Towards accurate prediction of central BP from radial BP in the ICU

Team 7

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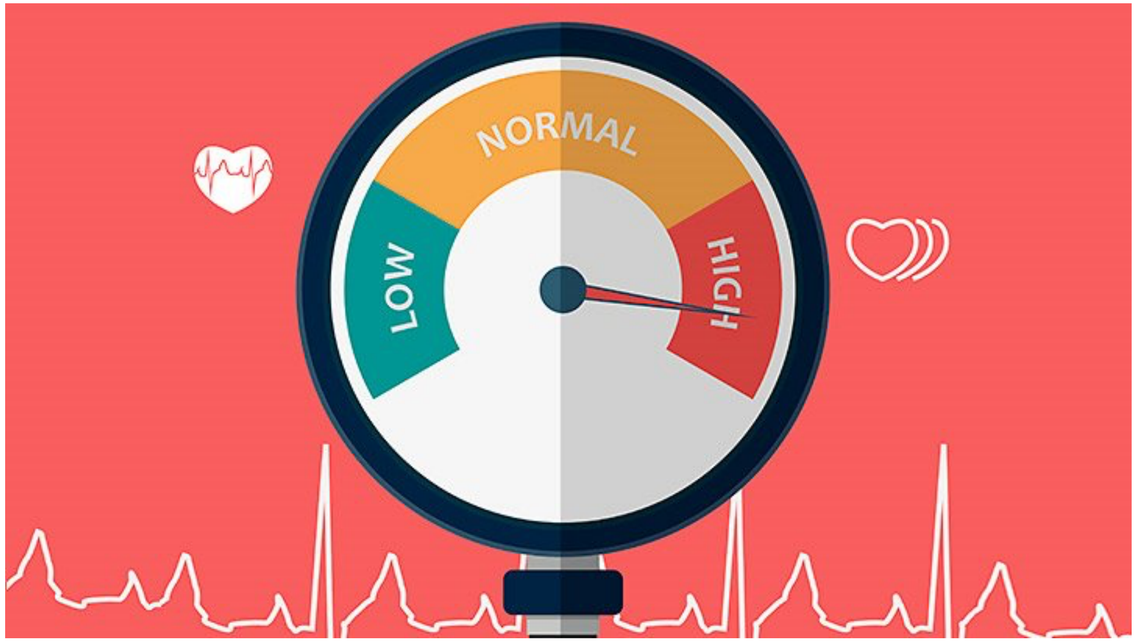
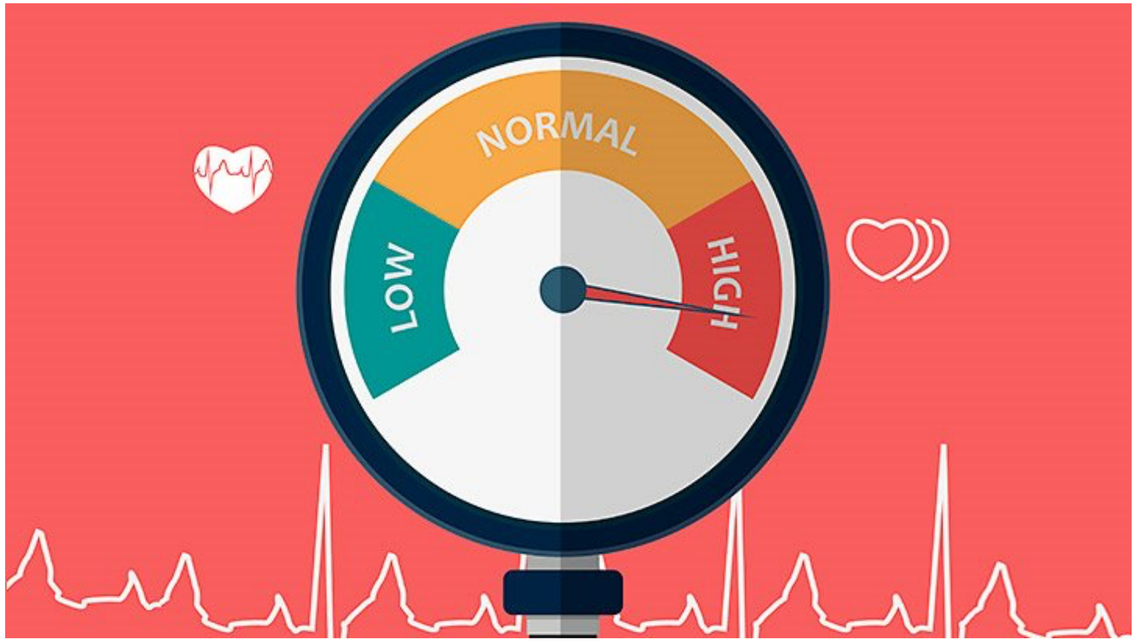
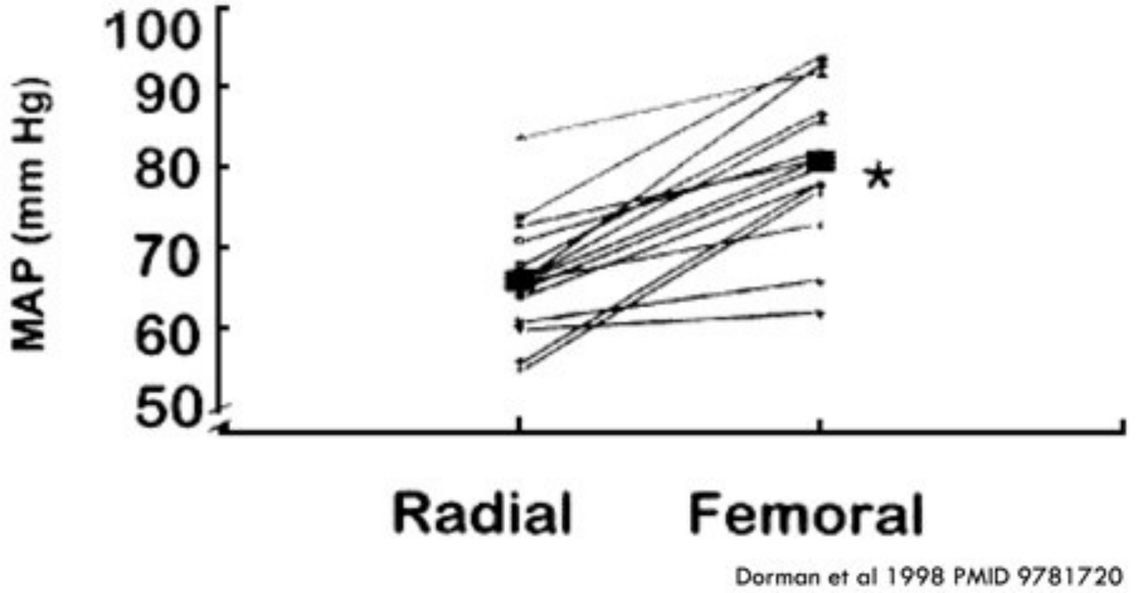
BP: Crucial yet inaccurate



