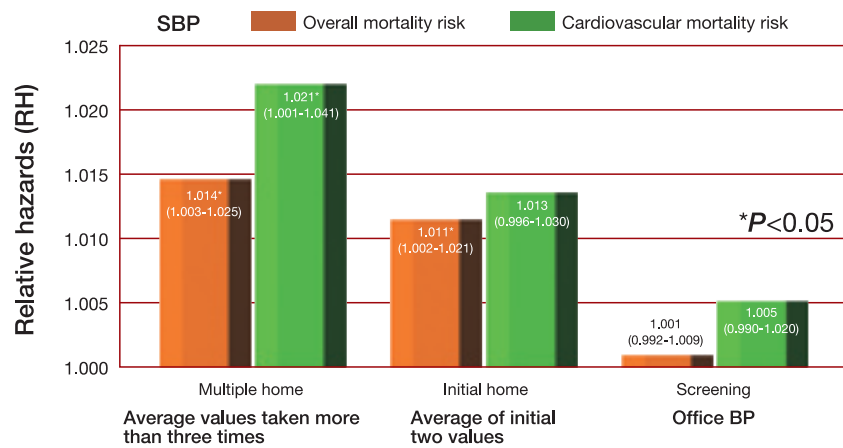


The study has a proven track record in its performance. The evidence provided in the study led to the development of the reference value of 135/85 mmHg.

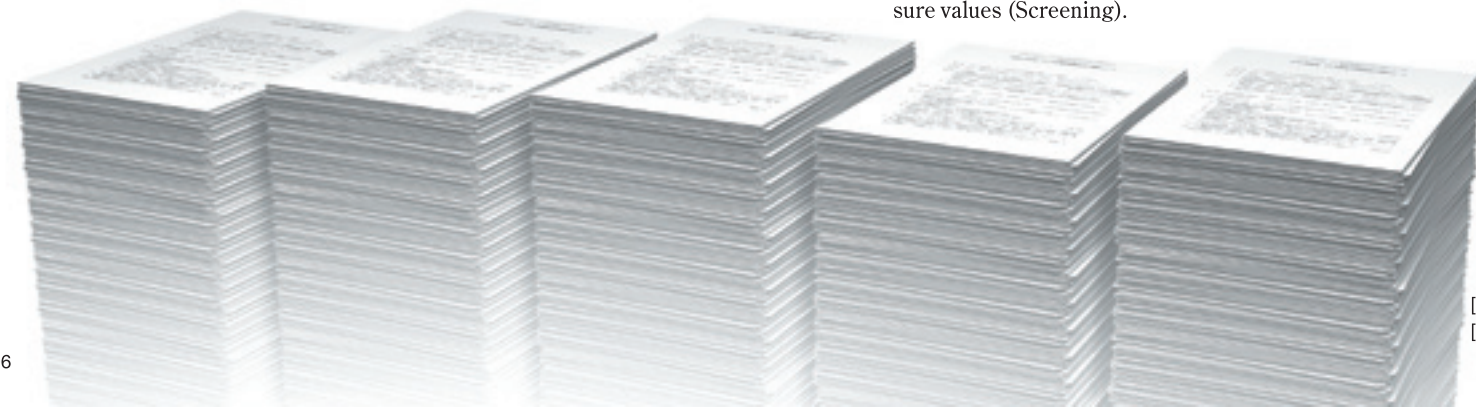
A total of 292 scientific papers have been published that reference the Ohasama Study. (as of March 2010)
 Many facts that could not be found only through examinations and consultations in a doctor's office have been upsetting conventional knowledge in medicine.

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.



[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.



