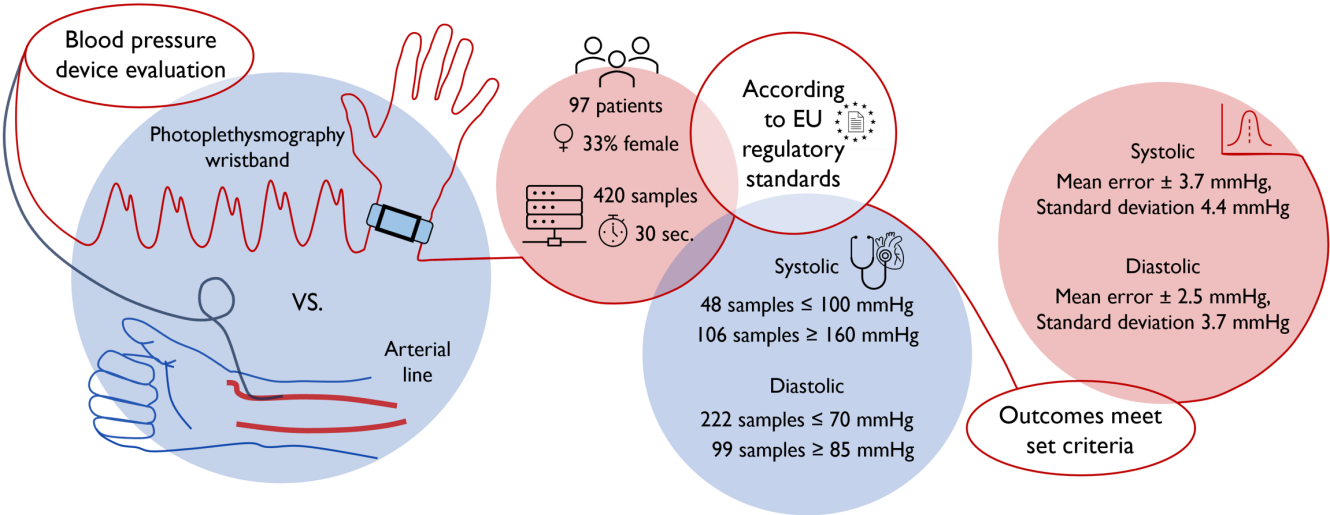
Research has shown that reducing BP through various interventions can significantly decrease the risk of CVD. Preventing age-related increases in BP, combined with the effective treatment of established hypertension, has the potential to reduce the burden of CVD on the population [2,3]. To achieve this, accurate monitoring and measurement of BP are essential and should be performed regularly [3,4].

Currently, BP measurements are typically taken during occasional visits to outpatient clinics. This sporadic approach may not capture the true variations in BP over time and can result in missing important risk factors for CVD, such as nighttime BP dips, hindering the optimal management of high BP [5]. Moreover, in-hospital measurements are cumbersome for healthcare personnel and can be influenced by factors such as isolated office hypertension and masked hypertension [6,7]. Finally, cuff-based BP measurement do not always correlate well with internal measurements in conditions like high BP or widespread vessel disease [8].

1 World Health Organization. Cardiovascular diseases <http://www.who.int/news-room/fact-sheets/detail/cardiovascular-diseases-cvds>  
2 Fuchs FD, Whelton PK. High blood pressure and cardiovascular disease. *Hypertension*. 2020;75(2):285–92 doi: 10.1161/hypertensionaha.119.14240  
3 Breaux-Shropshire T, Judd E, Vucovich L, Shropshire T, Singh S. Does home blood pressure monitoring improve patient outcomes? A systematic review comparing home and ambulatory blood pressure monitoring on blood pressure control and patient outcomes. *Integrated Blood Pressure Control*. 2015;43 doi: 10.2147/ibpc.s49205  
4 Rahimi K, Bidel Z, Nazarzadeh M, Copland E, Canoy D, Ramakrishnan R, et al. Pharmacological blood pressure lowering for primary and secondary prevention of cardiovascular disease across different levels of blood pressure: An individual participant-level data meta-analysis. *The Lancet*. 2021;397(10285):1625–36 doi: 10.1016/s0140-6736(21)00590-0  
5 Dennis Bloomfield, Alex Park. Nighttime blood pressure dip. *World Journal of Cardiology* doi: 10.4330/wjcv7.i7.373  
6 Muntner P, Shimbo D, Carey RM, Charleston JB, Gaillard T, Misra S, et al. Measurement of blood pressure in humans: A scientific statement from the American Heart Association. *Hypertension*. 2019;73(5) doi: 10.1161/hyp.0000000000000087  
7 Papadogiannis DE, Protogerou AD. Blood pressure variability: A confounder and a cardiovascular risk factor. *Hypertension Research*. 2010;34(2):162–3 doi: 10.1038/hr.2010.223  
8 Bui TV, Picone DS, Schultz MG, Armstrong MK, Peng X, Black JA, et al. Comparison between cuff-based and invasive systolic blood pressure amplification. *Journal of Hypertension* doi:10.1097/hjh.0000000000003228

