

The Medi-stats BP+ cardiovascular health portal

Improving the root cause of CVD risk
An alternative, digital approach

Norman de Villiers CEO

B Pharm (SA), MPhil (BU), GPhC, MRPharmS(IPresc), RegPharmNZ
Independent Prescribing Pharmacist

Improving the root cause of CVD risk

An alternative, digital approach

Following the exodus of pharmacists to GP practice, it is evident that pharmacists are keen to practice what they signed up for – clinical interaction with patients. However, it is evident that pharmacists are disillusioned by GP practice and are returning to community pharmacy. (Pharmacy press March 2023)

The Medi-stats BP+ portal generates the opportunity for clinical interaction between the pharmacist and the patient, supporting patient education and making a real difference.



Stroke, heart attack, vascular dementia

they all destroy quality of life and create care burdens

How can we mitigate the risks?

What do we need to know?

1 **Arterial Fibrillation (AF)** – measured opportunistically by means of pulse rate variability (96% accurate to a 12-lead ECG) ^{1,2} Stroke prevention

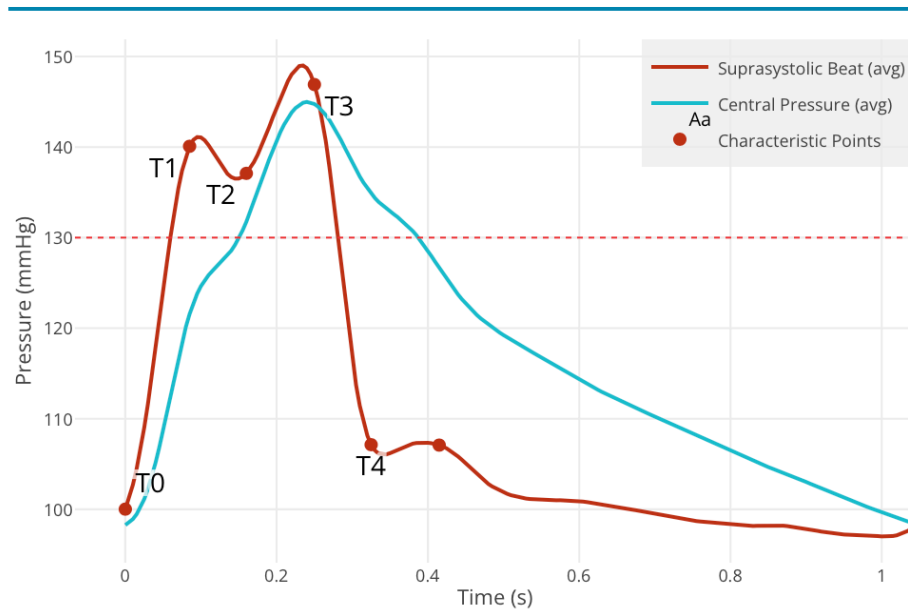
2 Arterial health is key

- Arterial stiffness precedes high blood pressure and can be used to predict future cardiovascular events. ³⁻⁶ Arterial stiffness can be reversed **if detected early** ³
- Blood pressure (BP) results almost entirely from waves generated by the heart
- The prognostic value of wave reflection predicts CV events independently of other CV risk factors ⁷

Advancing Arterial Health Monitoring

Measuring Pulse Pressure Waves and Effectiveness of Interventions

Pulse pressure waves



Measuring the characteristics of pulse pressure waves, allows us insight in the health and compliance of arteries. It also allows monitoring the effect of Nitric Oxide, produced by BP medication and/or physical exercise.

To support CV self-care in the community, everybody should have easy access to **arterial health assessment** and digital monitoring of the effectiveness of mitigating interventions.

Revolutionising Arterial Health Monitoring

The Medi-stats BP+ Portal for CVD Risk Assessment and Digital Monitoring

Knowing your arterial health is knowing your CVD risk.

The Medi-stats BP+ portal allows consultation room access to determine arterial health and digitally monitor the effectiveness of interventions to reverse or minimise CVD risk.

How do we do this?

By integrating the ultra-sophisticated, hospital grade technology in the Medi-stats BP+ device into a patient-centric digital health portal.

The patient is involved and owns their health data. Understanding improves adherence.

