

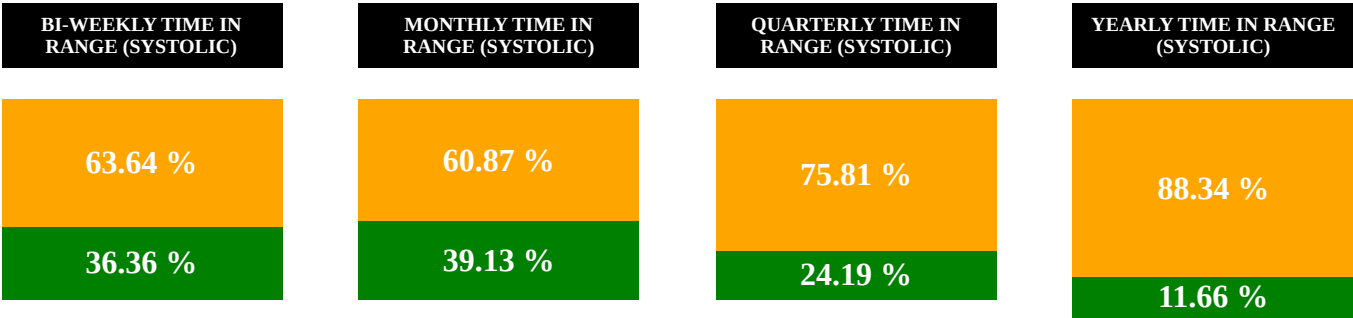


40 Mitchell Ave, Binghamton, NY 13903 Phone:(607) 723-1676

**Patient Name:** Kathleen Hanzalik  
**Height:**

**MRN #:** 1448  
**Weight:**

**Birth Year:**  
**Hypertension:** S1



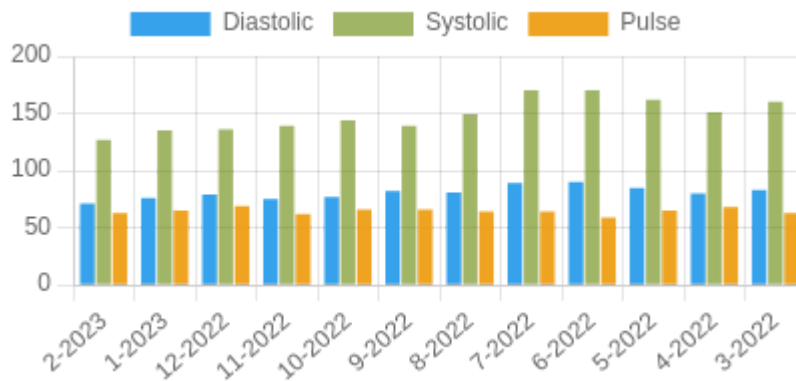
Systolic Range (<125 mmHg)

### Blood Pressure Averages

#### Blood Pressure Averages: Weekly

Week	Systolic(n)	Diastolic(n)	Pulse(n)
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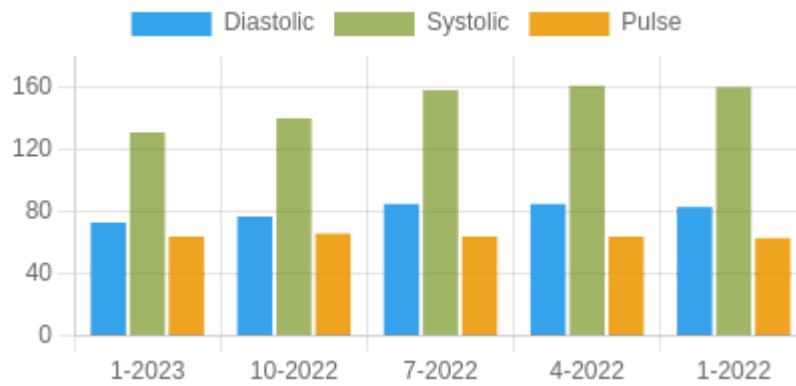
#### Blood Pressure Averages: Monthly



Month-Year	Systolic(n)	Diastolic(n)	Pulse(n)
2-2023	127 (22)	71 (22)	63 (22)
1-2023	135 (20)	76 (20)	65 (20)
12-2022	136 (20)	79 (20)	69 (20)
11-2022	139 (16)	75 (16)	62 (16)