UNDER PRESSURE

BP: Crucial yet inaccurate





Dorman et al 1998 PMID 9781720

UNDER PRESSURE

Aims

1. Understanding factors contributing to differences between BP modalities

UNDER PRESSURE

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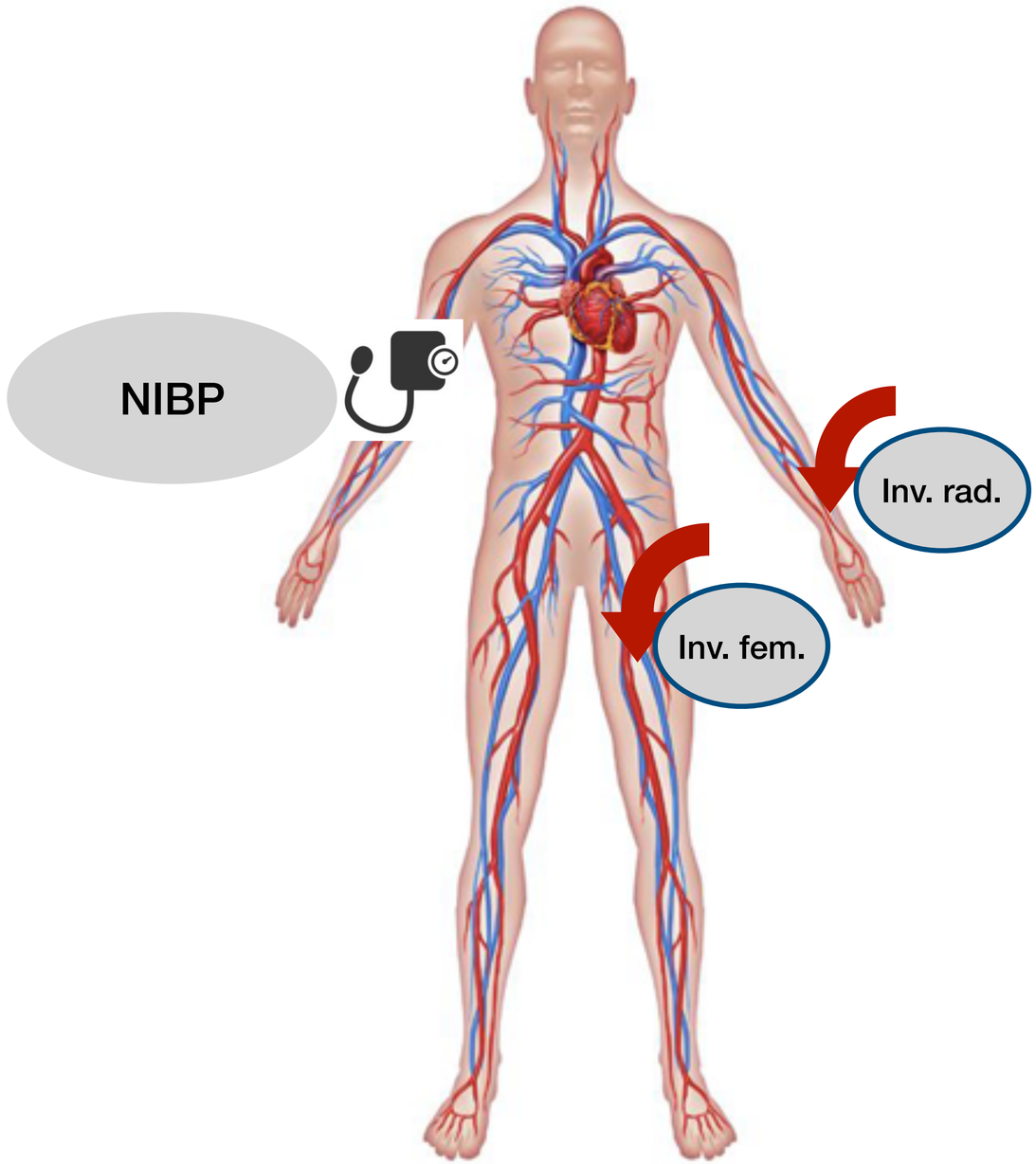
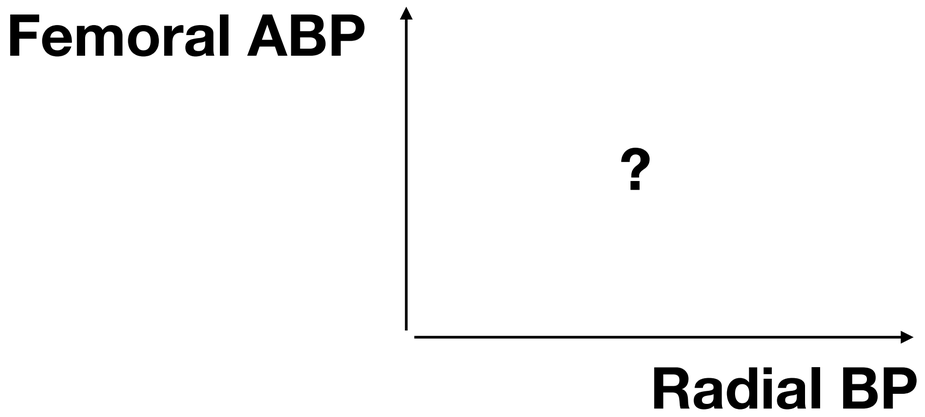
1. Understanding factors contributing to differences between BP modalities

