

# Blood Pressure Monitor “PASESA”

new oscillometric device with AVI&API



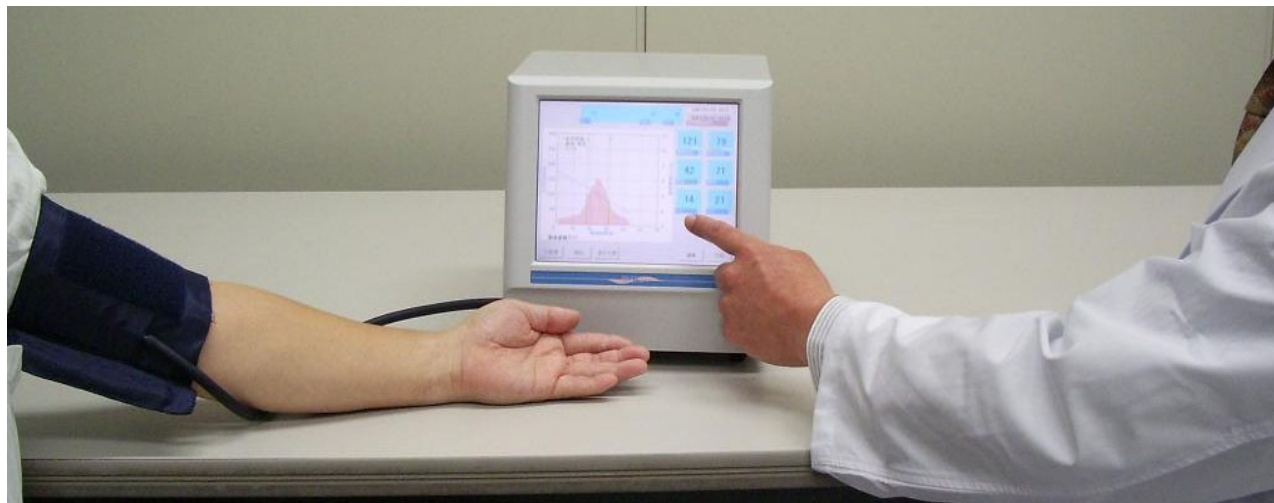
PASESA



Prevent ArterioSclerosis and Enjoy Successful Aging

# PASESA, digital blood pressure monitor for medical use

- Sit still for two minutes and you can check the condition (elasticity) of your blood vessels, while measuring your blood pressure at the same time.
- We developed this Japan's original technology with the collaboration of National Institute of Advanced Industrial Science and Technology and RIKEN, the Institute of Physical and Chemical Research.
- PASESA is useful and effective in preventing arteriosclerosis.
- PASESA has obtained marketing approval required by Japanese Pharmaceutical Affairs Law, and is now used mainly in university hospitals.