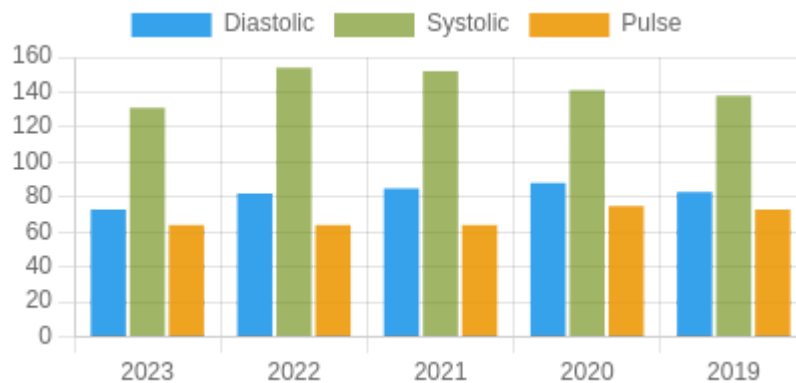
10-2022	144 (24)	77 (24)	66 (24)
9-2022	139 (4)	82 (4)	66 (4)
8-2022	149 (18)	81 (18)	64 (18)
7-2022	170 (21)	89 (21)	64 (21)
6-2022	170 (16)	90 (16)	59 (16)
5-2022	162 (18)	85 (18)	65 (18)
4-2022	151 (16)	80 (16)	68 (16)
3-2022	160 (26)	83 (26)	63 (26)

### Blood Pressure Averages: Quarterly



Quarter-Year	Systolic(n)	Diastolic(n)	Pulse(n)
1-2023	131 (42)	73 (42)	64 (42)
10-2022	140 (60)	77 (60)	66 (60)
7-2022	158 (43)	85 (43)	64 (43)
4-2022	161 (50)	85 (50)	64 (50)
1-2022	160 (26)	83 (26)	63 (26)

### Blood Pressure Averages: Yearly



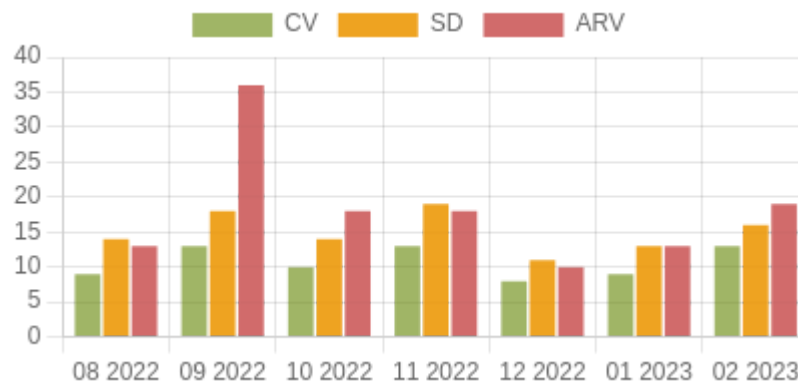
Year	Systolic(n)	Diastolic(n)	Pulse(n)
2023	131 (42)	73 (42)	64 (42)
2022	154 (210)	82 (210)	64 (210)
2021	152 (243)	85 (243)	64 (243)

2020	141 (281)	88 (281)	75 (281)
2019	138 (16)	83 (16)	73 (16)

## Blood Sugar Averages

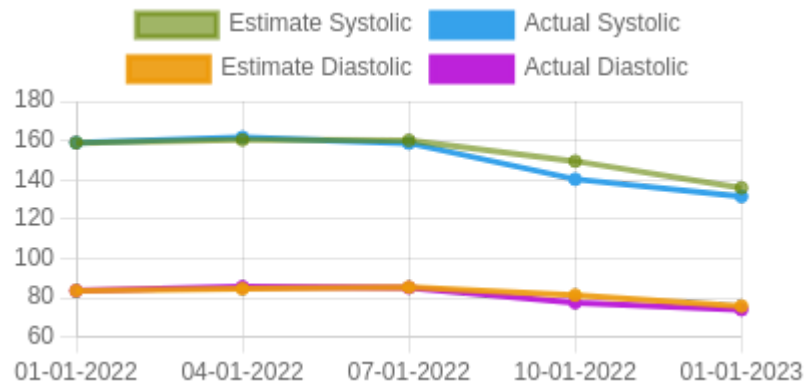
Year	Before breakfast	2 hours after breakfast	Before lunch	2 hours after lunch	Before dinner	2 hours after dinner	Bedtime
01-01-2023		123(41)					
01-01-2022		129(205)		133(2)		132(1)	173(1)