2. Predicting the central (femoral) blood pressure based on radial artery BP

UNDER PRESSURE





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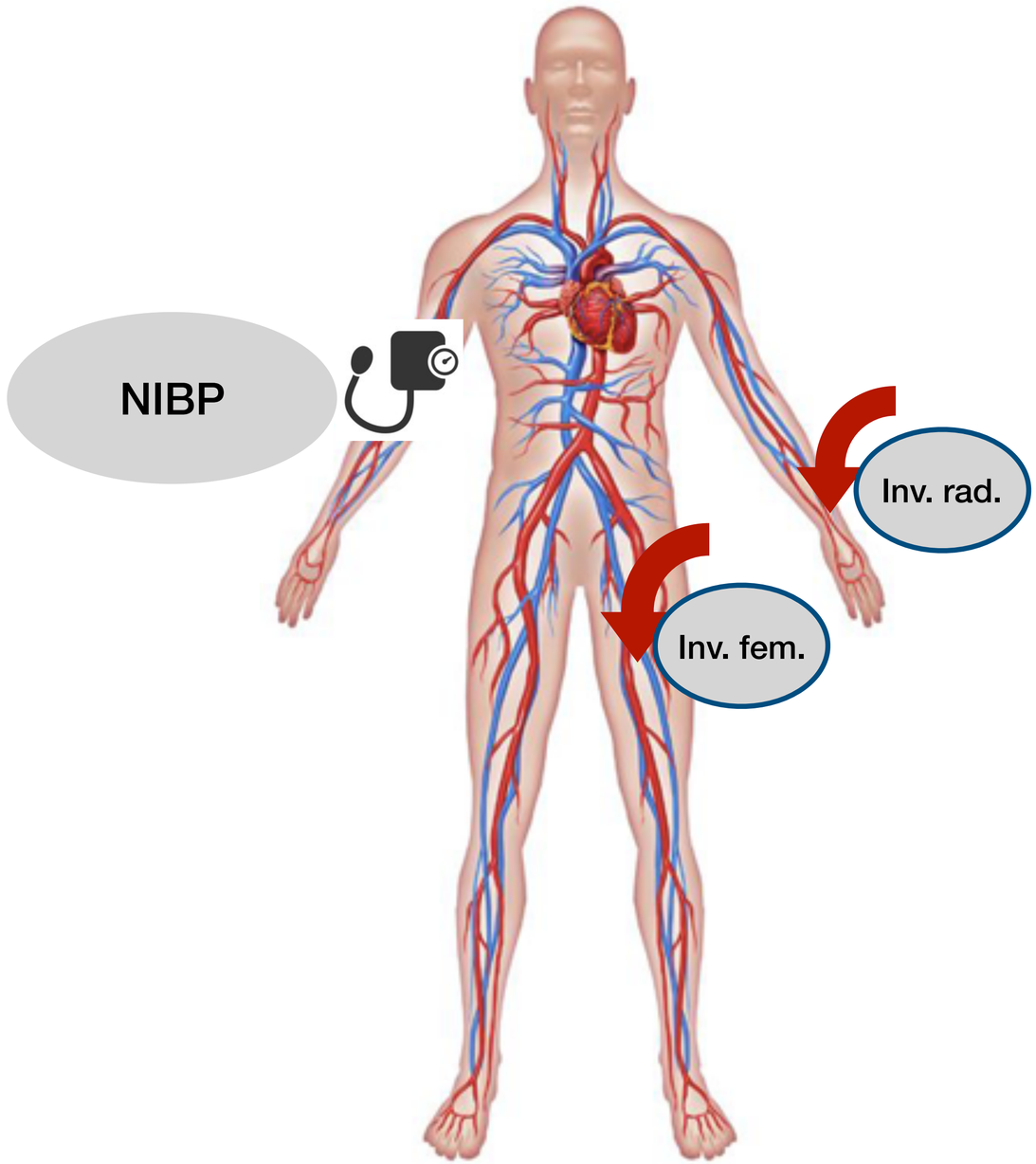
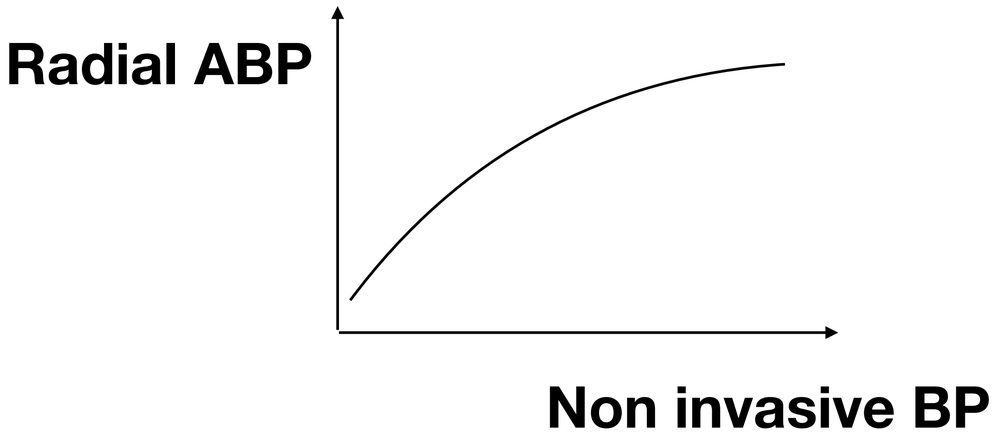
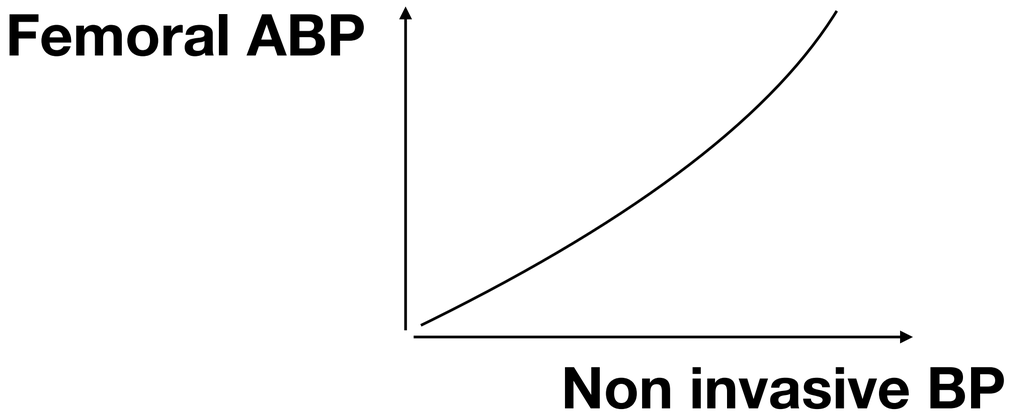
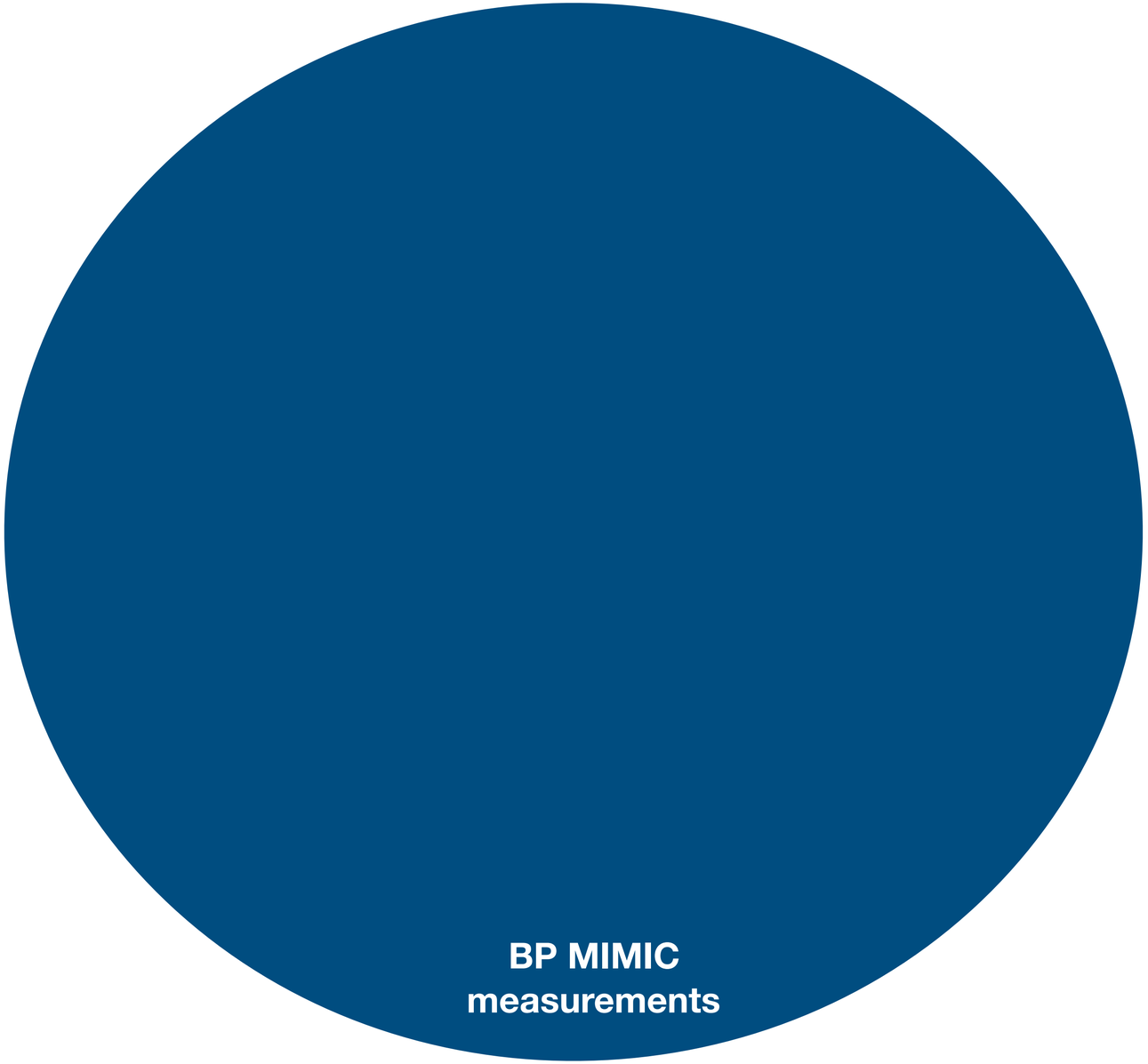






