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# COMPARISONS OF PREOPERATIVE BLOOD PRESSURES IN SURGICAL PATIENTS

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## Background

Surgical patients expect anesthesia providers to provide high quality care. Blood pressure variability must be mitigated by establishing the patient's blood pressure baseline and sustaining it through surgery. A consensus has not been established on which blood pressure measurement should be used as the patient's baseline.

Blood pressures before surgery in multiple care settings have been shown to vary. This may result in differences in drug and fluid administration, depending on the blood pressure considered baseline by the anesthesia provider.

The purpose of this observational evidence-based practice project was to compare mean blood pressures leading up to surgery among patients at Providence Sacred Heart Medical Center (PSHMC).

## Methods

- Literature review identified five high quality studies to inform this project.
- Institutional approval sought and obtained. IRB determined exempt research.
- Data on adult, elective surgical patients receiving a general anesthetic from 09/30/2017-10/1/2018 were extracted in an anonymized fashion.
- Patients characterized by demographic and clinical characteristics (table 1).
- Mean blood pressures calculated from three settings: ambulatory clinics in the 12 months prior to surgery, the surgical admit unit (SAU) and the "first on table" (FOT) or first pressure recorded in the operating room. Patients without blood pressures recorded in each care setting excluded.
- Repeated measures ANOVA and multiple linear regression ( $\alpha=0.05$ ).

## Findings

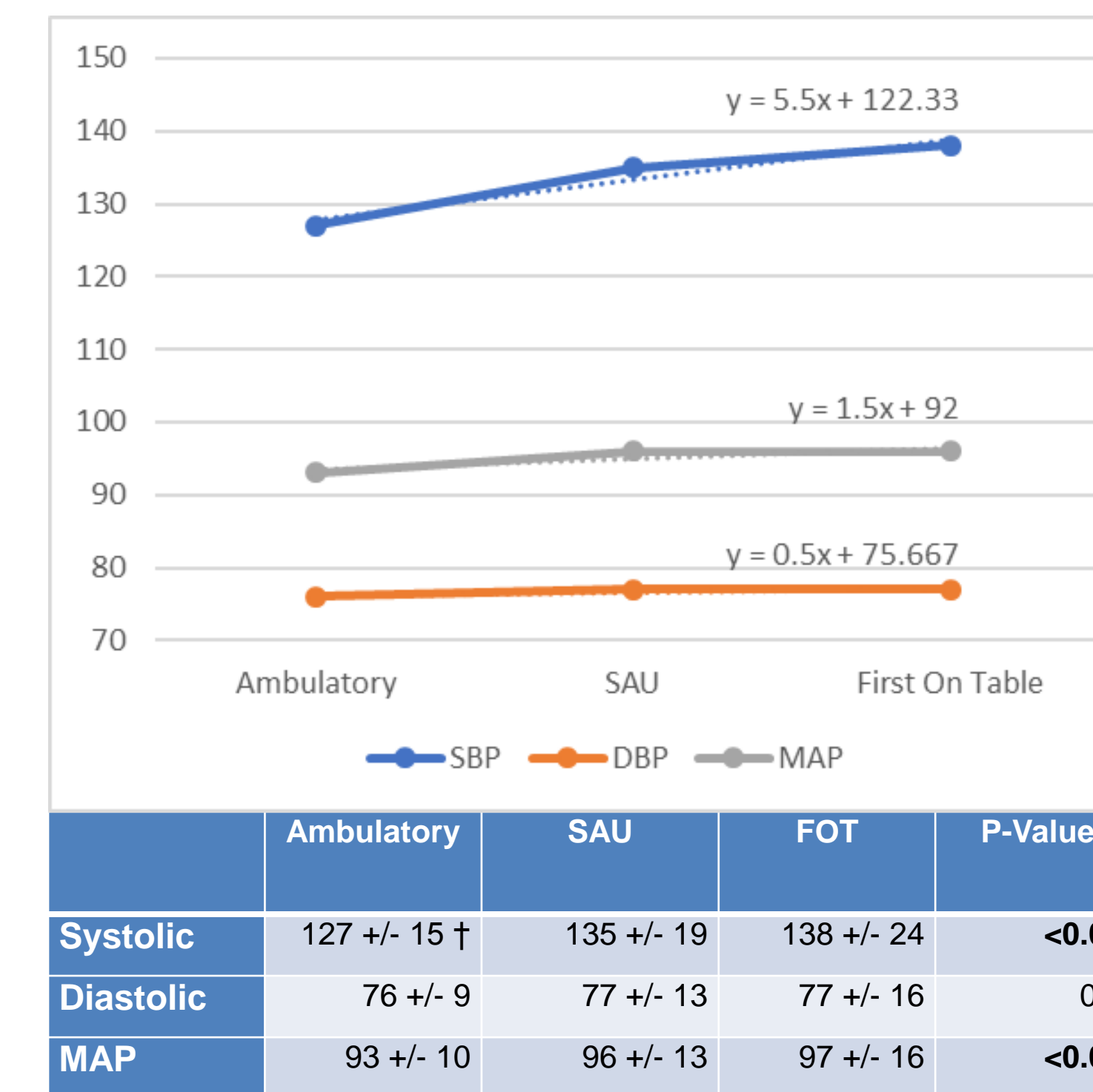
Table 1. Demographic and Clinical Characteristics (N=6,081)