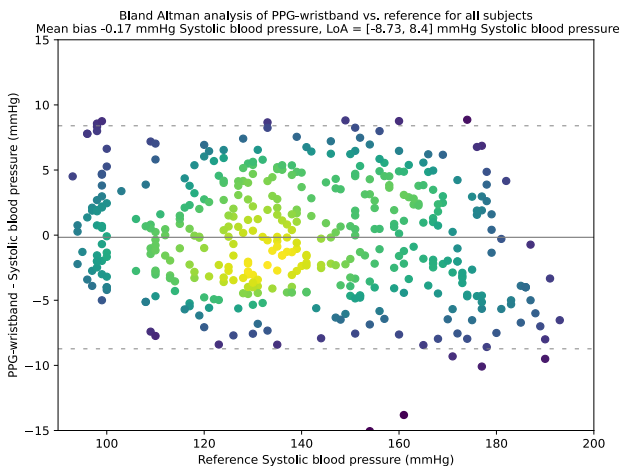
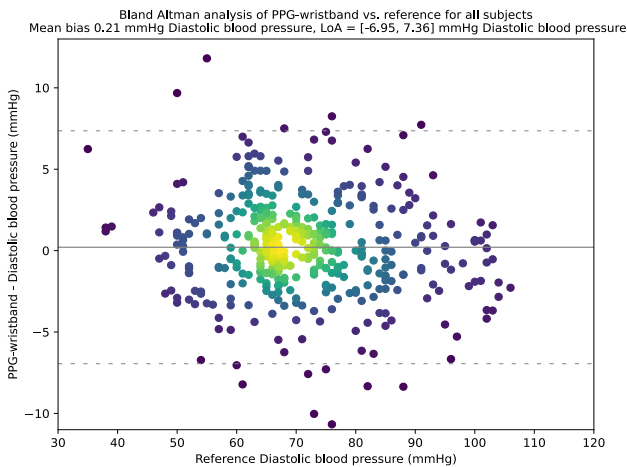
# Validation

Corsano's CardioWatch 287-2 Cuffless Non-Invasive Blood Pressure algorithm was evaluated in prospective single-centre investigations involving adult patients at Reinier de Graaf Gasthuis (Delft), a teaching hospital in The Netherlands. Results are meeting the ISO81060-2:2019 + AI:2020 and AAMI/ESH/ISO collaboration statement requirements:



	Systolic blood pressure (N =420)	Diastolic blood pressure (N=420)
Mean error	3.7 mmHg	2.5 mmHg
Standard deviation	4.4 mmHg	3.7 mmHg





Bland-Altman plots comparing the Corsano Cardio-Watch 287 Software derived BP and the invasive Fysicon reference BP pooled over All subjects. The solid line represents the bias and the dashed line represents the Limits of Agreement.



## Dipping Patterns

The fall in pressure, called the “dip”, is defined as the difference between daytime mean systolic pressure and nighttime mean systolic pressure expressed as a percentage of the day value. Ten percent to 20% is considered normal. Dips less than 10%, referred to as blunted or absent, have been considered as predicting an adverse cardiovascular event [5].

### Reverse Dipper or Riser ( $\leq 0\%$ dip)

- ☐ Increased risk of cardiovascular events [9,10]
- ☐ Twice risk of stroke compared to normal dippers [11]

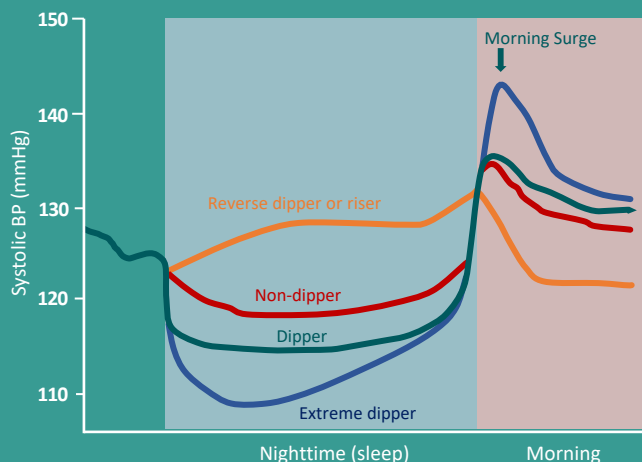
### Non-Dipper ( $\leq 10\%$ dip)

