For the cross-sectional measurement, the minimum diameter was decided based on the diameter of the MAB if the LIB was not circular. The peak systolic velocity for the carotid artery came from the standard method of measuring velocities around the carotid stenosis.

Stroke is the fourth cause of death in the United States and the second cause of death in the world. Approximately 25% of ischemic strokes are caused by debris from carotid artery plaque. Doppler ultrasound (US) is used widely today in screening the severity of carotid artery stenosis. Duplex Doppler is the most common method of measuring the severity of the stenosis from velocity measurements such as peak systolic velocities (PSV) around stenosis. An alternative method is to measure the minimum diameter of the stenosed artery as determined by looking at 2D US B-mode images.

Doppler B-mode images are sometimes difficult to segment. For one patient, the internal and external carotid LIB were segmented together due to the plaque being close to the bifurcation from the common carotid. Gray-scale interpretation is descriptive and observer based. Intra-observer variability is not accounted for in this project. There was variability of PSV with the smaller diameters.

A total of 10 patients with an average age of 68 and asymptomatic carotid stenosis were examined. An Ultrasonix MDP with 9-4 linear array was used for the examinations. Lumen-intima boundary (LIB) and media-adventitia boundary (MAB) were outlined on B-mode Doppler images in Stradwin 4.5 with the help of color and power Doppler images. The measurement function was used to determine the minimum diameter for all the B-mode images.