P38: DIFFERENCES IN FORM FACTOR CALCULATED FROM OSCILLOMETRIC OR WAVEFORM MEAN ARTERIAL PRESSURE

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To cite this article: Chloe Park, Therese Tillin, Nish Chaturvedi, Alun Hughes (2018) P38: DIFFERENCES IN FORM FACTOR CALCULATED FROM OSCILLOMETRIC OR WAVEFORM MEAN ARTERIAL PRESSURE, Artery Research 24:C, 90–90, DOI: https://doi.org/10.1016/j.artres.2018.10.091

To link to this article: https://doi.org/10.1016/j.artres.2018.10.091

Published online: 7 December 2019
historical and contemporaneous values of PP and MAP as well as age and heart rate, PWV was significantly associated with $\text{PP}_c$, MAP$_c$ and PP$_c$ but not with MAP$_p$. In the sub-study in which historical values of PWV were available, PWV increased by $0.75 \pm 1.42$ m/s, over an average of $5.5 \pm 1.7$ years. The change in PWV was associated with MAP$_c$ and with PP$_p$ ($b = 0.144$, $p < 0.001$).

**Conclusions:** These results are consistent with strong dependence of PWV on contemporaneous BP but also historical values of pulse pressure which may drive arterial stiffening.

### Results

**Methods:** Brachial BP was measured using a Pulsecor device in 1,112 participants in the Southall and Brent Revisited study (68.8 ± 6.1 y; 78.2% male; 47.4% White-European; 38.3% South-Asian; 14.3% African-Caribbean). Form factors (FFosc and FFwave) were calculated as $(\text{MAP-diastolic BP})/(\text{systolic BP-diastolic BP})$ by oscillometry (MAPosc) or from the BP waveform (MAPwave).

**Results:** FFosc and FFwave differed (0.28 (SD $0.42$)). Form factors were associated with ethnicity, prevalent cardiovascular disease or current smoking status, and neither showed significant correlations with age, total- or HDL-cholesterol, or physical activity. Both FFosc and FFwave were lower in men (difference ($\Delta$) = $-0.005$ (95% CI $-0.007$, $-0.002$) vs $-0.015$ (95% CI $-0.020$, $-0.009$) respectively) and were negatively correlated with height ($r = -0.14$ both), but only FFwave correlated with body mass index ($r = 0.02$ vs $r = 0.10$) and heart rate ($r = -0.06$ vs $r = 0.20$). MAPosc - MAPwave Correlated with age ($r = 0.10$), height ($r = 0.15$) and heart rate ($r = 0.17$) and was greater in women (0.95% CI $0.5$, 1.3) mmHg.

**Conclusions:** FFwave agrees poorly with FFosc probably due to measurement errors. This creates spurious associations between exposures and FF and causes systematic errors in estimated MAPwave. These errors have the potential to confound associations in epidemiological studies.

### References


### P38

**DIFFERENCES IN FORM FACTOR CALCULATED FROM OSCILLOMETRIC OR WAVEFORM MEAN ARTERIAL PRESSURE**

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**Background:** Oscillometric mean arterial pressure (MAP) agrees closely with invasive MAP, [1] but most devices do not report MAP and it is usually estimated by a form factor (FF). However, blood pressure (BP) measurement errors will affect FF, its correlations with exposures, and introduce errors into MAP estimated from the BP waveform.

**Methods:** Form factors (FFosc and FFwave) were calculated as (MAP-diastolic BP)/(systolic BP-diastolic BP) by oscillometry (MAPosc) or from the BP waveform (MAPwave).

**Results:** FFosc and FFwave differed ($0.28 \pm 0.42$). Form factors were associated with ethnicity, prevalent cardiovascular disease or current smoking status, and neither showed significant correlations with age, total- or HDL-cholesterol, or physical activity. Both FFosc and FFwave were lower in men (difference ($\Delta$) = $-0.005$ (95% CI $-0.007$, $-0.002$) vs $-0.015$ (95% CI $-0.020$, $-0.009$) respectively) and were negatively correlated with height ($r = -0.14$ both), but only FFwave correlated with body mass index ($r = 0.02$ vs $r = 0.10$) and heart rate ($r = -0.06$ vs $r = 0.20$). MAPosc - MAPwave Correlated with age ($r = 0.10$), height ($r = 0.15$) and heart rate ($r = 0.17$) and was greater in women (0.95% CI $0.5$, 1.3) mmHg.