The Medi-stats BP+ device (USCOM Ltd) is BIHF listed and CE approved.

The device uses familiar, cuff-based technology and requires no additional training.

Each and every health check is recorded, building a comprehensive database of central and brachial blood pressures alongside arterial health values, comprising all ethnic groups.

Data includes lifestyle interventions vs change in CVD risk, effects of morning vs evening dose, effects of physical exercise on arterial health, what reverses endothelial dysfunction and much, much more.

Revolutionising Arterial Health Monitoring

The Medi-stats BP+ Portal for CVD Risk Assessment and Digital Monitoring

In practice:

Pharmacies and CDCs are the most accessible placements for the Medi-stats BP+ portal with highly trained health care professionals at hand to interpret results and provide guidance for self-care. Accessibility is also paramount for longitudinal monitoring of progress.

Study shows non-physician-led blood pressure interventions reduce CVD and all-cause deaths. Significant blood pressure reduction associated with lower risk of CVD, stroke, and all-cause deaths. ⁸

Arterial Health Assessment and Monitoring

Utilising Pharmacy and CDC Settings for Patient-Centric Monitoring

The steps:

- Individuals are encouraged to create their own profiles and register with a pharmacy or CDC hosting the Medi-stats portal
- Individuals are encouraged to complete the health questionnaire before appointments to support involvement and save time at appointments
- Patients can also register with a pharmacy when receiving new CV medication for before-and-after monitoring
- Individuals can utilise the appointments system to create their own appointments with their registered premises for follow-up consultations
- At each BP check, 14 parameters are measured and recorded in the patient profile and anonymous database for research purposes
- Information added by the patient and HCP up to and during the consultation is locked in for the specific timeslot to support longitudinal monitoring
- The patient is trusted and supported to make informed, evidence-based decisions regarding self-care.
- The patient can request a paid-for cardiologist review

Arterial Health Assessment and Monitoring

Utilising Pharmacy and CDC Settings for Patient-Centric Monitoring

Suggested goal

- Trained independent prescriber pharmacists could titrate and prescribe BP medication under supervision of a GP or clinical pharmacist for improved utilisation of the workforce

At home monitoring:

- Interpretation of measurements by the Medi-stats BP+ is for professional use only where validated evidence is provided as guidelines
- Ambulatory monitoring and recording to the patient profile for evaluation of treatment is possible via API from devices such as AKTIIA
- Self-testing and recording via API to the patient profile is possible with technology such as Life Light

Individuals benefit from improved involvement, time-saving, follow-up appointments, and informed self-care. Longitudinal monitoring is also supported and home monitoring is enabled through validated interpretation and recording via API from third party devices.

A deeper dive into cardiovascular health

Understanding CVD Risk and the Role of Arterial Health

Stroke, heart attacks, vascular dementia, exercise induced sudden death risks are attributed to:

- The presence of heart rhythm abnormalities (AF)
- High aortic pressure
- Arterial stiffness causing increased pulsatile pressure in end-organs damaging micro circulation and adversely affecting cerebral ⁹ and myocardial oxygen-rich blood perfusion, leading to enlargement and exhaustion of the heart muscle.
- The effect of Nitric Oxide (NO) on arterial vasodilation

