Maximum or Mean: That Is the Question

To the Editor:

Recently, Matsui et al. suggested that maximum home systolic blood pressure (SBP) might enhance the predictive value of mean SBP in relation to hypertensive target organ damage in the heart and arteries. However, the data presented do not wholly substantiate the conclusions of Matsui et al. First, because of the collinearity problem between maximum and mean SBP, the results for the total population in Table 3 of their study should have been omitted. Second, the reader is also left without any information on the contribution of maximum SBP in explaining the variance in left ventricular mass index and carotid intima-media thickness, because in their Table 3 only the whole-model information on the contribution of maximum SBP in explaining the variance in left ventricular mass index and carotid intima-media thickness, because in their Table 3 only the whole-model $R^2$ was given. Third, because of the cross-sectional design and the use of intermediate signs of target organ damage, we suggest that the term “prediction,” as used, for instance, in the conclusion of their Abstract, is inappropriate. Finally, the maximum morning SBP was recorded during the first 3 days in more than one third of the patients studied by Matsui et al. We find it counterintuitive that a measurement obtained within 3 days of self-measurement at home would be more closely associated with target organ damage than the mean level of blood pressure recorded over 14 days.

In trying to replicate the observations of Matsui et al., we evaluated whether, in 2354 Ohasama participants followed up for 12.1 years (median), maximum home SBP (single measurements in the morning for ≤28 days) predicted cardiovascular mortality (144 deaths). In multivariable-adjusted Cox regression, the standardized hazard ratios associated with the maximum and mean home SBP at home were 1.30 (95% CI: 1.08 to 1.57; $P=0.006$) and 1.28 (95% CI: 1.08 to 1.53; $P=0.006$), respectively. The correlation coefficient between maximum and mean SBP was 0.91 ($P<0.001$). Adding maximum home SBP, therefore, did not improve a Cox model that included mean SBP, as indicated by the likelihood ratio test (likelihood ratio: 0.49; $P=0.48$) and vice versa (likelihood ratio: 0.46; $P=0.50$). In conclusion, we do not believe that the results from Matsui et al. overrule the current recommendations to measure the home blood pressure over ≥7 days and to use the mean level for risk stratification.

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Disclosures

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Kei Asayama

Studies Coordinating Centre

Division of Hypertension and Cardiovascular Rehabilitation

Department of Cardiovascular Diseases

University of Leuven

Leuven, Belgium

Department of Planning for Drug Development and Clinical Evaluation

Tohoku University Graduate School of Pharmaceutical Sciences

Sendai, Japan

Takayoshi Ohkubo

Department of Planning for Drug Development and Clinical Evaluation

Tohoku University Graduate School of Pharmaceutical Sciences

Sendai, Japan

Masahiro Kikuya

Department of Planning for Drug Development and Clinical Evaluation

Tohoku University Graduate School of Pharmaceutical Sciences

Sendai, Japan

Jan A. Staessen

Studies Coordinating Centre

Division of Hypertension and Cardiovascular Rehabilitation

Department of Cardiovascular Diseases

University of Leuven

Leuven, Belgium

Lutgarde Thijs

Studies Coordinating Centre

Division of Hypertension and Cardiovascular Rehabilitation

Department of Cardiovascular Diseases

University of Leuven

Leuven, Belgium

Otsu, Japan

Maastricht, the Netherlands

Shiga University of Medical Science

Department of Health Science

Department of Epidemiology

Maastricht University

Maastricht, the Netherlands

Takayoshi Ohkubo

Department of Planning for Drug Development and Clinical Evaluation

Tohoku University Graduate School of Pharmaceutical Sciences

Sendai, Japan

Masahiro Kikuya

Department of Planning for Drug Development and Clinical Evaluation

Tohoku University Graduate School of Pharmaceutical Sciences

Sendai, Japan

Jan A. Staessen

Studies Coordinating Centre

Division of Hypertension and Cardiovascular Rehabilitation

Department of Cardiovascular Diseases

University of Leuven

Leuven, Belgium

Lutgarde Thijs

Studies Coordinating Centre

Division of Hypertension and Cardiovascular Rehabilitation

Department of Cardiovascular Diseases

University of Leuven

Leuven, Belgium

Masahiro Kikuya

Department of Planning for Drug Development and Clinical Evaluation

Tohoku University Graduate School of Pharmaceutical Sciences

Sendai, Japan

Jan A. Staessen

Studies Coordinating Centre

Division of Hypertension and Cardiovascular Rehabilitation

Department of Cardiovascular Diseases

University of Leuven

Leuven, Belgium

Lutgarde Thijs

Studies Coordinating Centre

Division of Hypertension and Cardiovascular Rehabilitation

Department of Cardiovascular Diseases

University of Leuven

Leuven, Belgium

Maastricht University

Maastricht, the Netherlands

Shiga University of Medical Science

Department of Health Science

Department of Epidemiology

Maastricht University

Maastricht, the Netherlands

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Yutaka Imai
Department of Planning for Drug Development and Clinical Evaluation
Tohoku University Graduate School of Pharmaceutical Sciences
Sendai, Japan


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Kei Asayama, Takayoshi Ohkubo, Lutgarde Thijs, Masahiro Kikuya, Jan A. Staessen and Yutaka Imai

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