CLAIMS

1. A system for deriving an indicator of one or more vascular diseases of an individual comprising

a first sensor arranged to sense a first hemodynamic data obtained from a first major blood vessel;

a second sensor arranged to sense a second hemodynamic data from a second major blood vessel; and

an occlusion device arranged to be positioned around a third major blood vessel where the second major blood vessel branch from, the occlusion device operable to occlude the third major blood vessel for a predetermined period, wherein the occlusion device comprises a sphygmomanometer; and

a processor operable to receive the first dataset and the second dataset for deriving the indicator of the one or more vascular diseases;

wherein the first hemodynamic data and the second hemodynamic data are obtained before and after the predetermined period, wherein the second hemodynamic data is obtained during a period of time before the occlusion state corresponding to a relaxation state and a period of time after the occlusion state corresponding to a dilation state and the first hemodynamic data is obtained corresponding to the period of time when the second hemodynamic data is obtained; and

wherein the indicator is derived based on the first hemodynamic data, the second hemodynamic data, an age adjustment factor, a gender adjustment factor, and/or a heart rate.

2. The system according to claim 1, wherein the first and second major blood vessels are radial arteries on a living human subject’s right and left wrists.

3. The system according to claim 2, wherein the indicator (RA-MDI) is computed based on the following mathematical equation:

$$\mathrm{RA}-\mathrm{MDI}=\frac{\sum A/\sum B}{\sum C/\sum D}*\frac{AAdj*GAdj}{MAPn}*\frac{HR(R)}{HR(O)}*\frac{HR(D)}{HR(O)}$$

Where AAdj refers to an age adjustment factor to adjust for arterial dilation which degenerates with age; GAdj refers to a gender adjustment factor to adjust for difference in muscle structure across gender; HR(R) refers to heart rate obtained from the control wrist or arm during the relaxation period; HR(D) refers to heart rate during the dilation state; HR(O) refers to heart rate obtained during the occlusion state; $\sum$A, $\sum$B, $\sum$C, and $\sum$D each refer to the summation of the hemodynamic data obtained for a predetermined period corresponding to the dilation state and relaxation state, wherein $\sum$A, $\sum$B correspond to the hemodynamic data obtained on the occluded wrist during the dilation state and relaxation state respectively, and $\sum$C, $\sum$D correspond to the hemodynamic data obtained on the control wrist during the dilation state and relaxation state respectively.

4. The system according to claim 3, wherein there comprises a plurality of RA-MDI indicators derived and an average value RA-MDI-AVE is obtained.

5. The system according to claim 4, wherein if RA-MDI or RA-MDI-AVE is less than a cut-off value, the individual is classified as healthy, otherwise the individual is classified to suffer from an endothelial dysfunction.

6. The system according to claim 5, wherein the cut-off value is between 0.4 to 0.5.

7. A method for deriving an indicator of one or more vascular diseases of an individual comprising the steps of:

occluding, using an occlusion device, a third major blood vessel for a predetermined period, wherein the occlusion device comprises a sphygmomanometer;

obtaining from a first sensor, a first hemodynamic data from a first major blood vessel; and

obtaining from a second sensor, a second hemodynamic data from the second major blood vessel;

wherein the first hemodynamic data and the second hemodynamic data are obtained before and after the predetermined period, and the second major blood vessel branch from the third major blood vessel, wherein the step of obtaining the second hemodynamic data is during a period of time before the occlusion state corresponding to a relaxation state and a period of time after the occlusion state corresponding to a dilation state and the step of obtaining the first hemodynamic data correspond to the period of time when the second hemodynamic data is obtained; and

wherein the indicator is derived based on the first hemodynamic data, the second hemodynamic data, an age adjustment factor, a gender adjustment factor, and /or a heart rate.

8. The method according to claim 7, wherein the first and second major blood vessels are radial arteries on a living human subject's right and left wrists.

9. The method according to claim 8, wherein the indicator (RA-MDI) is computed based on the following mathematical equation:

$$\mathrm{RA-MDI} = \frac{\sum A / \sum B}{\sum C / \sum D} * \frac{AAdj * GAdj}{MAPn} * \frac{HR(R)}{HR(O)} * \frac{HR(D)}{HR(O)}$$

Where AAdj refers to an age adjustment factor to adjust for arterial dilation which degenerates with age; GAdj refers to a gender adjustment factor to adjust for difference in muscle structure across gender; HR(R) refers to heart rate obtained from the control wrist or arm during the relaxation period; HR(D) refers to heart rate during the dilation state; HR(O) refers to heart rate obtained during the occlusion state; $\sum$A, $\sum$B, $\sum$C, and $\sum$D each refer to the summation of the hemodynamic data

obtained for a predetermined period corresponding to the dilation state and relaxation state, wherein $\sum$A, $\sum$B correspond to the hemodynamic data obtained on the occluded wrist during the dilation state and relaxation state respectively, and $\sum$C, $\sum$D correspond to the hemodynamic data obtained on the control wrist during the dilation state and relaxation state respectively.

10. The method according to claim 9, wherein there comprises a plurality of RA-MDI indicators derived and an average value RA-MDI-AVE is obtained.