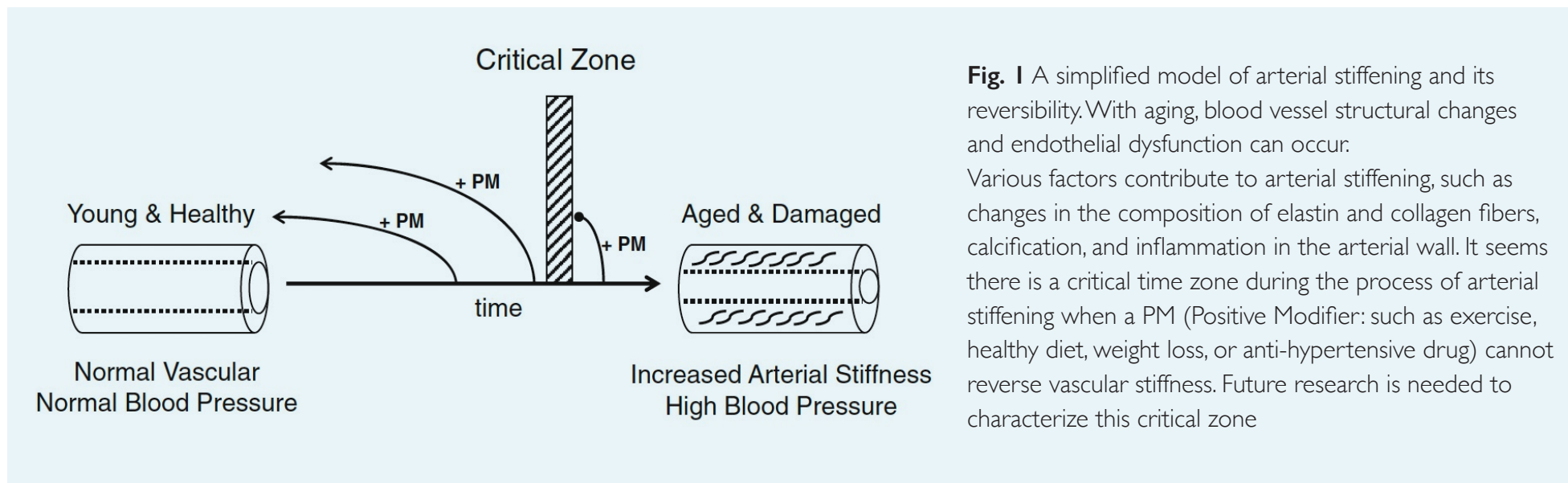
Visualising the effect of arterial health on CV health and recording this data in individual personal health profiles, supports informed and evidence-based decisions to manage own health care.

Early Detection and Positive Modifiers

Arterial Health and Hypertension-Related Diseases

Arterial deterioration happens before BP is affected. Therefore, with high BP arterial damage is already advanced. Positive Modifiers should be applied as early as possible and progress monitored to support adherence and compliance.

There is a critical time after which vascular stiffness does not reverse – **Early detection is key to preventative therapeutic strategies** for hypertension-related diseases.¹⁰



Vascular Stiffness and Target Organ Damage

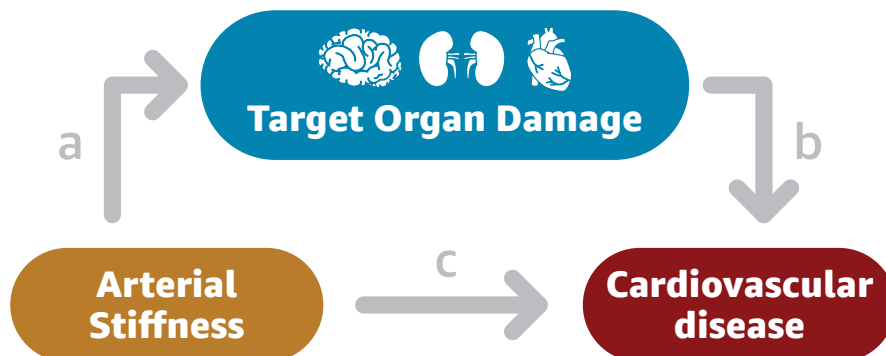
Clinical Implications of CVD Risk

Target organ damage and CVD

Vascular stiffness is linked to target organ damage (TOD) and in turn, CVD due to increased pulsatile flow in end-organs. *(Excess transmission of pressure pulsatility caused by increased arterial stiffness may incur microcirculatory damage in end-organs (target organ damage [TOD]) and, in turn, elevate risk for cardiovascular disease (CVD) events.)*

Clinical implications:

Elevated arterial stiffness is associated with presence of TOD and may partially mediate the relations of TOD with incident CVD. Our observations in a large community-based sample suggest that mitigating arterial stiffness may lower the burden of TOD and, in turn, clinical CVD. ¹¹



- a Arterial stiffness related to target organ damage
- b TOD, with or without arterial stiffness, related to CVD
- c Direct and overall effect of arterial stiffness on CVD

Nitric Oxide and Endothelial Dysfunction

Cardiovascular Health and the Impact of Arterial Stiffness

Nitric Oxide (NO) and Endothelial dysfunction

Nitric oxide is a strong vasodilatory and anti-inflammatory signalling molecule, produced by endothelial cells and is a critical regulator of vascular balance, such that endothelial dysfunction is defined as a reduced capacity for nitric oxide production and decreased nitric oxide sensitivity.¹²

The importance of NO is underlined by the fact that both BP medication and physical exercise produce NO.

