Validity of a Study

**Related Question**

[Question 112](https://mksap17.acponline.org/app/groups/gm/questions/mk17_b_gm_q112)

Validity, or the trustworthiness of a study's results, can be threatened by many factors, including errors in sampling, measurement, and data analysis. Internal validity is the extent to which a study's results are true and supported by the study. External validity is the degree to which a study's findings are generalizable to other settings.

Study errors can be random or systematic. Random error, which is due to chance, can be reduced by increasing the sample size and measurement precision. Systematic error results from bias and influences the study findings in a certain direction. Systematic error cannot be improved by increasing the sample size; it must be addressed by eliminating bias. For example, a study randomizes two groups of patients with diabetes to receive a new medication that lowers blood glucose levels (intervention group) or a placebo (control group), with the study outcome being self-monitored blood glucose (SMBG) measurements. If it were found that most of the intervention group patients recorded fasting morning SMBG levels and most of the control group recorded SMBG levels following the evening meal, any overall differences in glycemic control between the two study groups would be biased by the systematic, between-group differences in SMBG monitoring. When designing studies, systematic error is minimized by ensuring that the comparison groups are sampled, measured, and analyzed in the same way.