UNDER PRESSURE

Data requirements & Quality



UNDER PRESSURE

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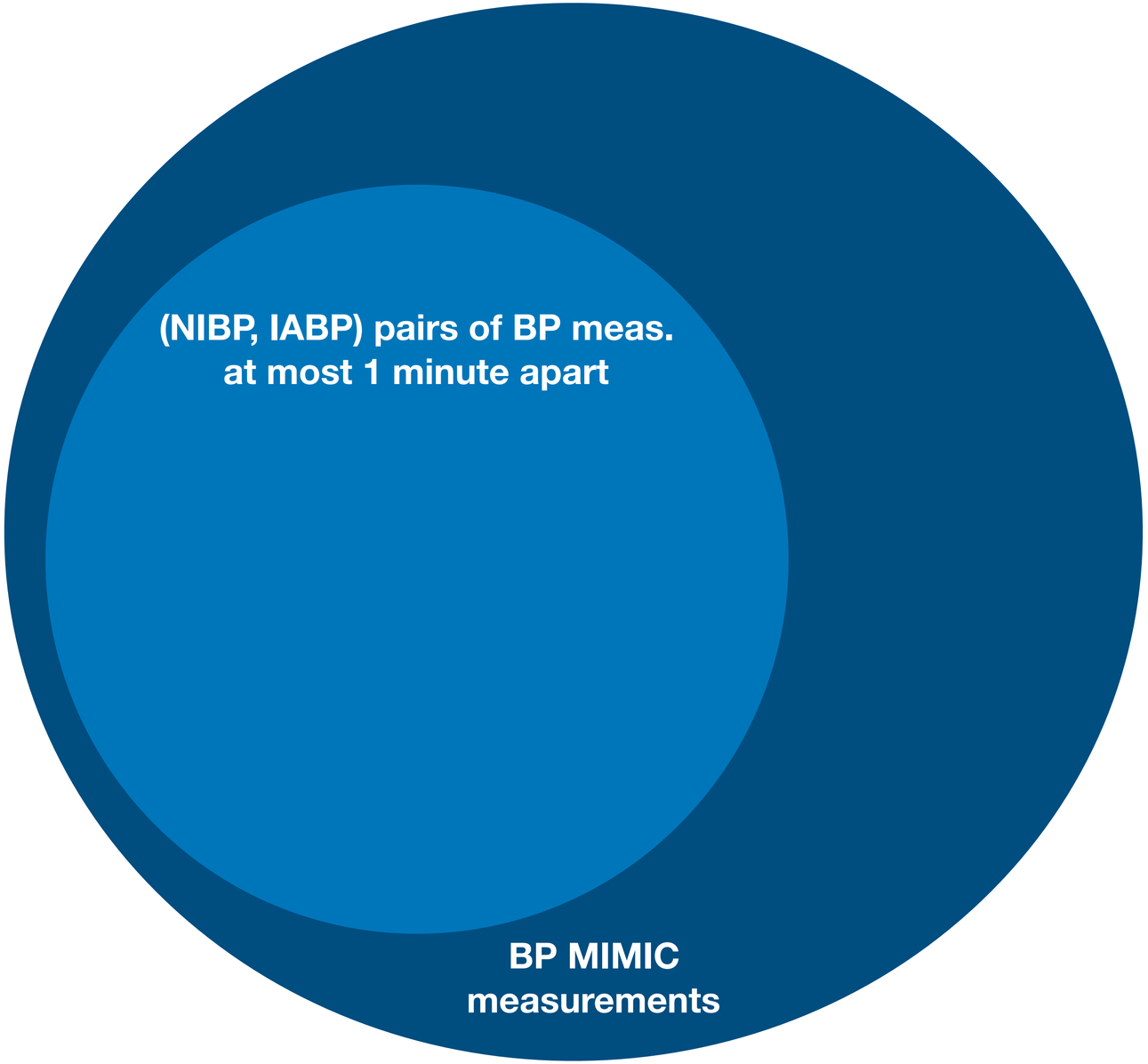
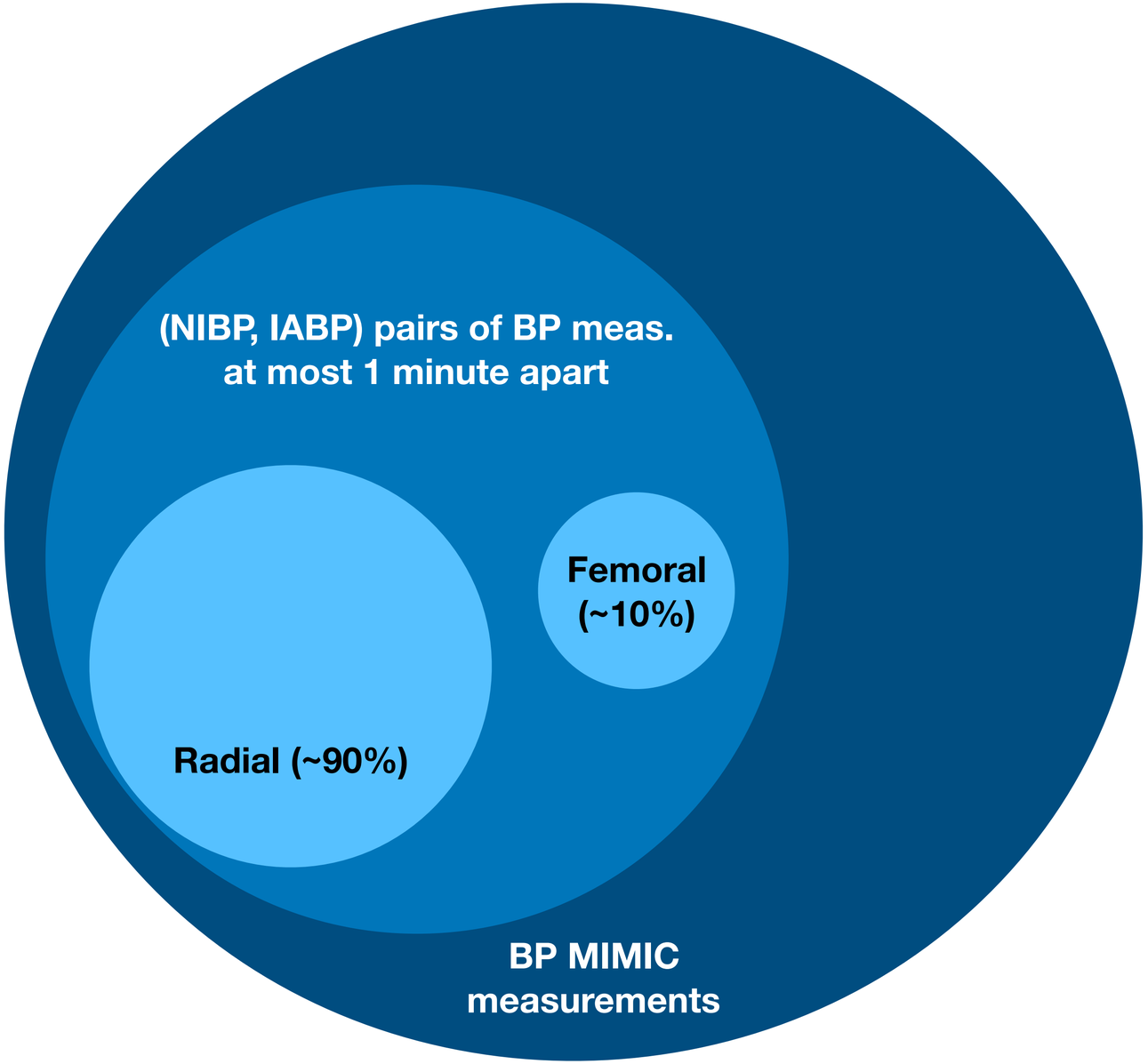