## Variability Trends (Monthly)



1. CV –The coefficient of variation (CV) is the ratio of the standard deviation to the mean. The higher the coefficient of variation, the greater the level of dispersion around the mean, Units = mmHg.
2. ARV – Average real variability (ARV) is a method for measuring short-term, reading-to-reading, within-subject variability. It is defined as the average of the absolute differences between consecutive readings, Units = mmHg.
3. SD – Standard deviation is a statistical measurement of variability. It measures how much variation there is from the average (mean), Units = mmHg.

## Kalman Trends

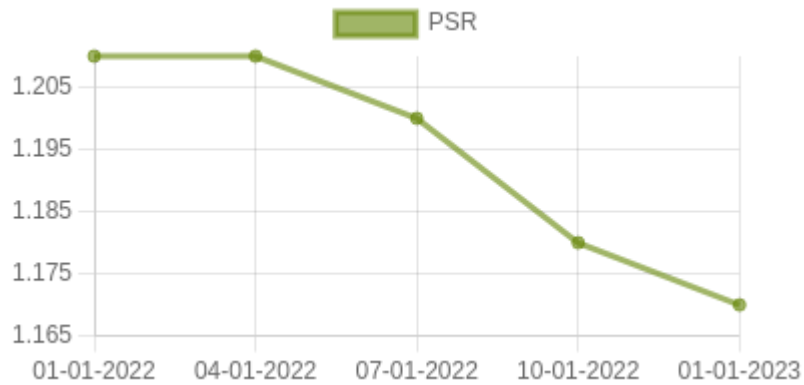


1. Mean(Arithmetic Mean) – Mean is the average of a set of numbers

2. SD – Standard deviation is a statistical measurement of variability. It measures how much variation there is from the average (mean).

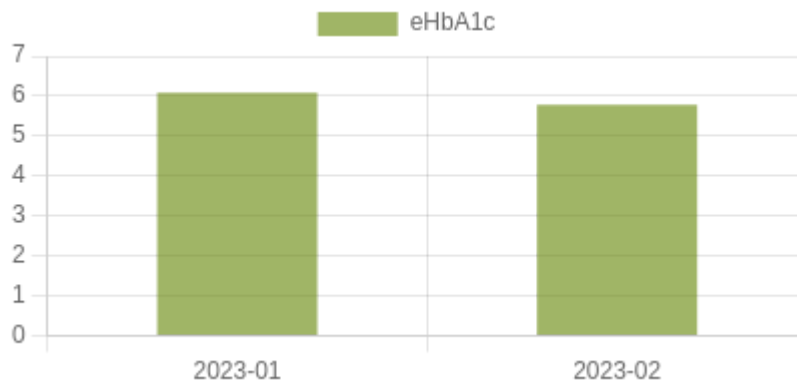
3. V- Variance determines the spread of numbers.. It measures how far each number in the set is from the mean (average) and from every other number in the set.

