Objective. This study was developed to obtain tissue dielectric constant (TDC) reference values in healthy individuals as a first step to further aid in the early detection of lower extremity edema due to congestive heart failure.

Background. In the US about 550,000 new cases of CHF occur per year often with lower extremity edema. Once edema is visually observed the causative process is usually well established. However, there is no method that can conveniently detect the early and potentially insidious changes in fluid content of these regions.

Methods. For this study skin tissue dielectric constant (TDC) was measured at 300MHz as a direct index of skin tissue water at arm, hand, lower leg and foot bilaterally in self-reported healthy persons of various ages. Parameter indicators were the ratio of the lower extremity to upper extremity TDC value. These included foot dorsum/forearm (FF), foot dorsum/hand (FH), medial leg/hand (LH) and medial leg/forearm (LF).

Results. A total of 44 subjects encompassing 88 ratios for each parameter have been evaluated to tissue depths of 0.5 mm and 2.5 mm. Results for participants who were under age 30 showed that the FF ratio determined for a depth of 2.5 mm was 1.003 ± 0.146 (mean ±SD).

Conclusion. Present findings suggest that using a 2SD threshold and based on the under 30 data, a measured FF ratio greater than 1.300 in an individual would be taken as an indication of the presence of lower extremity edema. This threshold may subsequently be refined pending further data.