UNDER
PRESSURE

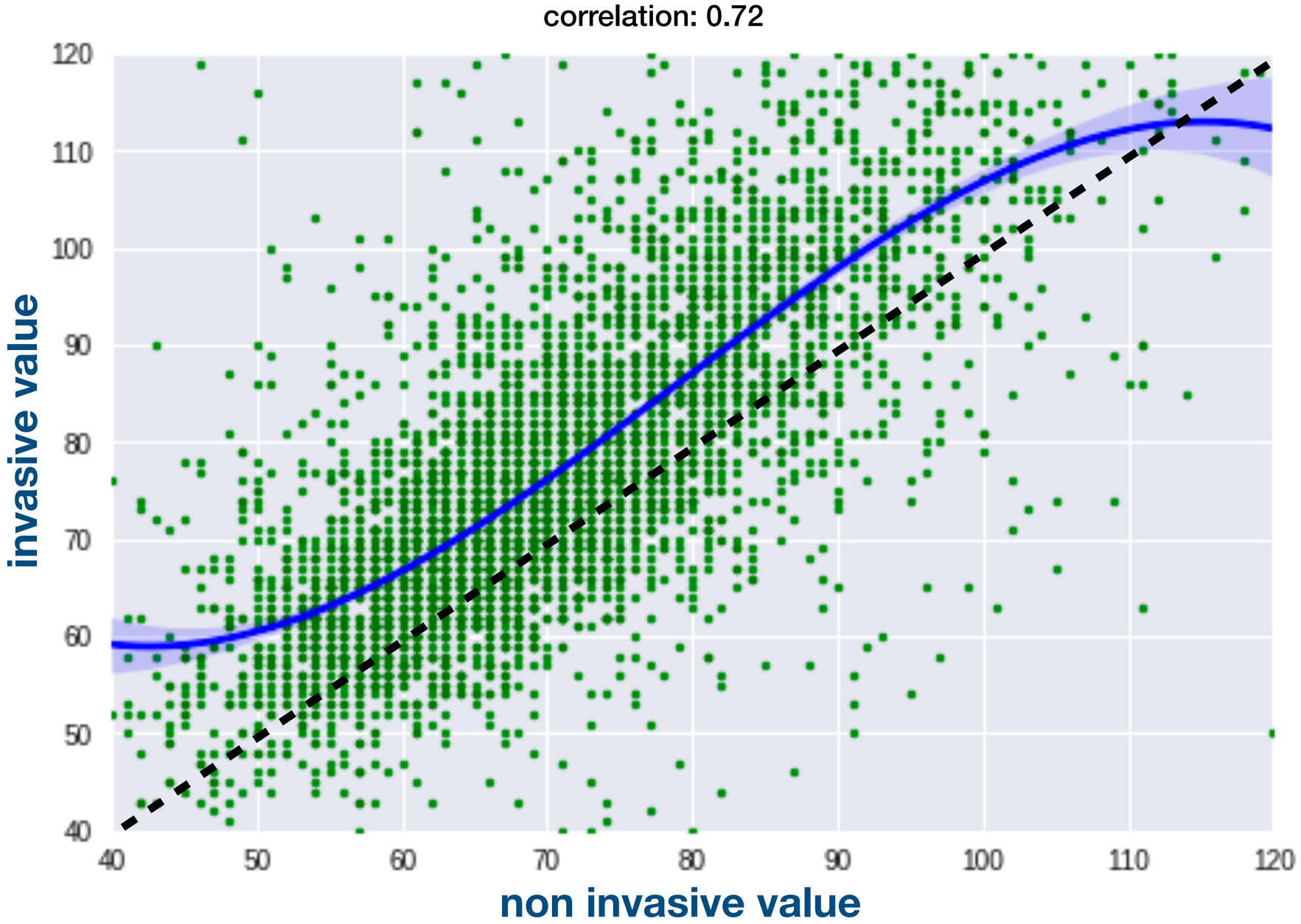
Data requirements & Quality



Number of measurement pairs: 70.000

UNDER PRESSURE

Non invasive versus Radial



UNDER PRESSURE

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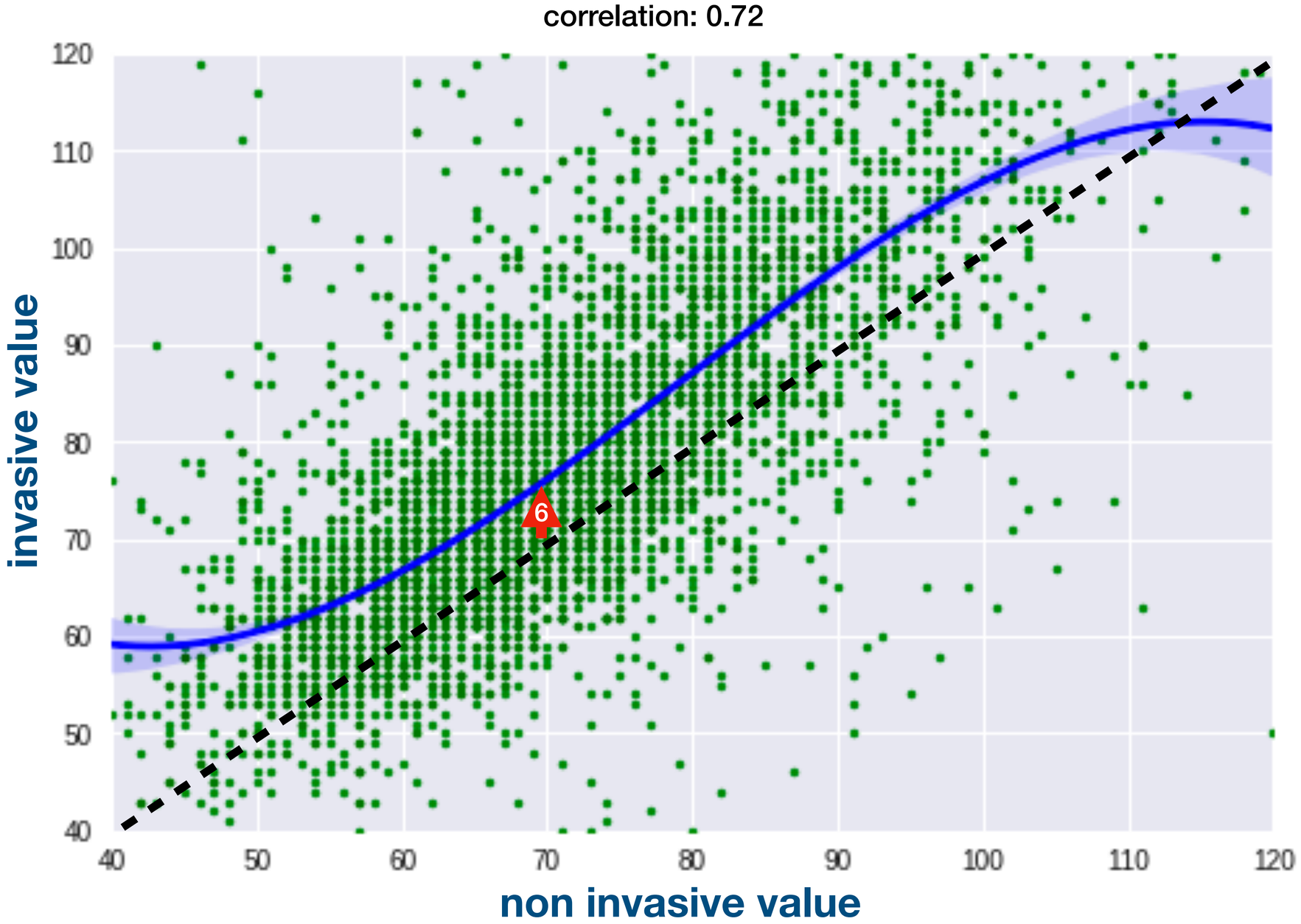
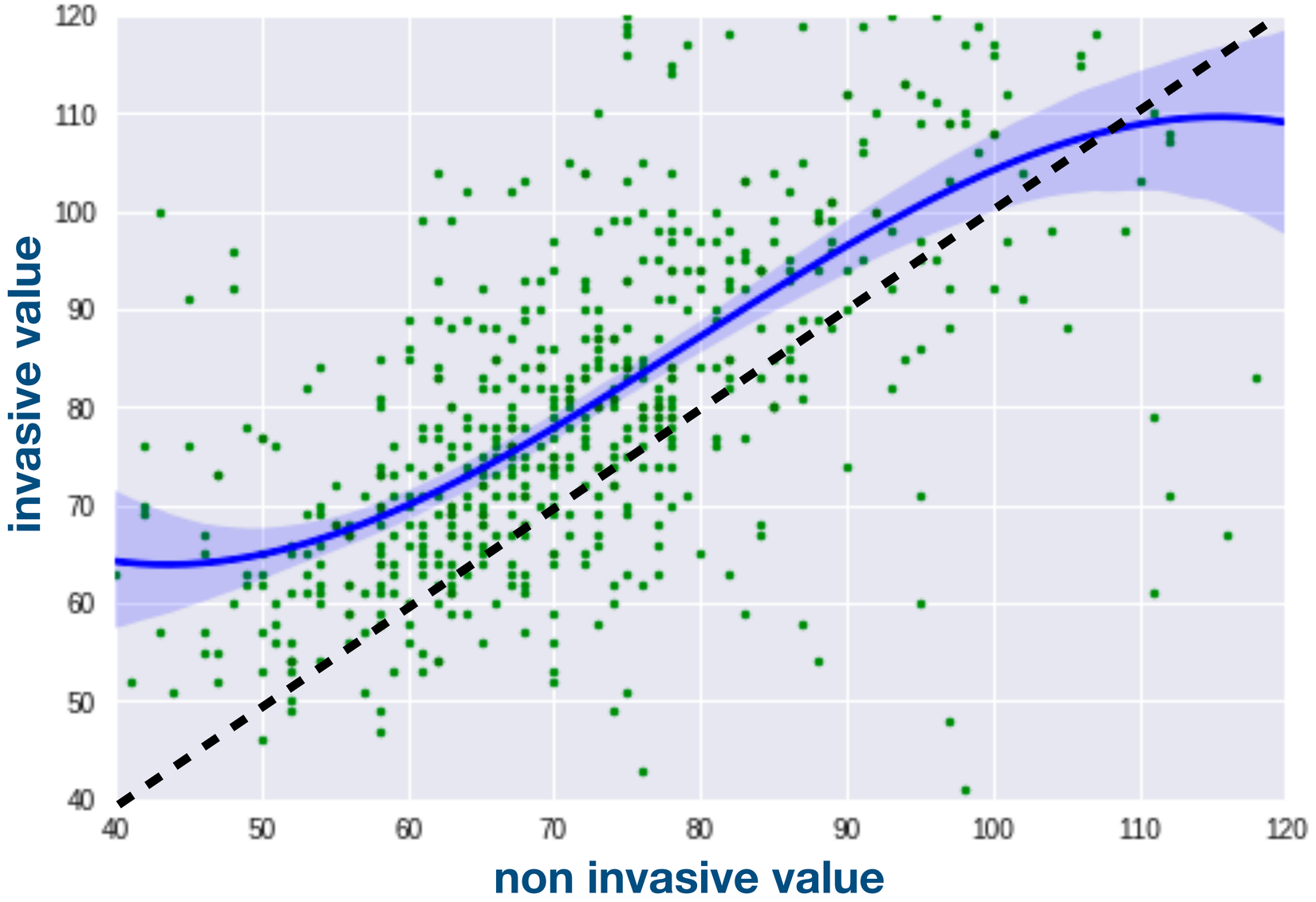