**Conclusions:** FFwave agrees poorly with FFosc probably due to measurement errors. This creates spurious associations between exposures and FF and causes systematic errors in estimated MAPwave. These errors have the potential to confound associations in epidemiological studies.

### References


### P41

**INCREASED STIFFNESS IN THE DIGITAL ARTERIES OF ESSENTIAL HYPERTENSIVE WOMEN: THE FUCHSIA STUDY**

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**Rationale and Aim:** Essential hypertension is characterized by extensive alterations of arterial geometry and mechanical properties: increased stiffness, dilation and wall of large arteries, increased thickness in muscular arteries, small artery remodeling. This study is aimed at exploring function and structure of the digital arteries of the hand, muscular arteries with an internal diameter of 500-1000 mm, easily accessible by ultrahigh frequency ultrasound.

**Methods:** 24 hypertensive women (HT) and 37 healthy controls (C) were recruited. 5'-videoclips of left palm digital arteries were obtained by Yevomo (FUJIFILM, VisualSonics, Toronto, Canada), by means of a 70 MHz probe (axial-lateral resolution 30-65 μm). An automatic system (Cvsuite, Quipu srl, Pisa, Italy) was used to measure intima-media thickness (IMT) and diameter. Distensibility and stiffness were then calculated using left brachial pulse pressure (PP - oscillometric).

**Results:** HT and C had similar age (57 ± 11 vs 53 ± 11 years, $p = 0.22$), BMI (24.9 ± 4.6 vs 24.5 ± 4.2 vs kg/m$^2$, $p = 0.80$) and mean blood pressure (BP, 95 ± 12 vs 91 ± 12 mmHg, $p = 0.24$); HT showed slightly higher RR (54 ± 14 vs 47 ± 10, $p = 0.07$). Palmar digital lumen tended to be higher in HT (804 ± 201 vs 696 ± 191 μm, $p = 0.10$), while IMT was similar (120 ± 23 vs 125 ± 36 μm, $p = 0.81$). Distensibility was reduced (21.4 ± 18.2 vs 29.0 ± 18.8 kPa$^{-1}$, $p = 0.05$), while stiffness was increased (7.95 ± 2.22 vs 6.72 ± 2.11 m/s, $p = 0.005$).

**Conclusions:** This is the first report of the presence of altered mechanical properties (i.e. increased stiffness) in muscular arteries with lumen <1000 mm of essential hypertensive women. These findings suggest that increased hemodynamic load characterizing hypertension lead to a different vascular phenotype in each arterial segment.

### P43

**MASKED HYPERTENSION AND RETINAL VESSEL STRUCTURE AND FUNCTION IN YOUNG HEALTHY ADULTS: THE AFRICAN-PREDICT STUDY**

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**Results:** Central pressures and Aix were different between normotensive and hypertensive men after the two AE bouts as shown in table 1.

**Conclusion:** Although both AE were able to reduce pulse wave reflection in hypertensive men, only the major volume has attenuated the increase in central aortic BP observed in the control session.

### Table 1: Mean ± SD values for the pulse wave reflection calculations and pulse contour and AE bouts with 15% and 30% workload

<table>
<thead>
<tr>
<th>Variable</th>
<th>Baseline Recovery</th>
<th>Baseline Recovery</th>
<th>Baseline Recovery</th>
<th>Baseline Recovery</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pulse wave reflection (Aix)</td>
<td>0.25 ± 0.23</td>
<td>0.24 ± 0.22</td>
<td>0.23 ± 0.21</td>
<td>0.22 ± 0.20</td>
</tr>
<tr>
<td>Pulse contour (Pc)</td>
<td>0.26 ± 0.25</td>
<td>0.25 ± 0.24</td>
<td>0.24 ± 0.23</td>
<td>0.23 ± 0.22</td>
</tr>
<tr>
<td>Mean arterial pressure (MAP)</td>
<td>115 ± 15</td>
<td>114 ± 14</td>
<td>113 ± 13</td>
<td>112 ± 12</td>
</tr>
<tr>
<td>Systolic blood pressure (SBP)</td>
<td>145 ± 15</td>
<td>144 ± 14</td>
<td>143 ± 13</td>
<td>142 ± 12</td>
</tr>
<tr>
<td>Diastolic blood pressure (DBP)</td>
<td>80 ± 10</td>
<td>79 ± 10</td>
<td>78 ± 9</td>
<td>77 ± 8</td>
</tr>
</tbody>
</table>