- ☐ Increased risk of adverse cardiovascular outcomes [9,12]
- ☐ Subclinical organ damages [9,10]

### Dipper ( $10 \leq 20\%$ dip)

### Extreme Dipper ( $> 20\%$ dip)

- ☐ Increased risk of silent cerebrovascular diseases [9]
- ☐ Increased risk of stroke due to exaggerated BP morning surge [13]



5 Dennis Bloomfield, Alex Park. Nighttime blood pressure dip. World Journal of Cardiology doi: 10.4330/wjc.v7.i7.373

9 Kario K, et al. Nocturnal hypertension: new technology and evidence. Hypertension 2018;71:997-1009 doi: 10.1161/HYPERTENSIONAHA.118.10971

10 Bae Keun Kim, et al. A Reverse Dipping Pattern Predicts Cardiovascular Mortality In a Clinical Cohort. J Korean Med Sci 2013; 28: 1468-1473 doi: 10.3346/jkms.2013.28.10.1468

11 Kario K, et al. Stroke prognosis and abnormal nocturnal blood pressure falls in older hypertensives. Hypertension doi: 10.1161/hy1001.092640

12 Chavalit Chotruangnapa, et al. Clinical risk factors and predictive score for the non-dipper profile in hypertensive patients. Clinical Hypertension doi: 10.1186/s40885-021-00180-4

13 Kario K, et al. Morning surge in BP as a predictor of silent and clinical cerebrovascular disease in elderly hypertensives. Circulation doi: 10.1161/01.CIR.0000056521.67546.AA

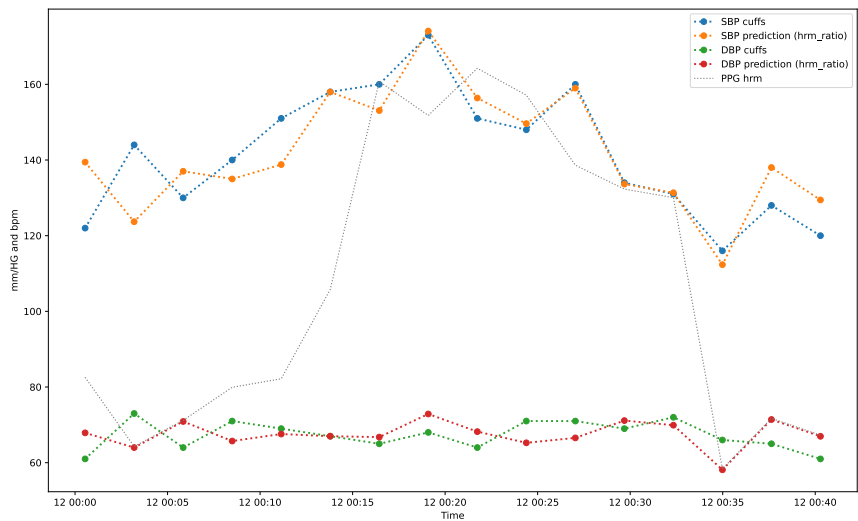


# NIBP under Exercise

The Corsano Cuffless Non-Invasive Blood Pressure algorithm was tested under High-Intensity Interval Training (HIIT) to evaluate the ability of the cuffless device to track physiological BP increases. Submaximal cycling, which has limited risks for subjects, was employed to induce substantial, shortterm but steady (for a couple of minutes) BP increases [14]

14 George S. Stergiou, et al. European Society of Hypertension recommendations for the validation of cuffless blood pressure measuring devices: European Society of Hypertension Working Group on Blood Pressure Monitoring and Cardiovascular Variability. Journal of Hypertension doi: 10.1097/HJH.0000000000003483

**NIBP HIIT Test Results**  
SBP error: 5.05 ±4.69, DBP error: 3.62 ±3.42



## Advantages of the Corsano CardioWatch

Building on the empirical insights gained from the aforementioned studies, we now turn our focus to the multifarious advantages offered by the Corsano CardioWatch in facilitating the early detection and management of hypertension.



### Continuous Patient Monitoring

Corsano CardioWatch stands out for its ability to offer uninterrupted surveillance of an array of vital parameters. Unlike episodic measurements, continuous monitoring provides a holistic view of a patient's health trajectory, allowing for the early detection of anomalies.



### Real-time Research Platform for AI and ML

The device, underpinned by a real-time research platform, caters directly to the burgeoning domains of AI and ML. It paves the way for refined analyses, predictive modelling, and diagnostic precision by facilitating unobstructed access to raw data.



### User-friendliness and Ergonomic Design

Prioritizing patient comfort, the CardioWatch sports an ergonomic design optimized for prolonged wear. Its intuitive interface, paired with a battery life ranging from 8 to 15 days, minimizes disruptions and ensures seamless data collection.