## PSR



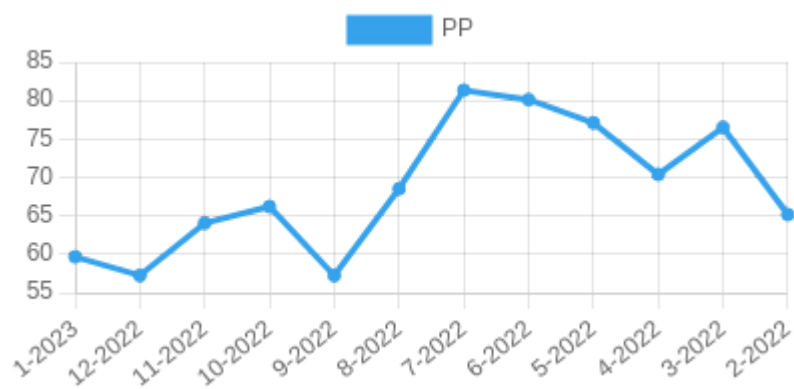
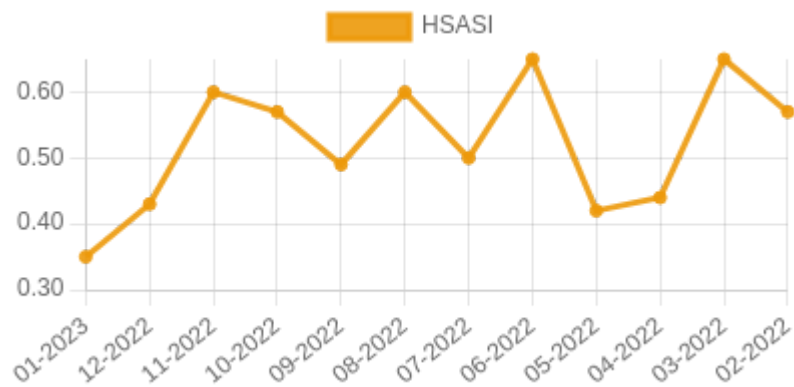
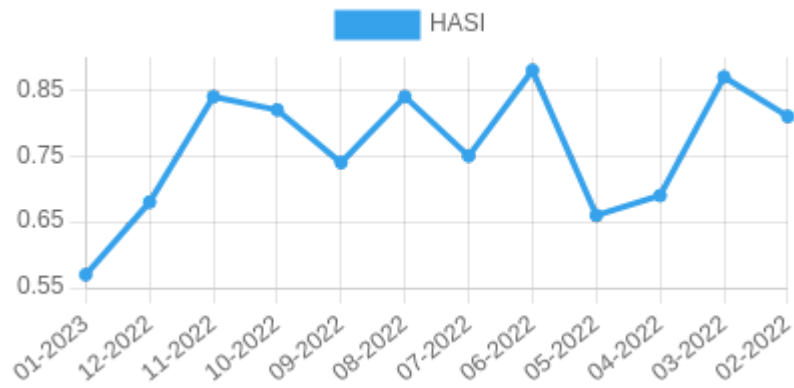
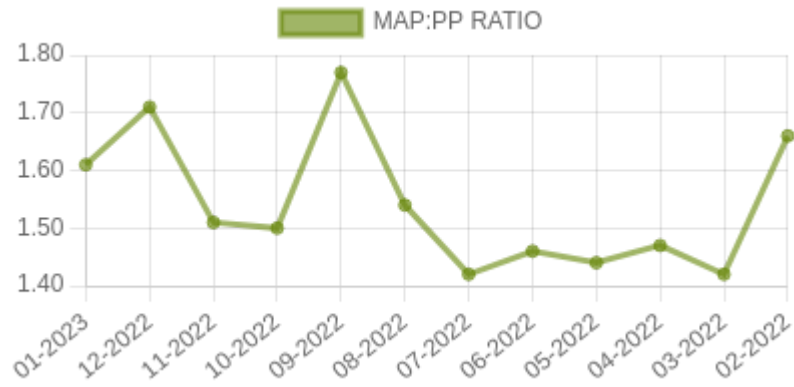
**PSR: Pulse stiffening ratio (PSR) is the ratio between systolic and diastolic stiffness. It can be expressed as  $PSR = \frac{\text{systolic stiffness}}{\text{diastolic stiffness}}$ .**