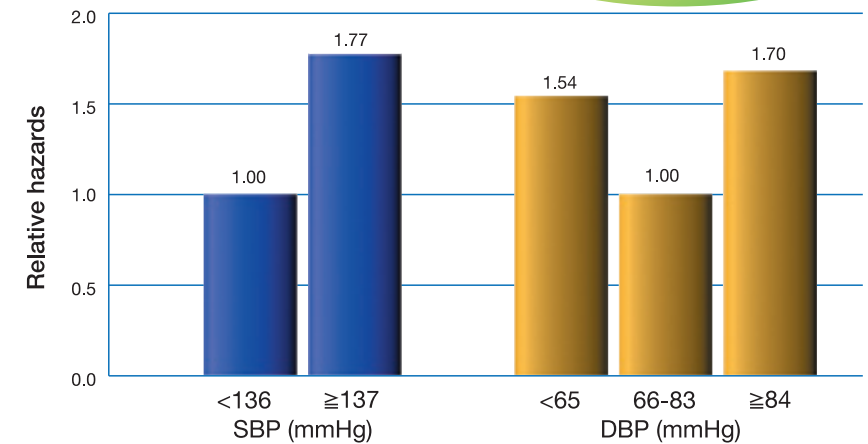
The first evidence of home and office BP.

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).

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

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 study influenced hypertension guidelines.

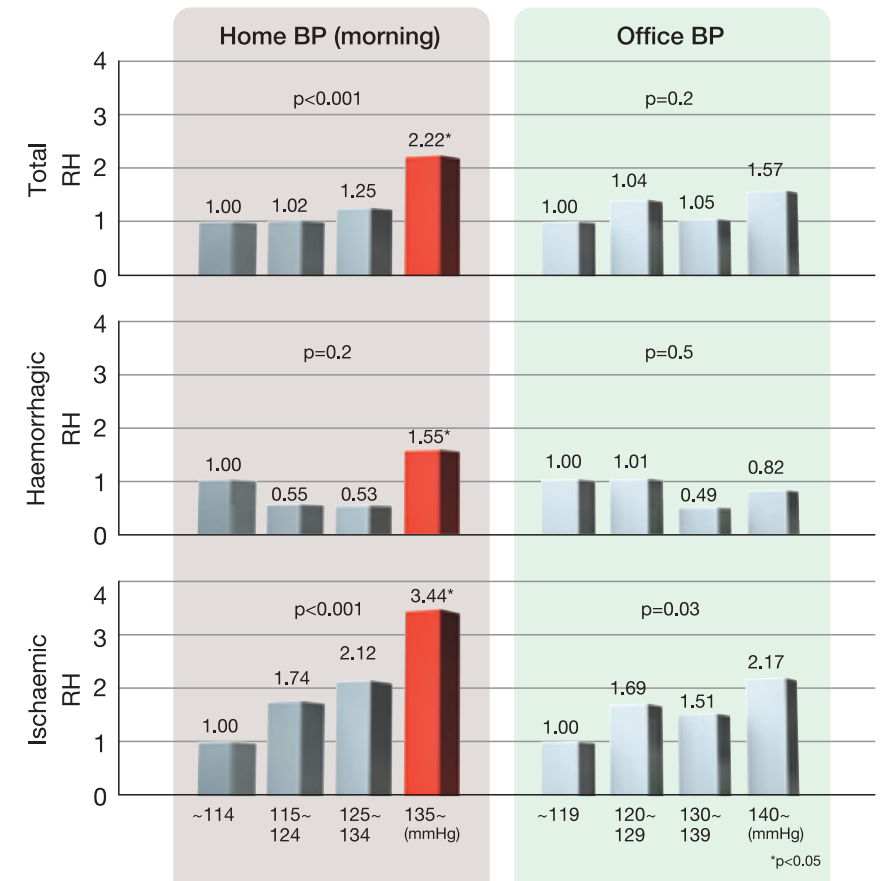


Tsuji I et al.1997; Am J Hypertens, 10:409-418
 [Subjects] 1,913 Ohasama residents aged 40 or over
 [Method] Prospective cohort study. Results were adjusted for age, sex, and antihypertensive treatment. Mean follow-up period was 5 years.