Positive modifiers producing NO can reverse endothelial dysfunction preventing CVD risk.¹⁰

Demonstrating the effect of NO on pulse pressure waves and arterial stiffness

The Medi-stats BP+ portal integration records brachial (red) and central (blue) pulse waves. The effect of medication and physical exercise is illustrated by the change in brachial pulse waveform thereby confirming to the patient and health care professional if endothelial health is improved, thereby mitigating risk.

Example of improved pulse pressure wave

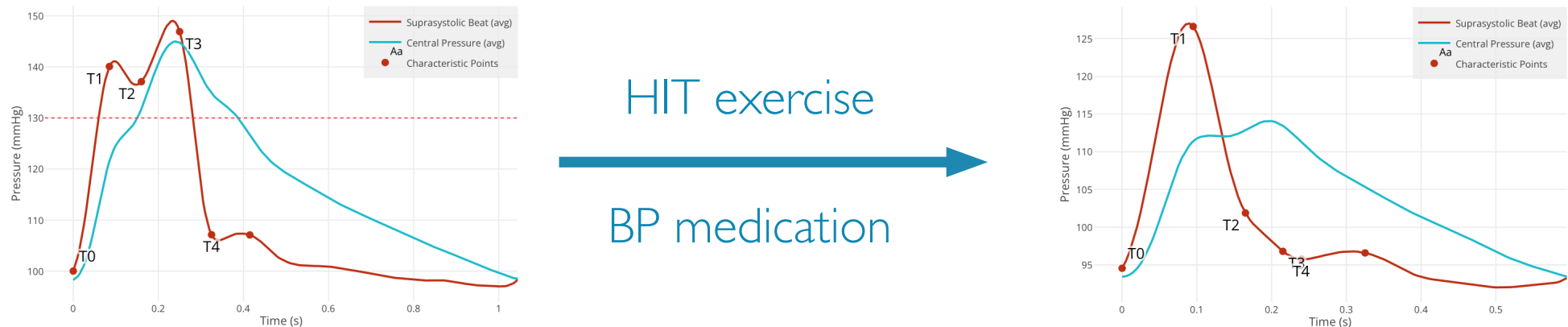
Unlocking the Benefits of Nitric Oxide in Cardiovascular Health

Nitric oxide (NO) acts as a signalling molecule in the cardiovascular system (Ignarro et al, 1998 Nobel Prize)

Impact of Nitric oxide (NO)

- If detected early, regular NO inducing exercise improves arterial health
- BP medication stimulates NO production in endothelial cells lowering BP

The Medi-stats BP+ portal visualises and monitors the effect of NO on arterial health through pulse pressure wave analysis



Nitric Oxide assists in brain function, fights infection as an antibacterial and anti-microbial, decreases muscle soreness, assists in metabolic processes, increases exercise performance, and so much more

The Role of Augmentation Index (AI)