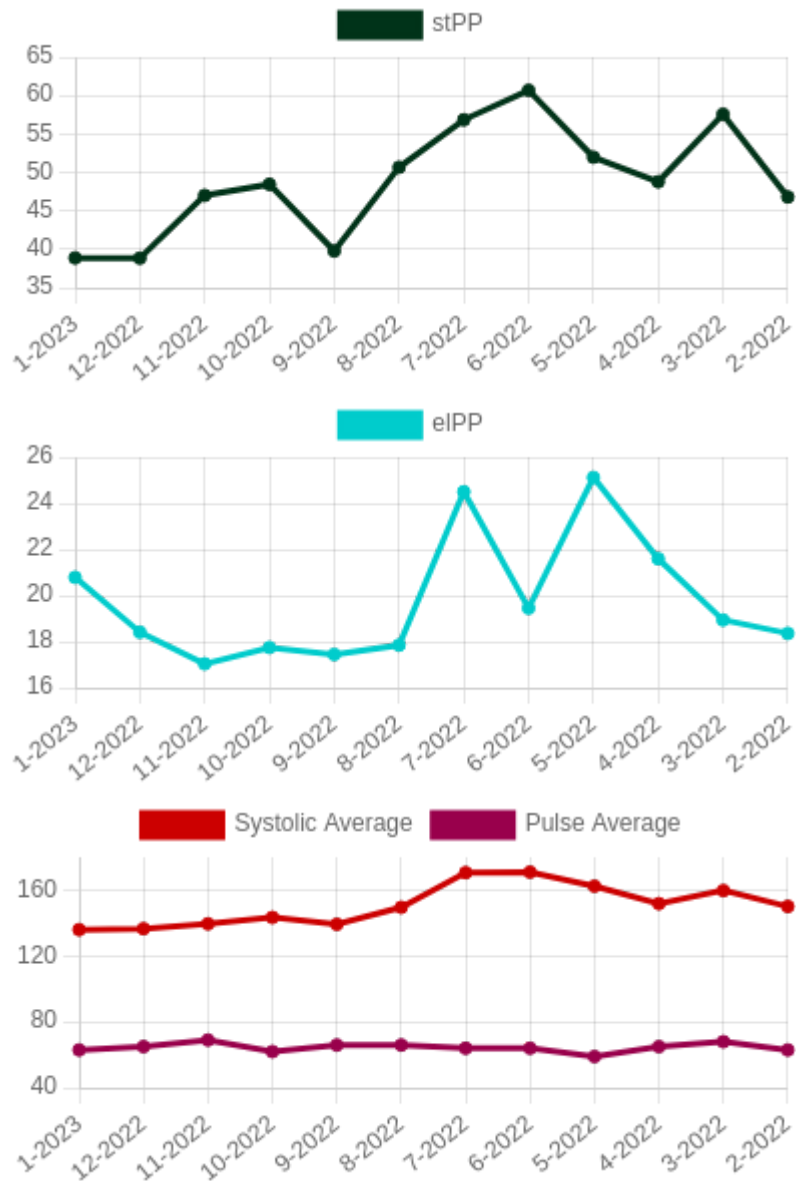
## HbA1c Trends



Estimated HbA1c - eHbA1c

## Others Trends





1. MAP:PP Ratio- Mean Arterial Pressure : Pulse Pressure Ratio

2. HASI- Home arterial stiffening index

3. HSASI- Home Symmetric arterial stiffening index

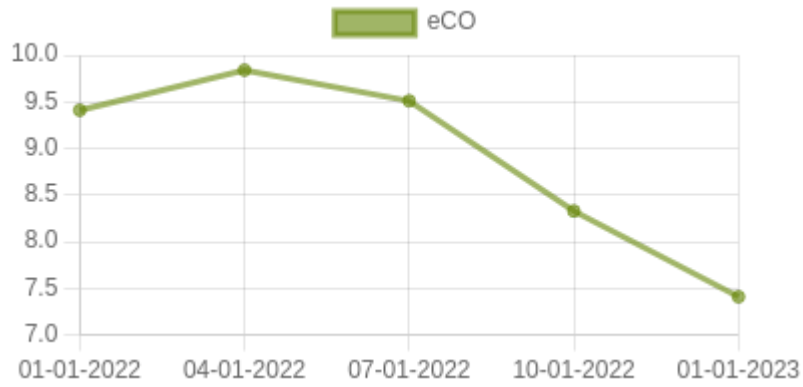
4. PP- Pulse Pressure

5. WIF or widening factor number.  $WIF = K - 1 / \ln(K) - 1$ , where K is the variability ratio (  $K = \text{Systolic Std. Dev} / \text{Diastolic Std. Dev}$  )

