At present, most commercial electron beam calculation algorithms are based on slab type geometry computations as described by Hogstron, Mills and Almond (PMB, 1981 pg 445), Depth dose corrects for electron loss, secondary buildup, energy straggling, and fluence buildup, and is scaled according to the cumulative stopping power ratio to water. The fluence buildup and other factors are also a function of scattering power, which has a strong atomic number dependence unlike stopping power. Because of path length difference due to electron scattering in non-water media, the water depth dose distributions do not scale correctly according to stopping power. The absolute value for the maximum dose can also be different in non water media. In this work a path length correction for electron beam dose distributions is described. The angular variance at depth is calculated according to the electron loss model described by Sandison (PMB 1990, pg 971). An exact path length correction for each thin slab encountered can now be determined. The dose distribution for water is converted to a planar fluence distribution by dividing by path length, and the total path length is summed. When the pencil beam computation is done in heterogeneous media, the new angular variances are computed so proper dose weight can be restored by dividing the planar fluence, which is a function of cumulative path, with the path length correction.The lateral pencil beam spread is predicted for a given path length by scaling by the ratio of measured and Fermi-Eyges predicted lateral spread in water.