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

A morning home systolic blood pressure of 135 mmHg or higher demonstrably increased the risk of ischaemic 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.



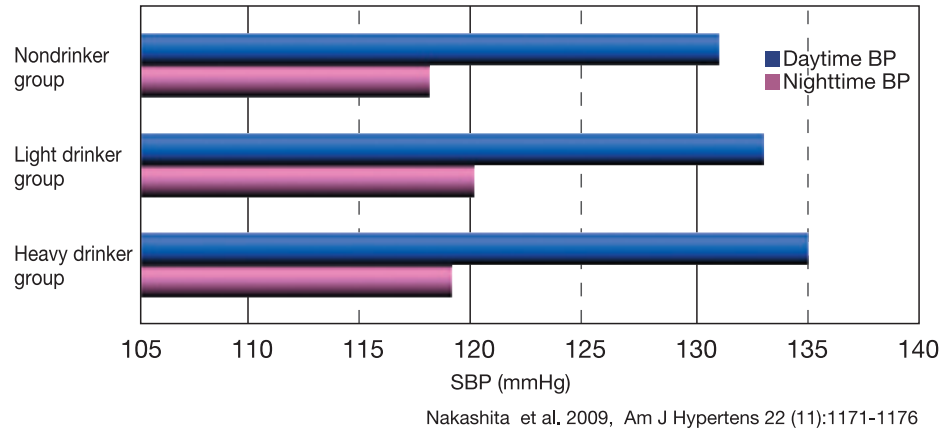
[Subjects] 1,702 Ohasama residents aged 40 or over
 [Method] Prospective cohort study. Results were adjusted for age, sex, smoking status, the use of antihypertensive medication, history of heart disease, diabetes, and hypercholesterolemia. Mean follow-up period was 10.6 years.

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 that 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 home hypertension”, “Heavy drinkers show elevated blood pressure in early-morning hours and daytime” and “Environmental tobacco smoke exposure in the work place or at home raises blood pressure in non-smokers”.

Daily alcohol intake raises the morning/daytime blood pressure.

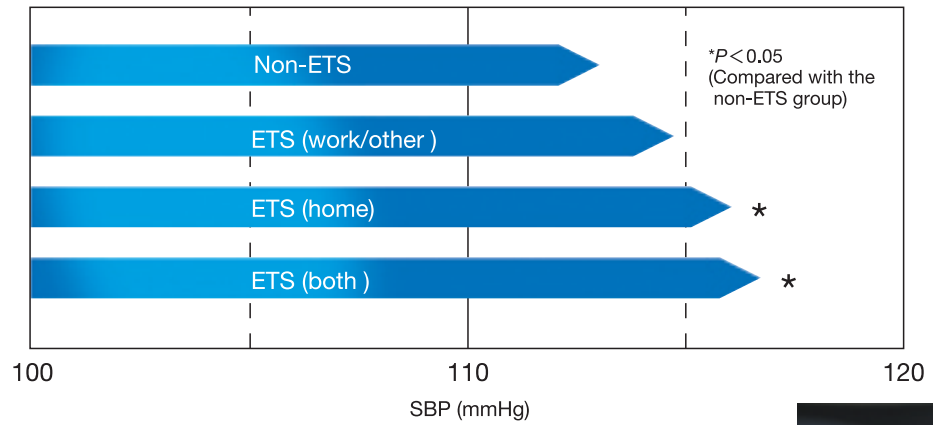
Two-hour moving average of blood pressure (2h-BP) was significantly higher in heavy drinkers, those who consume 180ml of alcohol (equal to 22g of pure alcohol) or more daily, than in nondrinkers, and daytime BP levels remained high. This suggests that large habitual alcohol intake may contribute to high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



[Subjects] 194 male Ohasama residents who answered the “Questionnaire Survey on Lifestyle Habits and Health” and measured their ABP (Average age: 66.9)
 [Method] Subjects were divided into nondrinker and drinker groups; the drinker group was further divided into light (alcohol intake per day: below 180 ml) and heavy drinker groups (alcohol intake per day: 180 ml or more). The correlation between drinking habits and diurnal variation in BP was evaluated using multivariable analysis after correction for confounding factors such as salt intake.



