The study has a proven track record in its performance. The evidence provided in the study led to the development of the reference value of 135/85 mmHg.

A total of 292 scientific papers have been published that reference the Ohasama Study. (as of March 2016) Many facts that could not be found only through examinations and consultations in a doctor’s office have been updating conventional knowledge in medicine.

By using home blood pressure monitoring, the Ohasama Study endeavors to raise the residents’ health awareness while identifying blood pressure variation trends that would not be revealed simply by examinations and consultations in clinics. To identify trends, doctors compare three types of monitoring data, including blood pressure measurements taken at home, in a doctor’s office, as well as ambulatory blood pressure (ABP). Among the many findings, the most significant has been the fact that home blood pressure is more strongly correlated with the development of risk for stroke and brain infarction, and demonstrates higher prognostic accuracy for cardiovascular death and overall mortality than office blood pressure measurements.

Home blood pressure measurement has a stronger predictive power for cardiovascular mortality.

![Graph showing SBP and overall mortality risk](image1)

When comparing home blood pressure with office blood pressure by applying them to Cox’s proportional hazards model as continuous variables, it revealed that the average of multiple (taken more than three times) home systolic blood pressure values (Multiple home) was most strongly related to cardiovascular mortality risk. Furthermore, it has turned out that the average of the first two home blood pressure values (Initial home) is also more strongly related to the mortality risk than the office blood pressure values (Screening).

A morning home systolic blood pressure of 135 mmHg or higher demonstrably increased the risk of ischemic stroke. Also, for the office blood pressure, there was a tendency toward increased risk as systolic blood pressure level rises, but it was not significant.

The first evidence revealing home BP and risk of stroke.

![Graph showing RH for different BP measurements](image2)

In the study, the relative hazard of death was evaluated for each home blood pressure value. The results showed that the hazard ratio for the highest mortality rate due to hypertension was 1.7. According to this result, the home systolic and diastolic blood pressure levels calculated when the hazard ratio becomes 1.7, which are 137 mmHg and 84 mmHg respectively, were defined as reference values and blood pressure levels higher than these were defined as hypertensive. The scientific paper on this definition influenced the AHA guidelines for blood pressure measurement, the ESH guidelines for blood pressure measurement at home, and the JSH guidelines for the management of hypertension.

The first proposal of reference values for home blood pressure measurement.

![Graph showing relative hazards for different BP levels](image3)

<table>
<thead>
<tr>
<th>SBP (mmHg)</th>
<th>Relative Hazards</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;136</td>
<td>1.00</td>
</tr>
<tr>
<td>≥137</td>
<td>1.70</td>
</tr>
<tr>
<td>66-83</td>
<td>1.00</td>
</tr>
<tr>
<td>≥84</td>
<td>1.70</td>
</tr>
</tbody>
</table>

[Subjects] 1,913 Ohasama residents aged 40 or over
[Method] Prospective cohort study, Results were adjusted for age, sex, and antihypertensive treatment. Mean follow-up period was 5 years.

The study influenced hypertension guidelines.

Home blood pressure measurement is a better predictor of the risk of stroke.

![Graph showing RH for different BP measurements](image4)

When comparing home blood pressure with office blood pressure values, the results of this study revealed that the average of home blood pressure values (Home BP measurement) was significantly higher than the office blood pressure values (Office BP) for both morning and afternoon measurements.

<table>
<thead>
<tr>
<th>BP Measurement</th>
<th>RH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Morning</td>
<td>1.00</td>
</tr>
<tr>
<td>Afternoon</td>
<td>1.00</td>
</tr>
</tbody>
</table>

[Subjects] 1,793 Ohasama residents aged 40 or over
[Method] Prospective cohort study. Results were adjusted for age, sex, smoking status, history of cardiovascular disease, and use of antihypertensive medication. Mean follow-up period was 6.6 years.

The first evidence of home and office BP.

<table>
<thead>
<tr>
<th>BP Measurement</th>
<th>RH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average values taken more than three</td>
<td>1.00</td>
</tr>
<tr>
<td>Average values taken</td>
<td>1.00</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SBP</th>
<th>Overall mortality risk</th>
<th>Cardiovascular mortality risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>135</td>
<td>0.50</td>
<td>0.49</td>
</tr>
<tr>
<td>137</td>
<td>0.75</td>
<td>0.61</td>
</tr>
</tbody>
</table>

Chikuo T et al, J Hypertens. 1998;16:971-975

[Subjects] 1,789 Ohasama residents aged 40 or over
[Method] Prospective cohort study. Results were adjusted for age, sex, smoking status, history of cardiovascular disease, and the use of antihypertensive medication. Mean follow-up period was 6.6 years.


[Subjects] 1,722 Ohasama residents aged 40 or over
[Method] Prospective cohort study. Results were adjusted for age, sex, smoking status, history of heart disease, diabetes, and hypercholesterolemia Mean follow-up period was 10.8 years.
The Story of the Ohasama Study

The study also revealed that various lifestyle habits including diet, alcohol intake, and smoking affect blood pressure.

Some participants have found that their morning blood pressure values are usually higher than their evening values, and others see large day-to-day changes in blood pressure. The early recognition of such signs and symptoms can be detected only by home blood pressure monitoring allowed for early treatment, helping many people successfully maintain their health. In recent years, numerous papers revealing new evidence have been published and attract our attention with information such as “High fruit intake is strongly associated with a lower risk of future hypertension”, “Heavy drinkers show elevated blood pressure in early-morning hours and daytime” and “Environmental tobacco smoke exposure in the workplace or at home raises blood pressure in non-smokers”.