6. elPP- Elastic component of pulse pressure.  $elPP = (PP - stPP)$

7. stPP- Stiffening component of pulse pressure.  $stPP = PP / (1 + WIF)$

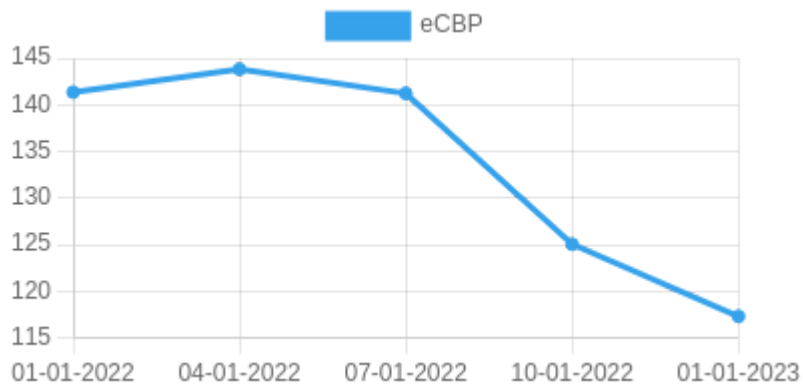
## eCO graph



**eCO (Estimated Cardiac Output) Normal range to be added 5 – 10 liters/minute**

**Units of eCO (Estimated Cardiac Output) – liters/minute**

### eCBP graph

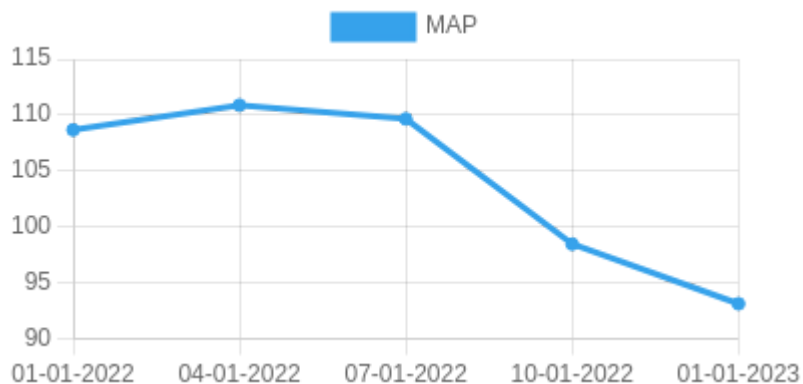


**eCBP (Estimated Central Blood Pressure) normal range – 0 – 100 mmHg**

**1. Cardiac output scale is in liters/minute. Normal range at rest is 5-6 liters/min and (with activity goes up to 30-35 liters/min)**

**2. Central mean BP is Squared, Mean radial artery BP/diastolic BP in mmHg. Scale in mmHg and range is in mmHg and the scale Should be between 0-50 50- 100, 150 and 200 mmHg. No established normal at the moment.**

### MAP graph



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**MAP -Mean arterial blood pressure.  $MAP = \text{Diastolic blood pressure} + \frac{1}{3}(\text{Systolic blood pressure} - \text{Diastolic blood pressure})$**

## **Reference & Abbreviations**

**Guide to abbreviations and blood pressure, pulse and other Metrics.**

**HBPM -Home blood pressure measurement.**

**HBS -Home blood sugar**

**PP -Pulse pressure**

**AP -Average pulse**

**BPV -Blood pressure variability**

**SV -Systolic variability**

**DV -Diastolic variability**

**PV -Pulse variability**

**ARV -Average real variability**

**CV -Coefficient of variation %**

**SD -Standard deviation**

**MAP -Mean arterial blood pressure**

**MAP:PP Mean Arterial Pressure : Pulse Pressure**

**HASI -Home arterial stiffness index**

**HSASI -Home Symmetric arterial stiffness index**

**Estimated CO -Cardiac output [ $CO=(PP \times HR) \times 0.002$ ]**

**PSR Pulse stiffening ratio. ( $PSR = \frac{SBP}{DBP}$  or slope of systolic BP/slope of diastolic BP)**

**Estimated central blood pressure ECBP ( $ECBP = \frac{\text{brachial MBP}^2}{\text{brachial DBP}}$  or  $ECBP = \frac{\text{radial MBP}^2}{\text{radial DBP}}$ )**

**Normal Ranges.**

**Systolic BP 110 – 120 mm Hg**

**Diastolic BP 70 – 80 mmHg**

**Pulse 60 - 100/min**

**Pulse pressure (PP) 40 mmHg (Low PP less than 25% of the systolic BP and high PP greater than 100 mm Hg)**

**Normal stroke volume (SV) 60 -100 ml**

**Cardiac output (CO)  $SV \times \text{pulse rate}/\text{min}$**

**Estimate Cardiac output =  $\text{Stroke volume} / \text{m}$**



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Blood pressure variability; Not defined in USA. But desirable ranges ESH guidelines; Systolic day time BP less than 15 mmHg and Diastolic less than 7.9 mmHg and Weighted SD less than 12.8 mmHg for systolic

#### Definitions.

MAP:PP ratio not defined.