Passive smoking raises blood pressure even among nonsmokers.



Seki M et al, J Hypertens, 2010; 28, 1814-1820

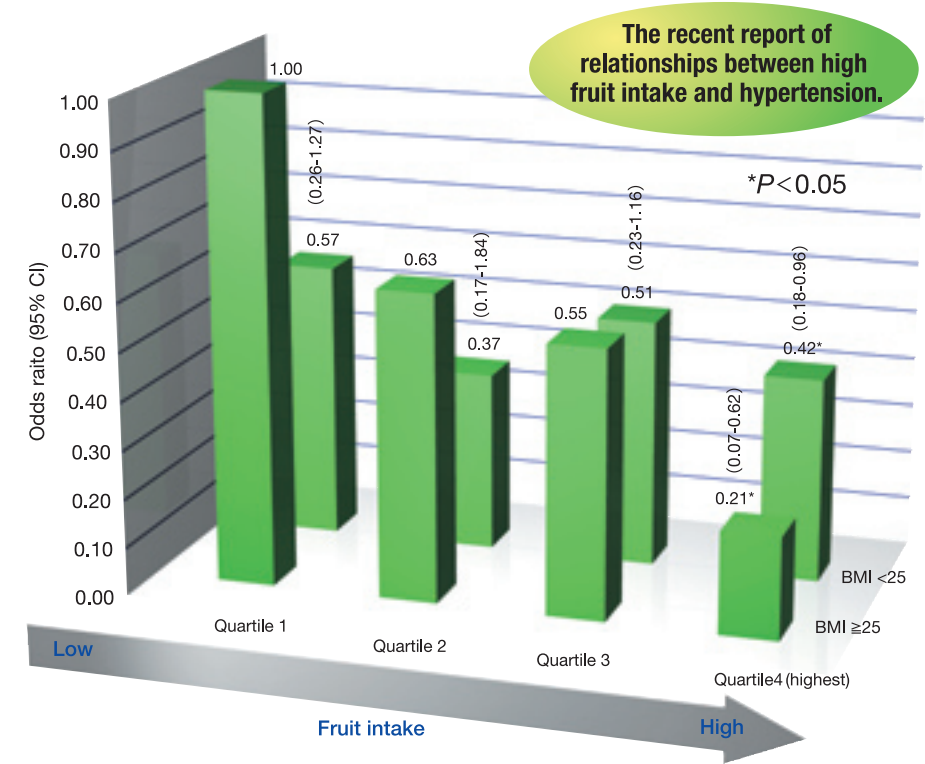
[Subjects] 579 Ohasama female residents aged 35 or over with no smoking history
 [Method] Mean values of home BP values of three days or more were separated into four categories: unexposed women [non-ETS], women exposed at home [ETS(home)], at the workplace/other places [ETS(work/other)], and at home and at the workplace/other places [ETS(both)], and the variables were compared.



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.

High fruit intake is associated with a lower risk of future hypertension.

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.



[Subjects] 745 Ohasama residents aged 35 or over

[Method] Fruit and vegetable intake was calculated based on the results of a questionnaire survey consisting of 141 items. Subjects were divided into quartiles according to the fruit intake; the odds ratio between fruit intake and onset of hypertension for each group was obtained through multivariable logistic regression analysis using the first quartile (low intake group) as a reference group. Results were adjusted for sex, age, smoking status, alcohol consumption, frequency of exercise, BMI, energy-adjusted fat and sodium consumption, baseline systolic home BP and history of diabetes, hypercholesterolaemia and cardiovascular disease. Mean follow-up period was 4.1 years.

Tsuboda-Utsugi et al, 2011, J Hum Hypertens, 25, 164-171

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 Tohoku 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 1997, 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.