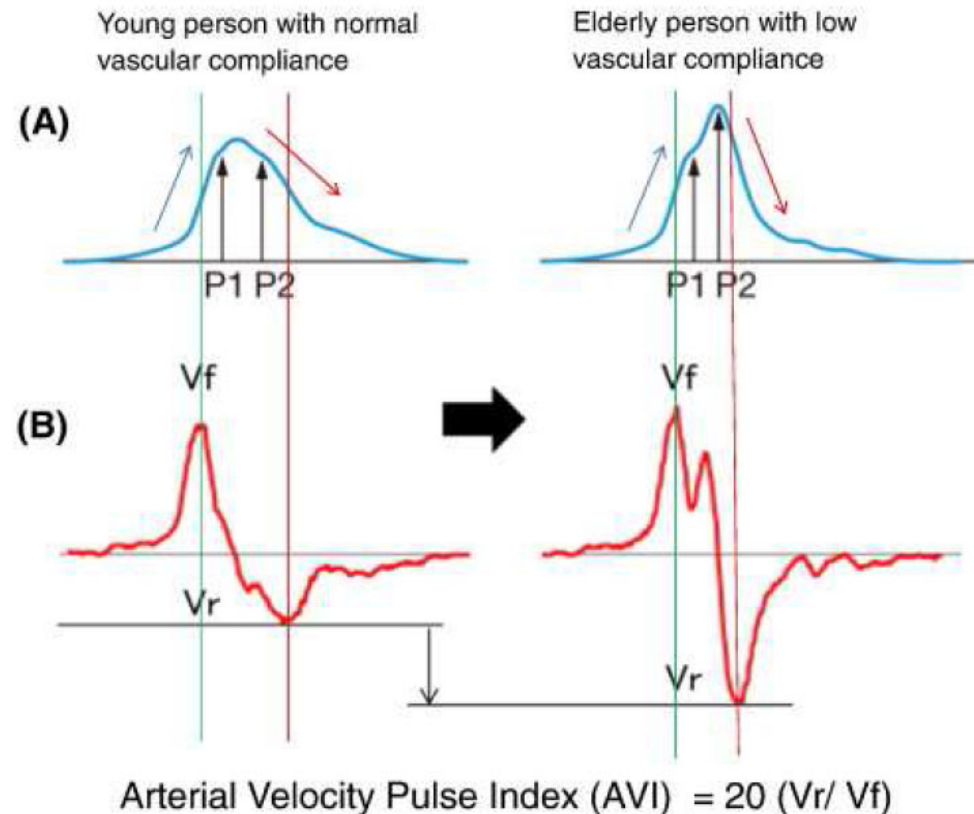
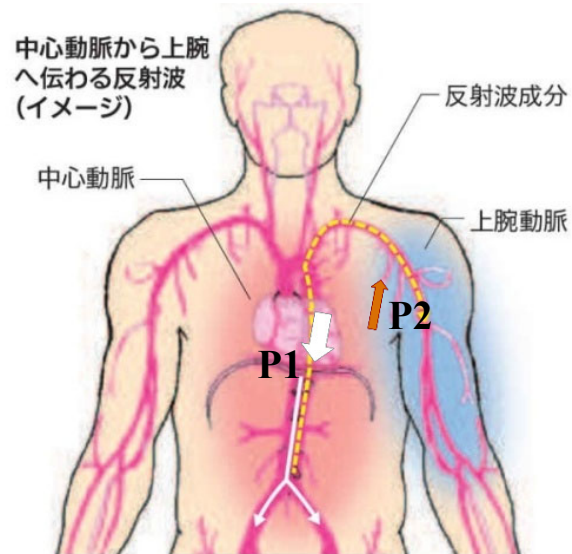


# Principle of AVI (Arterial Velocity pulse Index)

**Principle:** AVI shows the characteristics of the pulse waveform when the cuff pressure is higher than maximum blood pressure. RIKEN recently found that the pulse waves in pressure area which has usually been ignored represent the stiffness and the nature of the central arteries near the heart. Due to aging and arteriosclerosis, the waveform changes (from left to right in below patterns). The upper waveforms are those of cuff pressure pulse wave, and the lower are the differentiated waveforms (differentiated pulse wave). Aging, arteriosclerosis and increased peripheral vessel resistance increase the reflected wave, which in turn increase telesystolic waveforms (P2) and result in a sharp fall of waveform. Since the waveform is unaffected by the reflected wave at the beginning (P1), only Vr of differentiated pulse wave amplitude increases. Thus the value of the characteristics of the pulse waveform (Vr/Vf) becomes the index that changes according to the size of the reflected wave.

**Definition:** Calculate the ratio of the speed changes at upper arm artery during systolic period (Vf) and diastolic period (Vr) (Vr/Vf).  
 $AVI = 20 \times (Vr/Vf)$

**Characteristics:** The value of AVI increases by factors which increase the reflected wave (aging, arteriosclerosis and increased peripheral vessel resistance)