UNDER PRESSURE

Non invasive versus Femoral

correlation: 0.62



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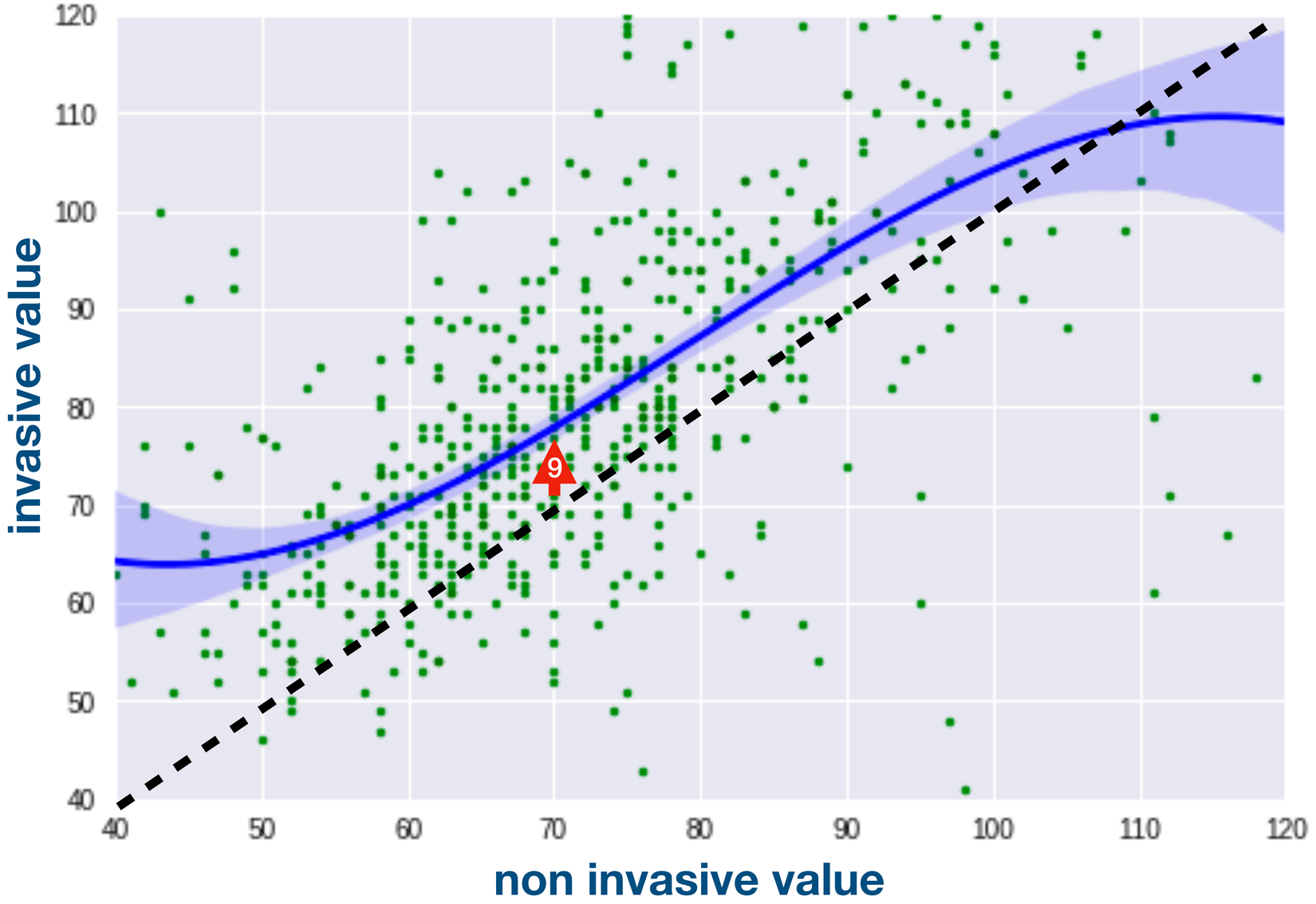
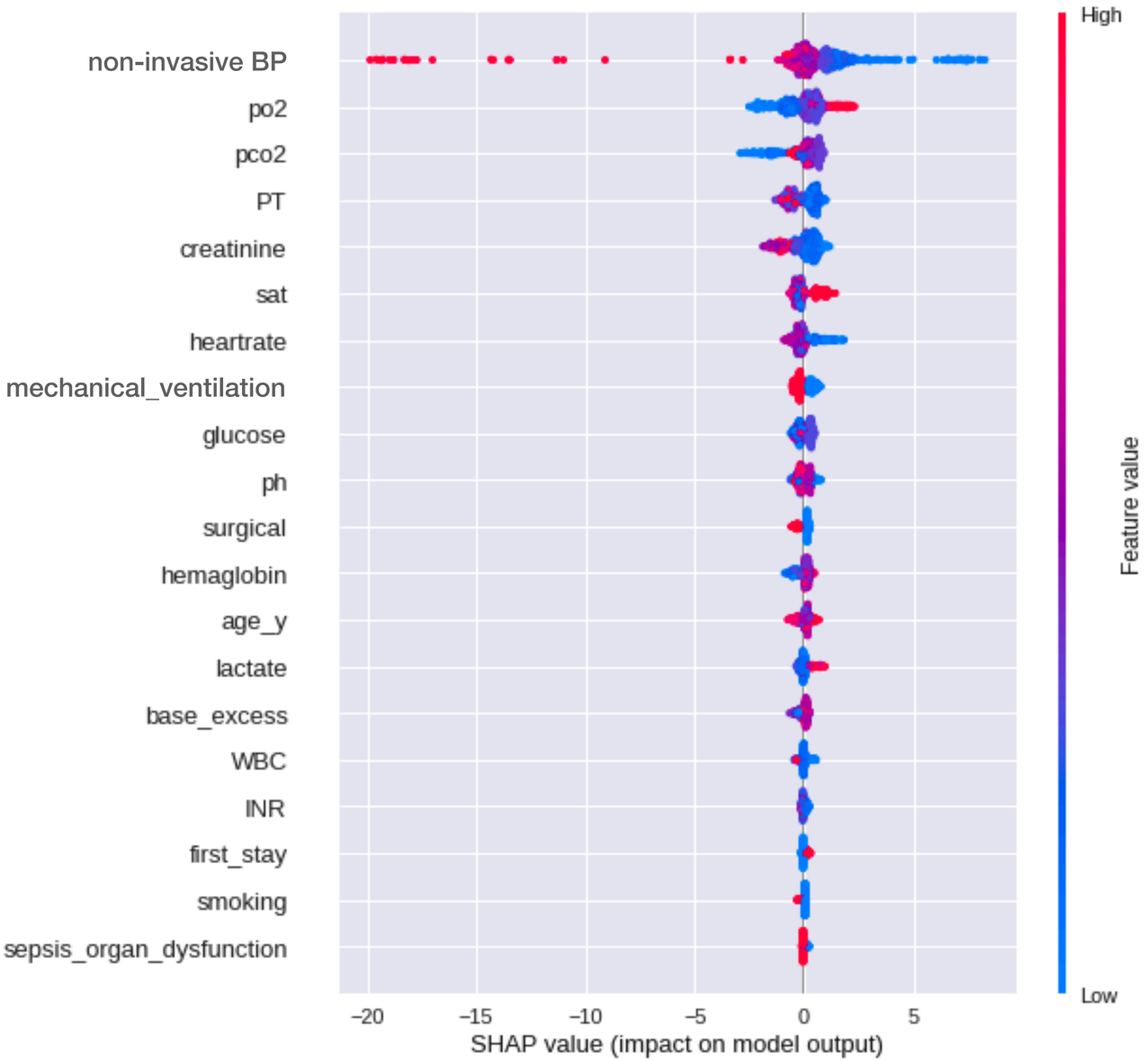