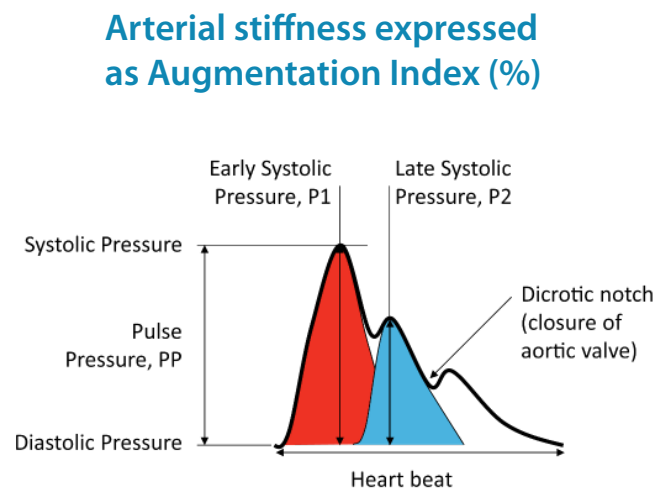
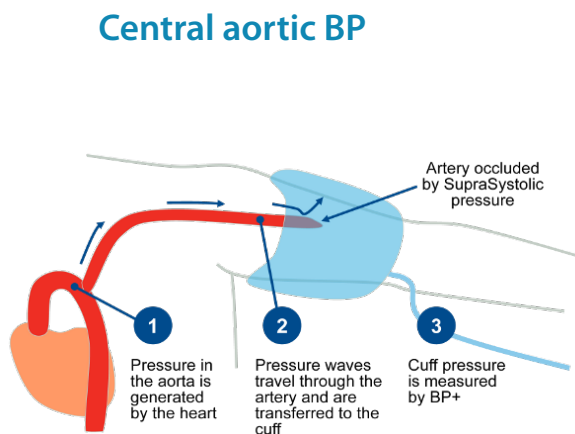
Understanding Pulse Waves and Arterial Stiffness

Measuring arterial stiffness

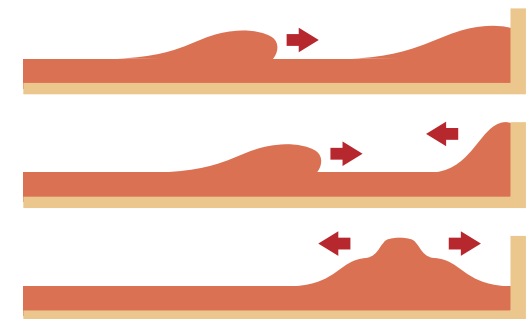
Pulse waves are formed when the heart pumps. These pulse waves are reflected where arteries split. The stiffness of the arteries makes the waves move faster and increase the force they arrive with back at the heart, causing an increase in pressure.

Arterial stiffness is expressed as Augmentation Index (AI) where the reflected wave in arteries is a percentage of the forward wave.

Brachial Augmentation Index is calculated as follows:



$$AI = \frac{\text{Reflective wave}}{\text{Forward wave}} \times \frac{100}{1}$$
$$AI = \frac{P_2}{P_1} \times \frac{100}{1}$$