Characteristic	Values	Count	Percent
Sex	Male	2851	47%
	Female	3230	53%
ASA Score	I	223	4%
	II	2491	41%
	III	2913	48%
	IV	196	3%
	Blank	258	4%
Service Line	Orthopedics	1651	27%
	Neurosurgery	1102	18%
	General	959	16%
	Urology	558	9%
	Vascular	492	6%
	ENT	382	6%
	Gynecology	344	6%
	Pulmonary	192	3%
	Gastroenterology	144	2%
	Plastics	110	2%
	Dental	70	1%
Comorbidities	Hypertension	3236	53%
	Cerebrovascular Disease	1523	25%
	PVD	1040	17%
	Diabetes Mellitus	1025	17%
	Coronary Artery Disease	972	16%
	COPD	732	12%
	Chronic Kidney Disease	569	9%
Atrial Fibrillation	442	7%	
Congestive Heart Failure	289	5%	
Liver Disease	234	4%	
		<b>Mean</b>	<b>SD</b>
Age (years)		60	16
BMI (kg/m <sup>2</sup> )		30	7

ASA= American Society of Anesthesiologists; ENT= Ear, Nose, Throat; PVD= Peripheral Vascular Disease; COPD= Chronic Obstructive Pulmonary Disease; BMI= Body Mass Index.

## Findings (cont.)

Figure 1. Comparison of Mean Blood Pressures by Care Setting



\*Calculated by repeated measures ANOVA. † Mean mmHg +/- SD

Table 2. Independent Factors Predicting FOT SBP

Factor	$\beta$	SE	95% CI	P-Value
Age	0.27	0.02	0.23-0.31	<0.001
Sex	1.99	0.57	0.87-3.10	<0.001
ASA Score	-0.67	0.54	-1.73-0.39	0.22
BMI	0.06	0.04	-0.02-0.14	0.16
COPD	-0.63	0.91	-2.41-1.15	0.49
Heart Failure	3.41	1.43	-0.61-6.21	0.02
Atrial Fibrillation	3.14	1.13	0.92-5.36	0.01
Diabetes Mellitus	1.05	0.79	-0.51-2.60	0.19
Hypertension	1.92	0.67	0.61-3.23	0.01
CAD	0.01	0.86	-1.68-1.70	0.99
CKD	2.27	1.02	0.27-4.28	0.03
Liver disease	-2.47	1.47	-5.35-0.40	0.09
CVA	0.59	0.66	-0.70-1.89	0.37
PVD	2.17	0.86	0.48-3.85	0.02

R<sup>2</sup>=0.0634

ASA= American Society of Anesthesiologists; BMI= Body Mass Index; COPD= Chronic Obstructive Pulmonary Disease; CAD= Coronary Artery Disease; CKD= Chronic Kidney Disease; CVA= Cerebrovascular Accident; PVD= Peripheral Vascular Disease.

## Discussion

SBP increased significantly from the pre-surgical ambulatory period to the first on table (FOT) blood pressure taken in the operating room. Changes in MAP were statistically, but not clinically, significant. A multivariable regression model revealed age, sex, heart failure, atrial fibrillation, hypertension, chronic kidney disease and peripheral vascular disease to be factors predictive of increasing FOT SBP. Our findings are consistent with current research evidence.

Providence Sacred Heart Medical Center patients may experience over-treatment for hypotension if the first-on-table SBP is utilized as a baseline. This overtreatment may result in increased monetary and physical costs.

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