UNDER PRESSURE

po2 and pco2 most predictive lab values

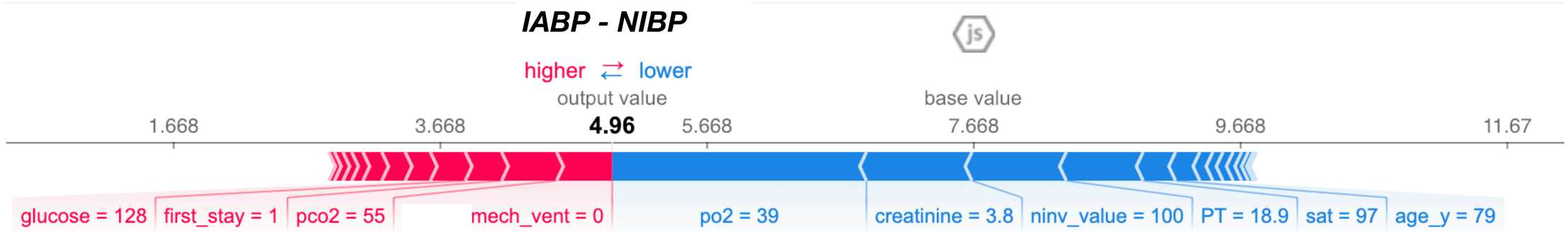
Femoral



UNDER PRESSURE

We can use SHAP to get interpretable ‘delta’ predictions for a specific patient

Femoral



UNDER PRESSURE

Predicting femoral BP from radial BP?