Pulse stiffening ration; Not defined. Pulse pressure \* inverse log ( std. dev. systolic / std. dev. Diastolic) / (std. dev. systolic / std. dev. Diastolic) - 1 (Pulse pressure X ln (K)/(K-1) where K is systolic Sd /diastolic SD.)

Home arterial stiffness index; Not defined

Home arterial symmetric arterial index: Not defined.

Central blood pressure:Not defined

#### References.

MAP;

Chemla D, Antony I, Zamani K, Nitenberg A. Mean aortic pressure is the geometric mean of systolic and diastolic aortic pressure in resting humans. *J Appl Physiol* (1985). 2005 Dec;99(6):2278-84. doi: 10.1152/jappphysiol.00713.2005. Epub 2005 Jul 28. PMID: 16051709. Tien LYH, Morgan WH, Cringle SJ, Yu DY. Optimal Calculation of Mean Pressure From Pulse Pressure. *Am J Hypertens*. 2023 May 21;36(6):297-305. doi: 10.1093/ajh/hpad026. PMID: 36945835; PMCID: PMC10200551.

PSR:

Gavish B, Izzo JL Jr. Arterial Stiffness: Going a Step Beyond. *Am J Hypertens*. 2016 Nov 1;29(11):1223-1233. doi: 10.1093/ajh/hpw061. PMID: 27405964.

DCBP:

Chemla D, Millasseau S, Hamzaoui O, Teboul JL, Monnet X, Michard F, Jozwiak M. New Method to Estimate Central Systolic Blood Pressure From Peripheral Pressure: A Proof of Concept and Validation Study. *Front Cardiovasc Med*. 2021 Dec 15;8:772613. doi: 10.3389/fcvm.2021.772613. PMID: 34977186; PMCID: PMC8714848.

CO

Koenig J, Hill LK, Williams DP, Thayer JF. Estimating cardiac output from blood pressure and heart rate: the liljestrands& zander formula. *Biomed Sci Instrum*. 2015;51:85-90. PMID: 25996703; PMCID: PMC5317099.

BP

Mean arterial blood pressure;

Guidelines recommend less than 125 mmHg Poon LC, Shennan A, Hyett JA, Kapur A, Hadar E, Divakar H, McAuliffe F, da Silva Costa F, von Dadelszen P, McIntyre HD, Kihara AB, Di Renzo GC, Romero R, D'Alton M, Berghella V, Nicolaides KH, Hod M. The International Federation of Gynecology and Obstetrics (FIGO) initiative on pre-eclampsia: a pragmatic guide for first-trimester screening and prevention. *Int J*

*Gynaecol Obstet* 2019;

145(Suppl 1):1–33. Not defined in general (desirable MAP ,90 mm Hg) Melgarejo JD, Yang WY, Thijs L, Li Y, Asayama K, Hansen TW, Wei FF, Kikuya M, Ohkubo T, Dolan E, Stolarz-Skrzypek K, Huang QF, Tikhonoff V, Maljutina S, Casiglia E, Lind L, Sandoya E, Filipovský J, Gilis-Malinowska N, Narkiewicz K, Kawecka-Jaszcz K, Boggia J, Wang JG, Imai Y, Vanassche T, Verhamme P, Janssens S, O'Brien E, Maestre GE, Staessen JA,

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Zhang ZY; International Database on Ambulatory Blood Pressure in Relation to Cardiovascular Outcome Investigators\*. Association of Fatal and Nonfatal Cardiovascular Outcomes With 24-Hour Mean Arterial Pressure. Hypertension. 2021 Jan;77(1):39-48

We hope these complementary multiparametric data along with standard set used in daily practice helps to understand home blood pressure trend and other information they may potentially generate in the future to understand medication effects and patient management.

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