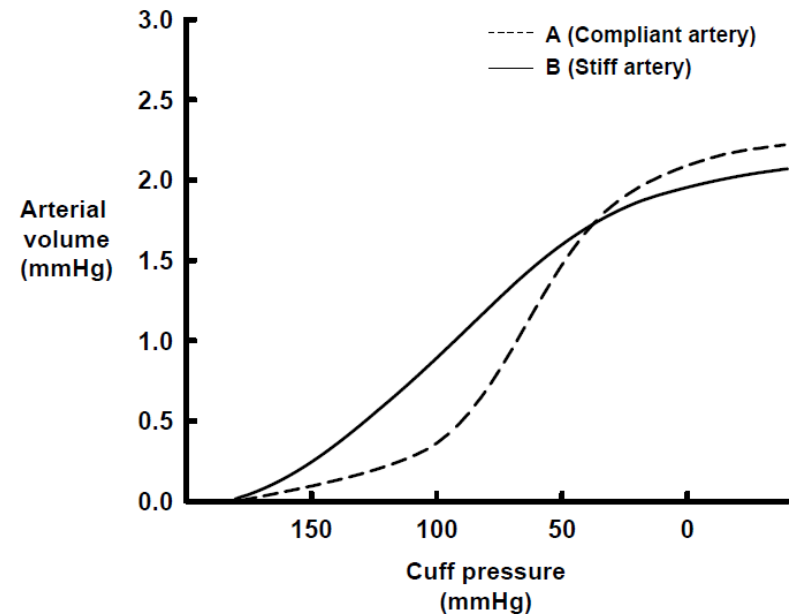
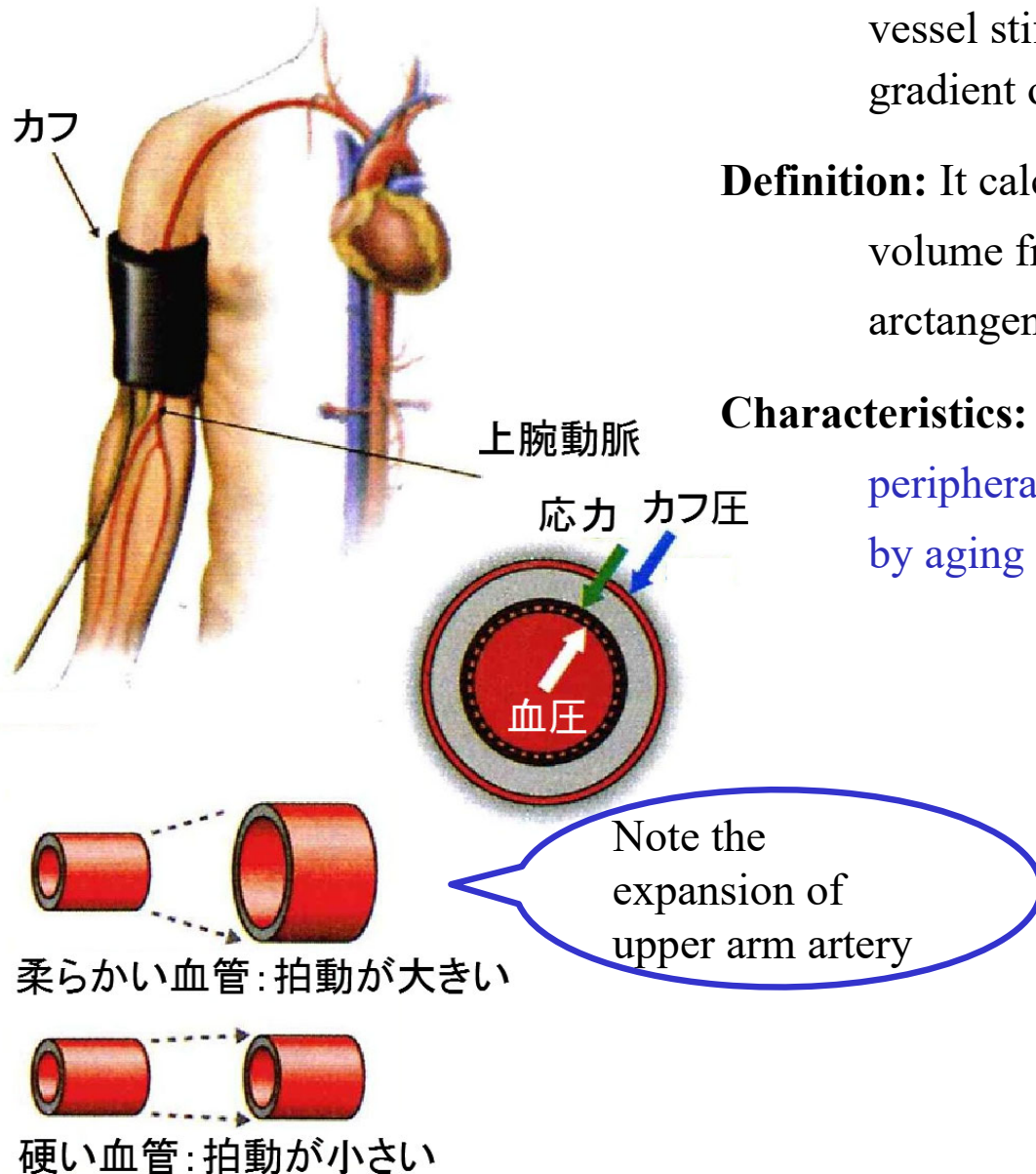


# Principle of API (Arterial Pressure volume Index)

**Principle:** The more elastic the arteries, the more drastic the arterial volume changes when the cuff pressure decreases. The blood vessel stiffness is converted into numerical values using the gradient of the curve as index.