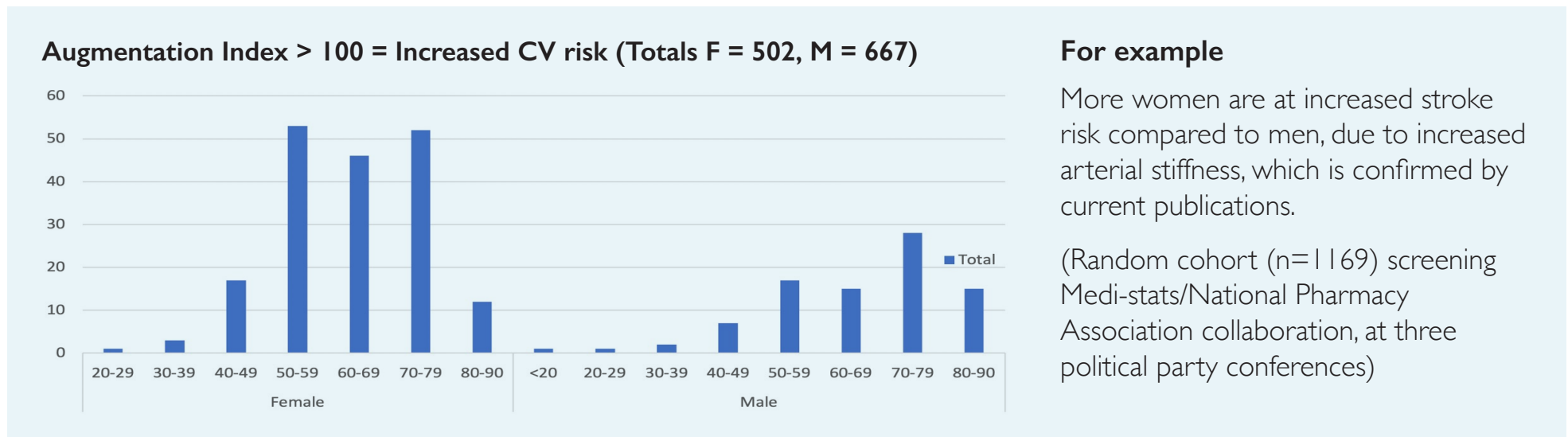


Gender Differences in Cardiovascular Risk

Role of Arterial Stiffness and Hypertension in Women's Health

Women and CVD risk

Hypertension is the leading risk factor for cardiovascular disease and premature death among women globally.¹³ The development of hypertension starts in young, premenopausal women, often in association with disorders of reproductive organs, and therefore needs to be managed early in life to prevent future cardiovascular disease.¹³



For example

More women are at increased stroke risk compared to men, due to increased arterial stiffness, which is confirmed by current publications.

(Random cohort (n=1169) screening Medi-stats/National Pharmacy Association collaboration, at three political party conferences)

A total of 270 (23%) of this cohort had increased arterial stiffness identified (Augmentation Index > 100), identifying increased Cardiovascular Disease Risk. Changes in arterial stiffness is an independent predictor of stroke¹⁴

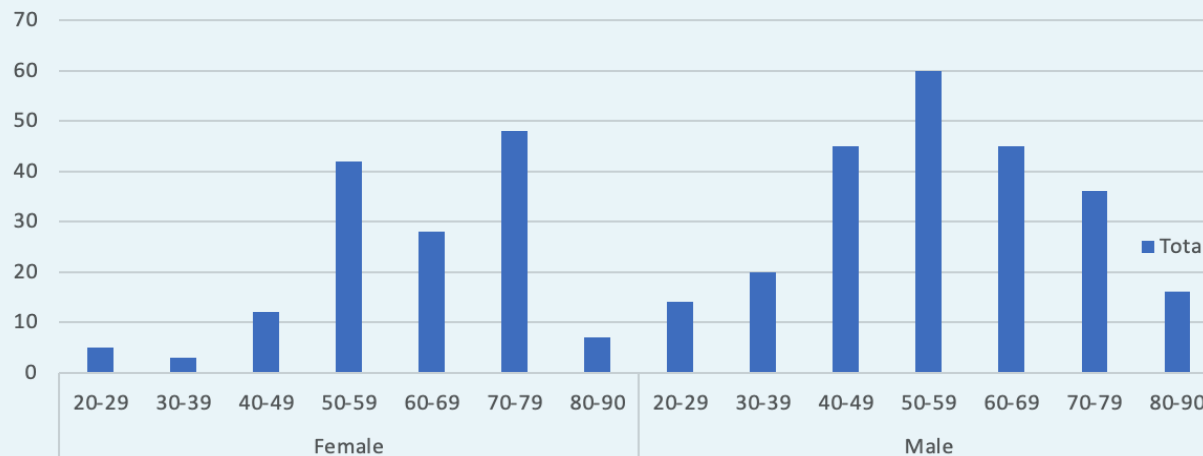
Gender Differences in Cardiovascular Risk

Role of lifestyle and Hypertension in Men's Health

Men and CVD risk

In the same cohort more men were at risk according to hypertension (SBP > 140mmHg) indicative of primary hypertension (NICE). Hormones play a significant role in regulating blood pressure. Before menopause, women have lower levels of estrogen, which helps to keep blood pressure in check. After menopause, women's estrogen levels drop, which can lead to an increase in blood pressure. In contrast, men's testosterone levels decline more gradually, and this may be one reason why men are more likely to develop hypertension in midlife.

Brachial Systolic BP > 140 mmHg indicative of primary hypertension (NICE)
(Totals F = 502, M = 667)