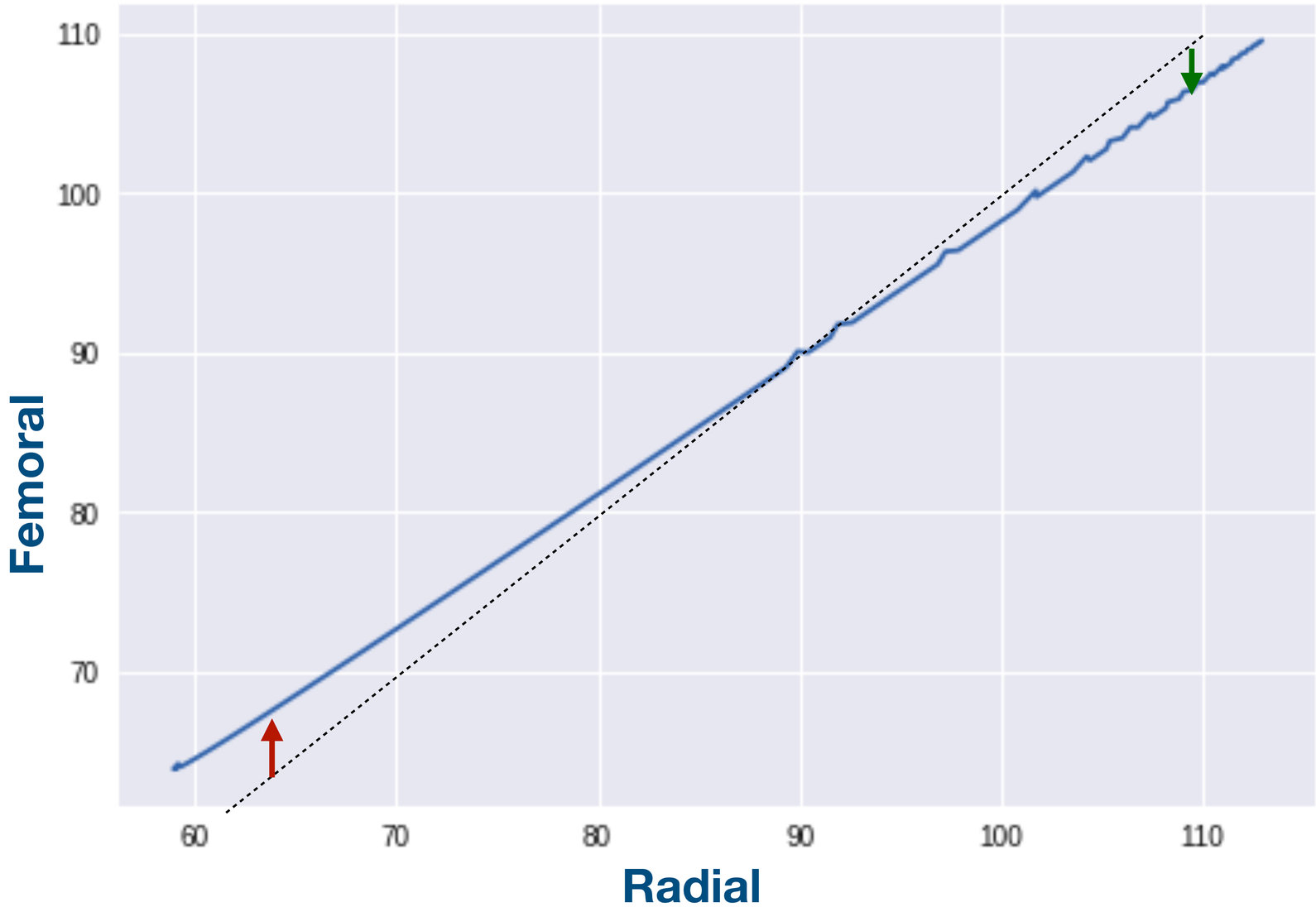
Femoral

?

Radial

UNDER PRESSURE

Predicting femoral BP from radial BP?



UNDER PRESSURE

Conclusions

- It’s possible to use MIMIC to compare invasive and non-invasive blood pressures
- There is a significant bias between different BP modalities
- Patient factors like pO2 and pCO2 influence this bias
- This seems a promising start of a tool to predict central (femoral) BP from radial BP leading to better treatment decisions

UNDER PRESSURE

https://github.com/Pacmed/invasive_bp_icu_datathon_milan

michetonu Update README.md — Latest commit 2789d45 20 seconds from now

LICENSE	Initial commit	2 hours ago
README.md	Update README.md	just now
data_preparation.ipynb	Add files via upload	an hour ago
feature_engineering.ipynb	Add files via upload	an hour ago
modelling.ipynb	Add files via upload	an hour ago
results_analysis.ipynb	Add files via upload	an hour ago

README.md

Under Pressure – Predicting central blood pressure from radial blood pressure in the ICU

Predicting and analysing the relationship between simultaneous non-invasive and invasive blood pressure measurements in the ICU, and the feature contributing to the difference in values.

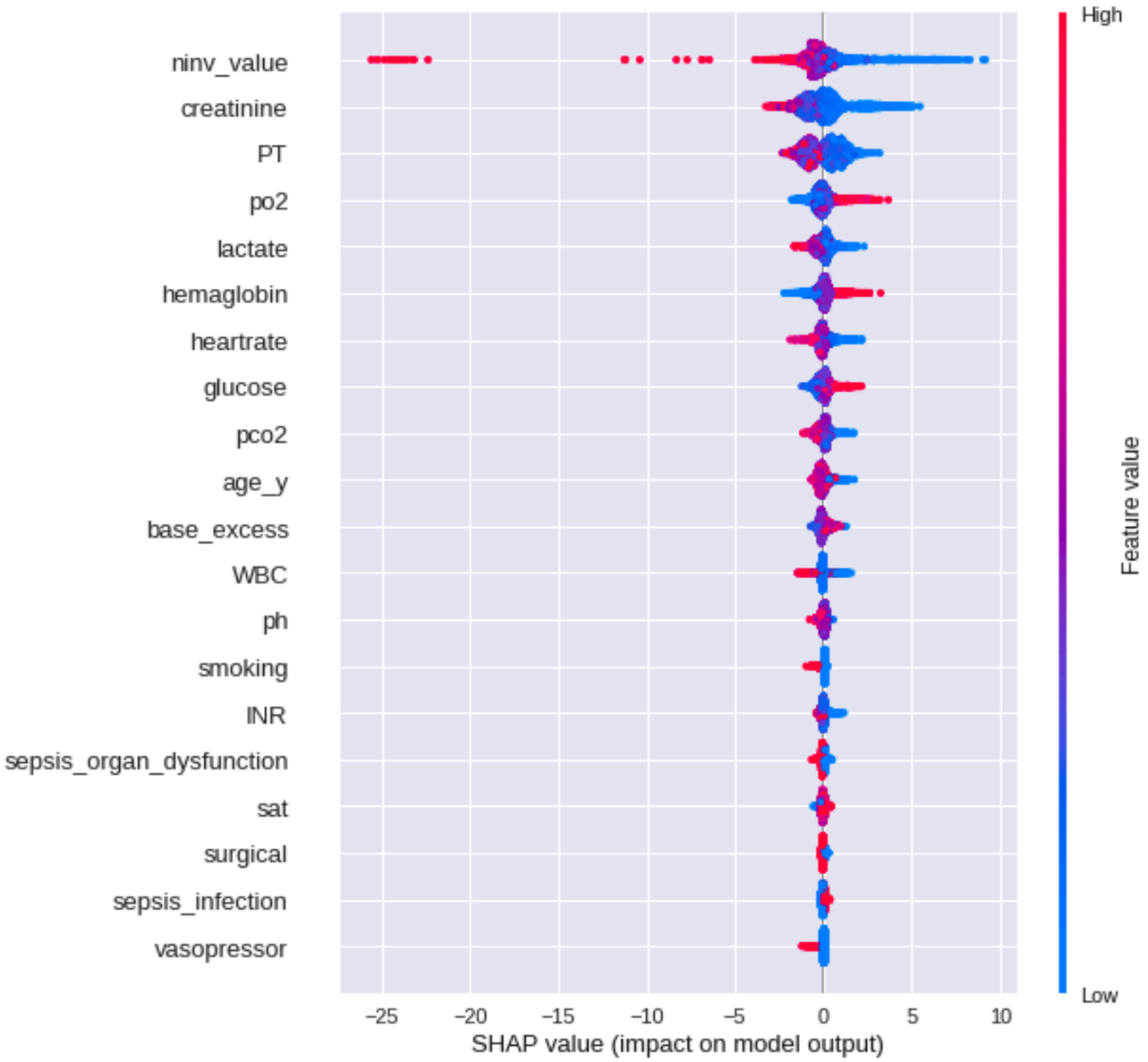
Code developed by Team 7 at the 2019 Critical Care Datathon in Milan, Italy.

https://dat-icm-milan.com/

UNDER PRESSURE

po2 and pco2 most predictive lab values

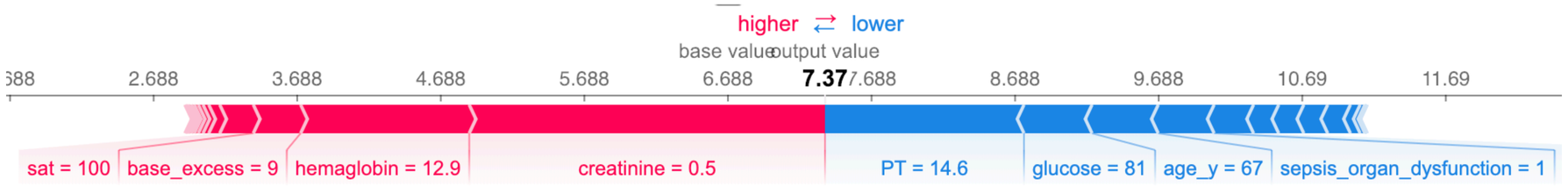
Radial



UNDER PRESSURE

We can use SHAP to get interpretable ‘delta’ predictions for a specific patiënt

Radial



UNDER PRESSURE