**Definition:** It calculates the relation between cuff pressure and arterial volume from cuff pressure data, and approximate it to an arctangent function ( $A \cdot \arctan(B \cdot X + C) + D$ ).  $API = 1/B$

**Characteristics:** Reportedly, API represents the condition of peripheral (upper arm) artery, and the value of API increases by aging and arteriosclerosis.



**Onset of arteriosclerosis has been rapidly increasing in areas affected by the Great East Japan Earthquake  
PASESA has been useful in physical examinations for detecting economy-class syndrome (deep vein thrombosis)**

**63rd JAMT Congress 2014 Luncheon Seminar May 18 2014**

“Arteriosclerosis among victims of the Great East Japan Earthquake: a possible new method for detecting arteriosclerotic disease”

by Kazuhiko Hanzawa, MD, PhD, Division of Thoracic and Cardiovascular Surgery, Niigata University Graduate School of Medical and Dental Sciences

**“According to the measurement results by PASESA, people living in temporary housings where they have easier access to medical facilities are in better physical condition.”**



63rd JAMT  
NIGATA 2014  
ランチョンセミナー 14  
**Luncheon Seminar 14**

日時 5月18日(日) 12:15-13:05

会場 第2会場 朱鷺メッセ 4F 国際会議室 (マリンホール)  
〒950-0078 新潟市中央区万代 6-1

**東日本大震災被災者の動脈硬化：  
新たな動脈硬化検査の可能性**

動脈硬化の  
新指標  
API & AVI

演者 榛沢 和彦 先生  
新潟大学大学院医歯学総合研究科呼吸循環外科学分野 (第二外科)

座長 渡邊 博昭 先生  
J A新潟県厚生連水原郷病院検査科

●本セミナーは整理券制となります。  
配布日時 5月18日(日) 8:00~10:30  
配布場所 朱鷺メッセ 2F アトリウム

# PASESA Printed report of detailed measurement result (A4)

For doctors

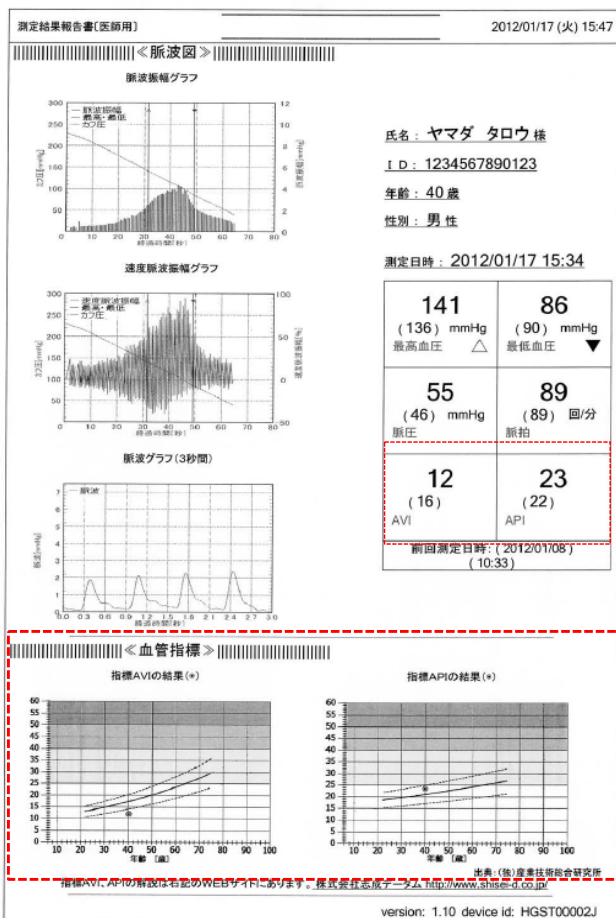
For examinees

Pulse wave amplitude graph

Velocity pulse wave graph

Pulse wave graph (Pulse wave chart)