Daily alcohol intake raises the morning/daytime blood pressure.

Two-hour moving average of blood pressure (2h-BP) was significantly higher in heavy drinkers, those who consume 180mL of alcohol (equal to 22g of pure alcohol) or more daily, than in nondrinkers, and daytime BP levels remained high. This suggests that large habitual alcohol intake may contribute to high morning/daytime BP.

The comparison in fruit intake between the high intake group and the moderate intake group demonstrated that the high intake group has a lower risk of the onset of hypertension than the moderate intake group by 60%. This result is particularly pronounced in subjects with a BMI of 25 kg/m² or more.

Morning home SBP in environmental tobacco smoke (ETS) exposure at work/other was significantly higher, by approximately 4 mmHg, than that in non-ETS. Also, morning home SBP in ETS exposure at home was significantly higher, by approximately 3 mmHg, than that in non-ETS.

Morning home SBP in environmental tobacco smoke (ETS) exposure at work/other was significantly higher, by approximately 4 mmHg, than that in non-ETS. Also, morning home SBP in ETS exposure at home was significantly higher, by approximately 3 mmHg, than that in non-ETS.
The standard in Japan has set the precedent for the global standard. Globally-accepted study outcome.

Adopted by health organizations including the WHO and academic societies, the reference value of “135/85 mmHg” continues to gain acceptance internationally.

Now well-known outside of Japan as well, the findings of the Ohasama Study, which have been continuously disseminated from the small town in the Tokushima District, are highly regarded by medical and health experts worldwide. The world’s first large-scale general population study centering on home blood pressure monitoring influenced guidelines in the US and Europe. The guidelines of the Joint National Committee (JNC) of the USA in 1987, the WHO/ISH hypertension guidelines in 1999, the ESH/ESC guidelines in 2003 and 2007, and the Japanese Society of Hypertension (JSH) in 2004 and 2009 adopted 135/85 mmHg as the reference value in defining hypertension based on home blood pressure monitoring and ambulatory blood pressure monitoring in the Ohasama Study.

Ohasama has become a common global term in the medical world. Messages from key opinion leaders (1)

These days, clinical and epidemiological studies using home blood pressure monitoring, which was pioneered by the Ohasama Study, are conducted at the forefront of medicine around the world. The major examples include the Didima Study in Greece, the FAMELA Study in Italy, FINN-Home Study in Finland, and the Belgian Population Study. Regardless of nationality, all people in the world share a desire to be healthy. We have received enthusiastic messages of support for the “Ohasama Study” from the world’s key opinion leaders who have conducted various studies using home blood pressure monitoring.

“Scientific achievements of the Ohasama Study”

As blood pressure readings markedly vary depending on measurement, psychological, and physical conditions, it is difficult to determine which measurements should be adopted as criteria. The issue that had already been raised at WHO conferences regarding blood pressure held in Geneva in the 1970s, which the author often attended, still remains unsolved. By whom and under what conditions should blood pressure be measured? According to studies on blood pressure measurement performed on a large number of subjects using a mercury sphygmomanometer in various regions of the world, the final digit of the measured values was zero in most cases, e.g., 149/90 mmHg. For this reason, the necessity of the development and promotion of an automated sphygmomanometer, which provides objective measurements, was pointed out at the conferences. Attention should be paid to these points when discussing the prevalence of hypertension and percentage of normal blood pressure.

Japan has been the world’s leader in the development and promotion of instruments for the measurement of blood pressure. I have had a deep respect for Professor Yutaka Imai, a leading expert in the field, and been interested in his group’s Ohasama Study. Research involving community residents and medical institutions requires more effort and adequate preparations, compared to clinical studies, since their understanding and cooperation based on mutual trust - the foundation of preventive medicine and medical care, are essential. Professor Imai and his research group deserve to be praised for their research achievements over a long period of time. Finally, the Division of Blood Pressure at Home (chairperson: Professor Yutaka Imai) of the Japanese Society of Hypertension has published the “Guidelines for Self-monitoring of Blood Pressure at Home” (second edition: September 2011).

“The largest and most influential population study”

In 1986, Professor Yutaka Imai had the vision to start the Ohasama Study, which to date remains the largest and most influential population study on self-measured blood pressure at home. A team of Japanese investigators led by Professor Imai’s study were the first to demonstrate that blood pressure self-monitoring offers several well-recognized advantages of the more complex approach of ambulatory monitoring and that home blood pressure is a more accurate predictor of outcome than office blood pressure. In a large number of publications in top-ranking journals, the Ohasama investigators proposed and refined diagnostic thresholds for home blood pressure and carefully defined the modalities for its use in clinical practice. The work of Professor Imai and his team inspired many subsequent studies on the classification of high blood pressure into white-coat, masked, and sustained hypertension and on blood pressure variability as a potential cardiovascular risk factor. The Ohasama results importantly informed current guidelines on blood pressure measurement and led to the first trial ever, also coordinated by Professor Imai, of antihypertensive drugs guided by home blood pressure. Ohasama will continue to generate exciting results in the foreseeable future and has already entered textbooks as a landmark study.