For example

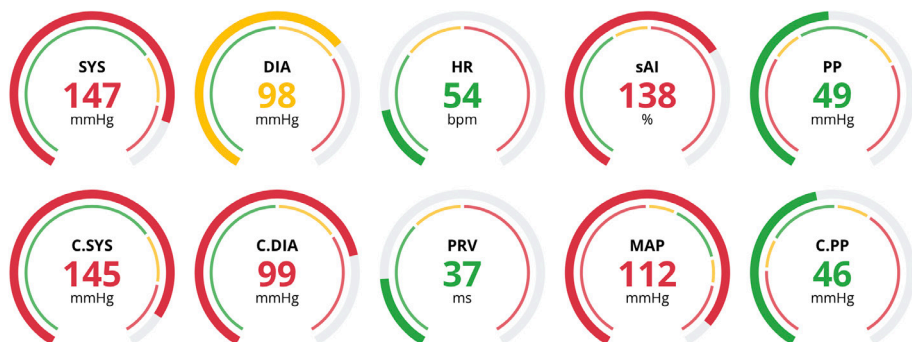
Men's higher risk of hypertension can be attributed to lifestyle factors like excessive alcohol consumption, smoking, a high-sodium and low-potassium diet, and lower physical activity levels compared to women.

(Random cohort (n=1169) screening Medi-stats/National Pharmacy Association collaboration, at three political party conferences)

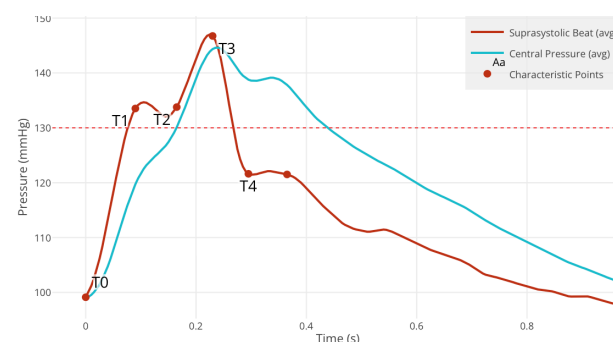
Ambulatory Blood Pressure Monitoring

Role of Nocturnal BP and Impact of Nighttime Medication Dosing

Oscillometry results - 11/03/2022



Pulse curve - 11/03/2022



Slight improvement after 1 month on ACE inhibitor

Improvement with medication alone is only incremental. Richard lacked advice from his GP to support informative decision making. A clinical discussion supported his recovery journey

72hrs Ambulatory Blood Pressure Monitoring

To have a deeper understanding of Richards situation we utilised the validated Aktia Optical Blood Pressure Monitor to track ambulatory nocturnal blood pressure and through the day. Of specific interest is the effect of the night time dose on nocturnal BP to rule out insufficient end-organ perfusion such as glaucomatous damage.

	Daytime (Resting)			Night-time			24-hours		
	SBP	DBP	HR	SBP	DBP	HR	SBP	DBP	HR
MEAN	143	84	71	136	78	58	140	82	66
SD	2	1	4	3	3	7	1	1	1
MAX	161	92	110	154	84	95	161	92	110
MIN	134	77	57	129	71	49	127	70	49
READINGS	55	55	55	19	19	19	88	88	88



Medical Advisory team

UK Medical Advisory

Prof Alun Hughes

Professor of Cardiovascular Physiology and Pharmacology, UCL, lead researcher in pulse wave technology in the UK

Dr Christopher Boos

Consultant cardiologist, Specialty Lead for Research and Innovation at Poole Hospital

Dr Girish Babu

Consultant Cardiologist and Cardiac Electrophysiologist Royal Bournemouth Hospital

USCOM Medical Advisory

Prof James Sharman

University of Tasmania, Menzies Institute for Medical Research

Prof Andrew Lowe

Auckland University, Institute of Biomedical Technologies

Prof Rob Phillips, PhD (Med), MPhil (Med)

Chief Scientist of USCOM, Critical Care Research, University of Queensland

Dr Stephane Carlier, MD PhD

Invasive Cardiologist, Biomedical Engineer, UMONS

Professor Colin Sullivan, BsC(Med), MB, BS, PhD, FRACP, FTSE, FAA

University of Sydney

Professor Malcolm West, MB BS PhD FRACP

Professor of Medicine at the University of Queensland. A consultant specialist Cardiologist.

Professor Peter Lichtenthal

Professor of Clinical Anaesthesia and Director of Cardiothoracic Anaesthesia at the University of Arizona College of Medicine in Tucson, Arizona, USA

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We want to change the
management of hypertension

How do we do this together?

Thank you

Call us now on 0800 118 1628 or visit www.medi-stats.com