Weight gain during pregnancy is of great importance for the health of mother and child. There is considerable individual variability with regard to the weight gain, with maternal height and pre-pregnancy body weight being important determinants. We aim to assess the usefulness of the maternal body mass index (BMI) and other ways of combining maternal weight and height in predicting weight gain during pregnancy. We analyzed data of more than 2.2 million pregnancies taken from the German perinatal statistics of 1995-2000. We found that BMI is not useful as a predictor of weight gain during pregnancy. We developed an alternative system of using maternal weight and height to predict weight gain by classifying pregnant women according to their weight and height. This allows an assessment of weight gain by comparing a given pregnant woman to other women with similar weights and heights.