

# MSR176 Q-Squared as a Mapping Model Performance Metric in Gastrointestinal Disease

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## Objectives

Model performance in mapping studies is often assessed using metrics such as root mean square error (RMSE), mean squared error (MSE), and R-squared. Recently, the Q-squared statistic has been used as a test for prognostic accuracy, however to our knowledge, it has not been used in any study mapping between quality of life measures. We aimed to estimate Q-squared for a subset of published mapping algorithms and evaluate its usefulness and appropriateness as a metric for prediction accuracy and model performance.

## Methods

We used the HERC Database of Mapping Studies to review published data mapping patient-reported outcome measures instruments to EQ-5D and other target instruments in gastrointestinal disease (GID) populations. Data were extracted on study year, GID type, source and target instruments, RMSE, MSE, standard deviation [SD], mapping model, and model validation. We calculated Q-squared as either 1-RMSE/SD-squared or 1-MSE/SD-squared.

## Results

Among the included studies (n=9), none reported Q-squared. Seven studies reported appropriate metrics for manual calculation of Q-squared: 6 provided data on RMSE and SD, and one reported data on MSE and SD. Median Q-squared across included studies was 0.53 (interquartile range: 0.31). Q-squared was highest in studies applying ordinary least squared regression with a median Q-squared of 0.68 (range: 0.21, 0.95), and lowest in studies applying censored least absolute deviations with a median Q-squared of 0.33 (range: 0.11, 0.54). The highest Q-squared values were reported in studies mapping the EORTC QLQ-C30 to SF-6D (Q-squared=0.95) and EQ-5D (Q-squared=0.81). Q-squared values differed by validation method, with higher median values (0.53; range: 0.37, 0.72) observed in internal validation samples vs external validation samples (median Q-squared= 0.28; range: 0.11, 0.95).

## Conclusions

Incorporating Q-squared into future mapping studies could improve assessment of model performance given its ability to directly assess predictive accuracy, in a way that can be directly compared between samples and instruments.