Blood vessel index reference value graph

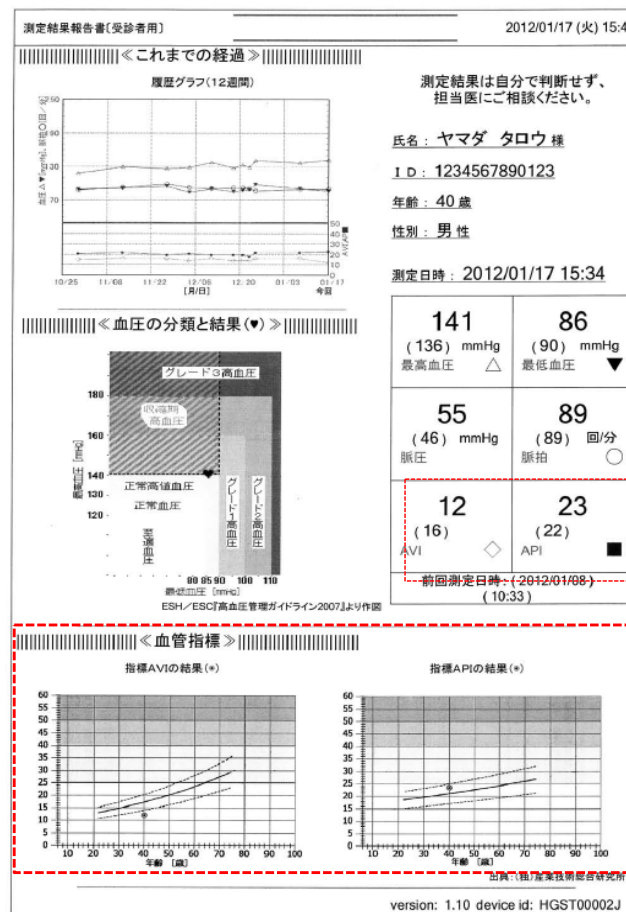


History graph

Blood pressure Pulse

AVI / API

Categories of blood pressure



# About RIKEN



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## Introduction

RIKEN is Japan's largest and most comprehensive research organization for basic and applied science and a world leader in a diverse array of scientific disciplines.

For nearly a century since its foundation in 1917, RIKEN has fostered pioneering, innovative research in fields spanning the entire range of the natural sciences, from developmental biology and neuroscience to quantum physics and computer science.



The K computer at RIKEN Kobe campus

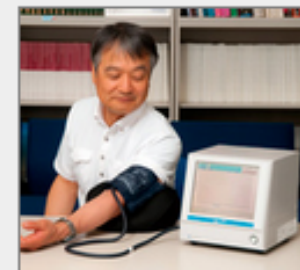
Today, RIKEN encompasses a network of world-class research centers across Japan, with main campuses in Wako, Tsukuba, Yokohama, Kobe and Harima offering state-of-the-art facilities that rank among the best in the world. This high-quality, high-performance research environment, combined with a uniquely bottom-up approach to scientific innovation, has enabled RIKEN to foster an environment in which researchers are able to thrive.

<http://www.riken.jp/en/outreach/transfer/products/>

### PASESA Blood Pressure Monitor

Laboratory: Organ and Body Scale Team

Company: Shisei datum



This device, which has received approval for sale in Japan, measures blood pressure, heart rate, and pulse pressure, while simultaneously displaying the condition of central arteries near the heart (AVI) and the stiffness of peripheral blood vessels (API). The AVI index was developed by RIKEN and Shisei datum, a private-sector company, based on new principles. The index is derived from an analysis of the pulse wave generated by conventional electronic blood pressure monitors, and can be used for the following purposes:

1. Disease management, prevention, and analysis of treatment results in patients with diabetes, kidney disease, and lifestyle-related diseases
2. Monitoring of circulatory disorders in children with Kawasaki disease and other disorders
3. Checkups for lifestyle related diseases at medical facilities for healthy individuals

The PASESA blood pressure monitor has been installed or is being considered mainly in university hospitals, public health centers, and fitness clubs. It offers the following benefits in comparison to previous devices that required that the patient be in a supine position when measuring the stiffness of blood vessels.

1. Can be used by anyone just like a conventional blood pressure monitor. It can be used for patients in wheelchairs, and in very old as well as very young patients.
2. It provides a highly sensitive index for intervention (treatment)
3. The technology can be easily adopted to home-use monitors.
4. Can measure both central artery and upper arm (peripheral) arteries separately with just one cuff.
5. Can simultaneously measure blood pressure, heart rate, and pulse pressure.